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

Supporting documentation for the
conservation status assessment for the habitat:

H1110 - Sandbanks which are slightly covered by sea water all the time

UK OFFSHORE

IMPORTANT NOTE - PLEASE READ

- The information in this document is a UK offshore-level contribution to 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.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this habitat is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) for UK offshore are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; and/or (iii) the field was only relevant at UK-level (sections 10 Future prospects and 11 Conclusions).
- For technical reasons, the UK offshore-level future trends for Range, Area covered by habitat and Structure and functions are only available in a separate spreadsheet that contains all the UK offshore-level supporting information.
- The UK offshore-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.

Amendment

Section 11.4: Short-term trend of habitat area in good condition within the network: Direction (on page 6) was originally incorrectly documented in this assessment as Uncertain (U) for H1110 – Sandbanks which are slightly covered by sea water all the time. This section was updated on 24/05/2021 to display the correct Decreasing (-) trend for this habitat.

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 (Offshore information only)**
1.2 Habitat code	**1110 - Sandbanks which are slightly covered by sea water all the time**

2. Maps

2.1 Year or period	
2.3 Distribution map	Yes
2.3 Distribution map Method used	
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	Birchenough, S.N.R., Bremner, J., Henderson, P., Hinz, H.,Jenkins, S., Mieszkowska, N., Roberts, J.M., Kamenos, N.A.,and Plenty, S. (2013) Impacts of climate change on shallow and shelf subtidal habitats, MCCIP Science Review 2013,193-203, doi:10.14465/2013.arc20.193-203 Dinmore, T., Duplisea, D. E., Rackham, B. D., Maxwell, D. L. & Jennings, S. (2003). Impact of a large-scale area closure on patterns of fishing disturbance and the consequences for benthic communities. ICES Journal of Marine Science, 60, 371-380. Eastwood, P. D., Mills, C. M., Aldridge, J. N., Houghton, C. A. & Rogers, S. I. (2007). Human activities in UK offshore waters: an assessment of direct, physical pressure on the seafloor. ICES Journal of Marine Science, 64, 453-463. Foden, J., Rogers, S. I. & Jones, A. P. (2011). Human pressures on UK seafloor habitats: a cumulative impact assessment. Marine Ecology Progress Series, 428, 33-47. Foden, J., Rogers, S. I. & Jones, A. P. (2010). Recovery of UK seafloor habitats from benthic fishing and aggregate extraction - towards a cumulative impact assessment. Marine Ecology Progress Series, 411, 259-270. HM Government, 2012. Marine Strategy Part One: UK Initial Assessment and Good Environmental Status. Report No. PB13860. Jennings, S., Lee, J., & Hiddink, J. G. (2012). Assessing fishery footprints and trade-offs between landings value, habitat sensitivity, and fishing impacts to inform marine spatial planning and an ecosystem approach. ICES Journal of Marine Science, 1-11. JNCC, 2018. Habitats Directive Annex I: Sandbanks covered by seawater all the time. http://jncc.defra.gov.uk/page-6639 [Accessed July 2018] JNCC, 2017. Offshore benthic habitats monitoring options - Method paper 1: Risk assessment for offshore Marine Protected Areas and benthic habitats in UK, v.04 JNCC, 2015. Pressures-Activities Database. http://jncc.defra.gov.uk/default.aspx?page=7136 [Accessed 09/17] JNCC, 2013. European Community Directive on the Conservation of Natural Habitat sand of Wild Fauna and Flora (92/43/EEC) Supporting documentation for the Third Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2007 to December 2012 Conservation status assessment for Habitat:H1170 - Sandbanks which are slightly covered by sea

water all the time.
JNCC, 2011. Review of methods for mapping anthropogenic pressures in UK waters in support of the Marine Biodiversity Monitoring R&D Programme. Briefing paper to UKMMAS evdience groups. Presented 06/10/2011.
Kroncke, I. (2011) Changes in the Dogger Bank macrofauna communites in the 20th century caused by fishing and climate. Estuarine Coast. Shelf Sci., 94, 234-245.
MCCIP, 2017. Marine Climate Change Impacts: 10 years' experience of science to policy reporting. (Eds. Frost M, Baxter J, Buckley P, Dye S and Stoker B) Summary Report, MCCIP, Lowestoft, 12pp.doi: 10.14465/2017.arc10.000-arc.
MCCIP, 2013. Marine Climate Change Impacts Report Card 2013. http://www.mccip.org.uk/impacts-report-cards/full-report-cards/2013/
MCCIP, 2006. Annual Report Card. http://www.mccip.org.uk/impacts-report-cards/full-report-cards/2006/ [Accessed 09/17].
OSPAR Commission, 2017. OSPAR CEMP Guidelines. Common Indicator: BH3 Extent of Physical damage to predominant habitats. https://www.ospar.org/documents?v=37641
OSPAR Commission, 2009. Trend analysis of maritime human activities and their collective impact on the OSPAR maritime area. Biodiversity Series. Publication Number 443/2009.
Tillin, H. & Tyler-Walters, H., (2014): Assessing the sensitivity of subtidal sedimentary habitats to pressures associated with marine activities - Phase 1 Report, JNCC Report 512. http://jncc.defra.gov.uk/page-6790
Tillin, H.M., Hull, S.C. & Tyler-Walters, H., 2010. Development of a sensitivity matrix (pressures-MCZ/MPA features). Report to the Department of the Environment, Food and Rural Affairs from ABPmer, Southampton and the Marine Life Information Network (MarLIN) Plymouth: Marine Biological Association of the UK., Defra Contract no. MB0102 Task 3A, Report no. 22., London, 145 pp. <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=16368>
Tyler-Walters, H., Tillin, H.M., d'Avack, E.A.S., Perry, F., Stamp, T., 2018. Marine Evidence-based Sensitivity Assessment (MarESA) - A Guide. Marine Life Information Network (MarLIN). Marine Biological Association of the UK, Plymouth, pp.91

4. Range

4.1 Surface area (in km²)		
4.2 Short-term trend Period		
4.3 Short-term trend Direction		
4.4 Short-term trend Magnitude	a) Minimum	b) Maximum
4.5 Short-term trend Method used		
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)	
	b) Operator	
	c) Unknown	No
	d) Method	
4.11 Change and reason for change in surface area of range	No change	
	The change is mainly due to:	

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4.12 Additional information

5. Area covered by habitat

5.1 Year or period			
5.2 Surface area (in km²)	a) Minimum 17141	b) Maximum 17141	c) Best single value 17141
5.3 Type of estimate			
5.4 Surface area Method used			
5.5 Short-term trend Period			
5.6 Short-term trend Direction			
5.7 Short-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.8 Short-term trend Method used			
5.9 Long-term trend Period			
5.10 Long-term trend Direction			
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	No change The change is mainly due to:		
5.15 Additional information			

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km²)	Minimum 8260	Maximum 8260
	b) Area in not-good condition (km²)	Minimum 8865	Maximum 8865
	c) Area where condition is not known (km²)	Minimum 15	Maximum 15
6.2 Condition of habitat Method used	Based mainly on extrapolation from a limited amount of data		
6.3 Short-term trend of habitat area in good condition Period	2007-2018		
6.4 Short-term trend of habitat area in good condition Direction	Decreasing (-)		
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			

7. Main pressures and threats

7.1 Characterisation of pressures/threats

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Pressure	Ranking
Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats (G03)	H
Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species (G01)	H
Dumping/depositing of inert materials from terrestrial extraction (C06)	H

Threat	Ranking
Marine fish and shellfish harvesting (professional, recreational) activities causing physical loss and disturbance of seafloor habitats (G03)	H
Marine fish and shellfish harvesting (professional, recreational) causing reduction of species/prey populations and disturbance of species (G01)	H
Dumping/depositing of inert materials from terrestrial extraction (C06)	H
Wind, wave and tidal power, including infrastructure (D01)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	M
Change of habitat location, size, and / or quality due to climate change (N05)	M
Desynchronisation of biological / ecological processes due to climate change (N06)	M
Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change (N07)	M
Change of species distribution (natural newcomers) due to climate change (N08)	M

7.2 Sources of information

7.3 Additional information

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified, but none yet taken
8.2 Main purpose of the measures taken		
8.3 Location of the measures taken		
8.4 Response to the measures	Long-term results (after 2030)	
8.5 List of main conservation measures		

Management of professional/commercial fishing (including shellfish and seaweed harvesting) (CG01)
Adapt/manage renewable energy installation, facilities and operation (CC03)

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8.6 Additional information

9. Future prospects

9.1 Future prospects of parameters	a) Range b) Area c) Structure and functions
9.2 Additional information	

10. Conclusions

10.1. Range	
10.2. Area	
10.3. Specific structure and functions (incl. typical species)	
10.4. Future prospects	
10.5 Overall assessment of Conservation Status	
10.6 Overall trend in Conservation Status	
10.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
10.8 Additional information	

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

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km² in biogeographical/ marine region)	a) Minimum 16804 b) Maximum 16804 c) Best single value 16804
11.2 Type of estimate	
11.3 Surface area of the habitat type inside the network Method used	
11.4 Short-term trend of habitat area in good condition within the network Direction	Decreasing (-)
11.5 Short-term trend of habitat area in good condition within network Method used	Insufficient or no data available
11.6 Additional information	

12. Complementary information

12.1 Justification of % thresholds for trends	

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12.2 Other relevant information

Distribution Map

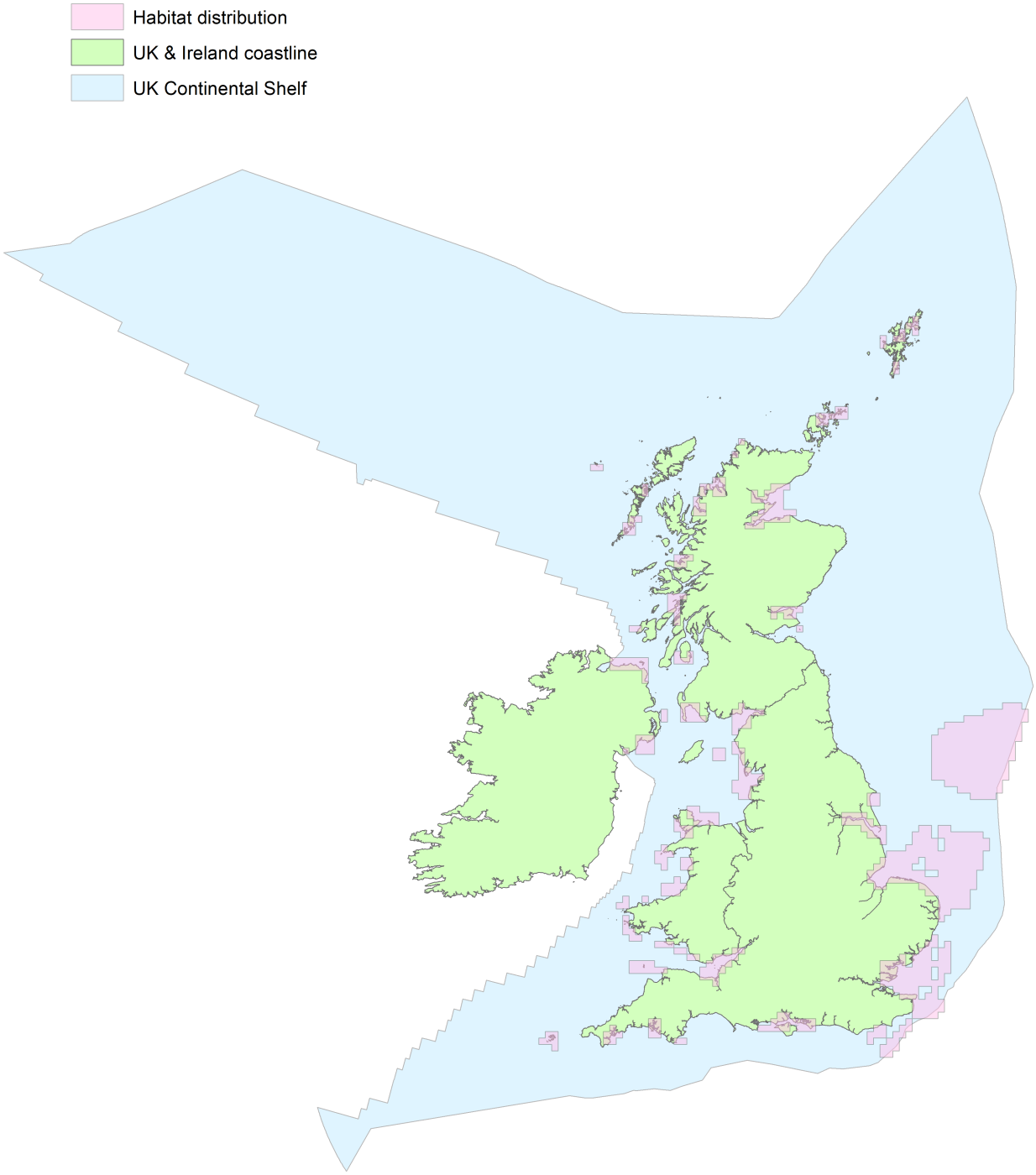

Figure 1: UK distribution map for H1110 - Sandbanks which are slightly covered by sea water all the time.

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

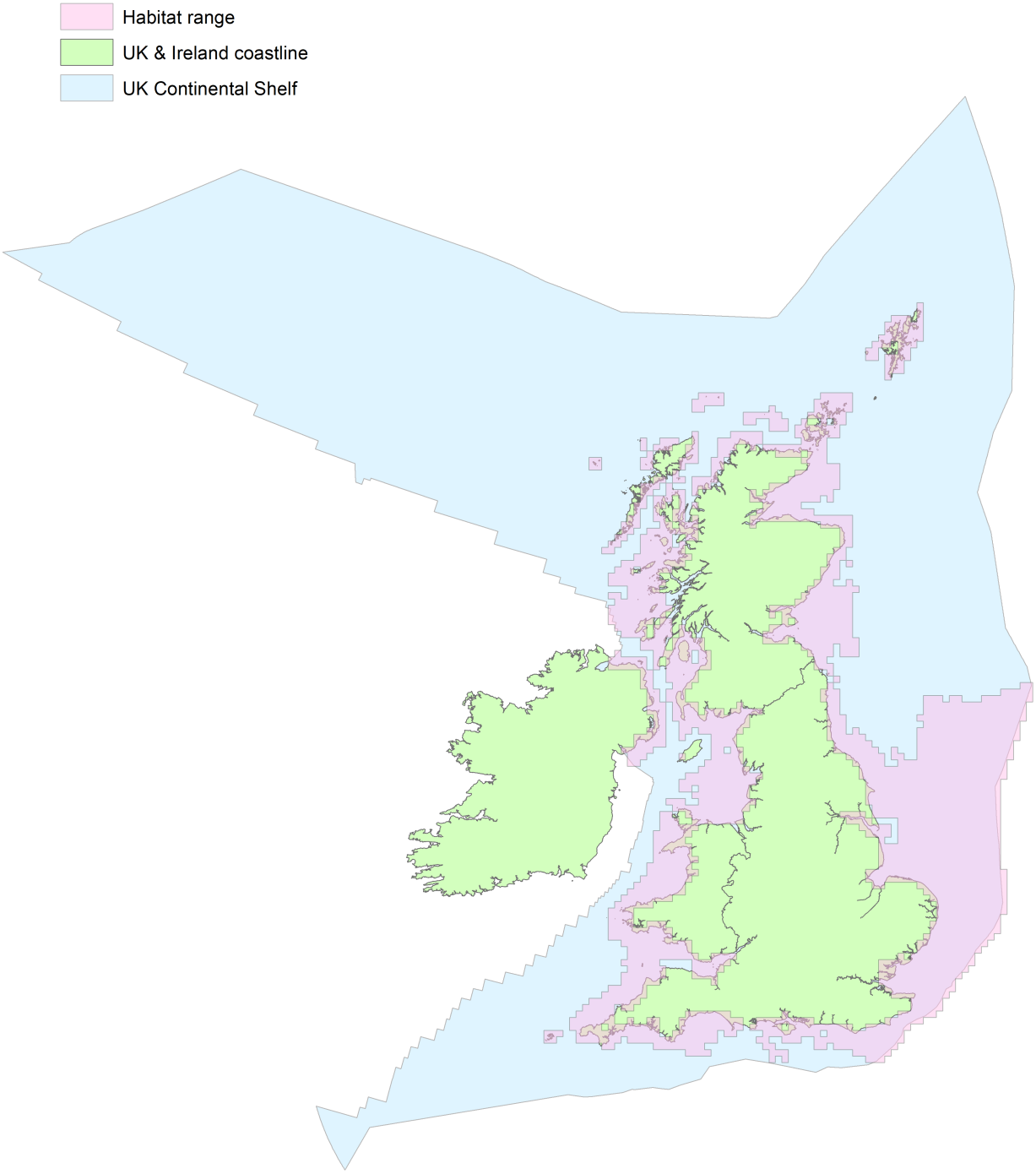

Figure 2: UK range map for H1110 - Sandbanks which are slightly covered by sea water all the time.

Range was calculated by JNCC using mapped surface area of the habitat in addition to the area of sloping sandy sediment habitat down to 60m and connected to a sandbank in less than 20m of water. The 60m limit is equivalent to the deepest known sandbank contour (found at Dogger Bank SAC). Mapped data of the habitat has been created by combining existing data (i.e. sandbanks already mapped within SACs) with an analysis of bathymetric depth, slope and aspect and sediment data across UK waters' and is based on current best available evidence (JNCC, 2018a).

Explanatory Notes

Habitat code: 1110 Region code: MATL

Field label	Note
6.1 Condition of habitat	See 6.2

6.2 Condition of habitat; Method used

Method Overview

The indicator 'Extent of Physical Damage to Predominant and Special Habitats (BH3)' (OSPAR Commission, 2017) was used to assess the area of the UK offshore (beyond 12nm) Annex I sandbanks. The method spatially combines different levels of fishing intensity pressure and habitat sensitivity ranges (resilience and resistance) to determine the distribution and degree of seafloor disturbance across the UK.

Physical disturbance of the seafloor by human activities such as bottom contact fishing, aggregate extraction or offshore construction can adversely affect benthic habitats. Previous studies have found that bottom trawling is known to be affecting a large area of the seafloor (Dinmore et al., 2003; Eastwood et al., 2007; Foden et al., 2010, 2011; JNCC, 2011; Jennings et al., 2012) so the assessment method currently focuses on this activity.

The Extent of Physical Damage indicator (BH3) uses two types of information: i) the distribution and sensitivity of habitats (resilience and resistance), and ii) information on the distribution and intensity of human activities and pressures that cause physical damage, such as mobile bottom gear fisheries, sediment extraction and offshore constructions, although only fisheries are covered in this assessment. These two sources of information (pressure and sensitivity) are combined to calculate the potential damage to a given seafloor habitat, and the trends across the six-year period.

Disturbance is assessed in 0.05 degree grid squares. The disturbance categories between 0 and 9 were grouped into two main groups: 0-4 and 5-9, to distinguish between low to moderate and moderate to high categories, and a qualitative threshold of moderate (middle value between these two groups) was selected as an MSFD qualitative indicator of Good Environmental Status for broadscale habitats. Disturbance categories 0-4 are used to report Section 6.1a 'area in good condition' and disturbance categories 5-9 are used to report 6.1b 'area in not good condition'. The UK Article 17 Report Management Group have agreed that the proportion of a habitat in 'good condition', reported in Section 6.1a, will be treated as equivalent to the proportion of habitat in favourable condition when drawing final conclusions in Section 10.

Data used

- Fishing pressure: ICES abrasion layers from 2013 to 2016 were used to map fishing pressure in the current reporting period.The specific version used was Version 1 of sr.2017.17, published 25 August 2017, https://doi.org/10.17895/ices.pub.2861
- Habitat sensitivity: The sensitivity of the sandbanks was derived from the sensitivity of all species that were recorded in the sandbank area and from the sensitivity of the broadscale habitats that constitute a sandbank (habitats: A5.1, A5.2, A5.3, A5.4, A5.5). Species point data was obtained from the Marine Recorder database and clipped to the Annex I offshore sandbank layer. The EUNIS level 3 broadscale habitat map was filtered for these constituent habitats and then clipped to the known Annex I offshore sandbank layer.
- Habitat map: A draft version of the Article 17 offshore sandbanks layer.

More detail is provided in the caveats section below.

Results - Current reporting period (2013-2018)

The results of the current 2018 BH3 physical damage indicator assessment displayed 52% of offshore sandbanks in 'not good' condition and 48% in 'good' condition. This places the structure and functions of offshore sandbanks into an unfavourable-bad (>25% of the feature in 'not good' condition) conclusion. There is low confidence in this assessment (see below for caveats in the method).

A pilot assessment of the OSPAR BH2 benthic communities indicator, in the Southern North Sea, showed significant changes in the diversity of the benthic communities in relation to fishing pressure (Defra, in prep).

Results - Previous reporting period (2007-2012)

The results of the 2013 vulnerability assessment displayed 9% of offshore sandbanks in 'not good' condition, 89% in 'good' condition and 2% in 'unknown' condition. The 2013

vulnerability assessment, placed the offshore sandbanks into unfavourable-inadequate (6%-25% of the feature in 'not good' condition) conservation status.
Comparison of results between reporting periods
The current evidence is showing that the area of offshore habitat in good condition is lower for 2019 reporting than 2013, meaning the conservation status of this parameter has changed from unfavourable - inadequate to unfavourable - bad. This change is not indicating an increase in the level of impacts from human activities but a combination of factors, in particular better access to pressure data (See below).
The current method (BH3 Physical Damage Indicator) was adapted from the previous method (Vulnerability Assessment used in Art 17 2007-2012), but is a more automated approach that assigns data to a more refined set of categories. It also allows for the most updated data to be incorporated. The difference in the results, is thought to be driven by the updated fishing, habitat and sensitivity data that have been used in the latest assessment.
The data used in the current assessment was improved in the following ways:
- BH3 was run on ICES VMS fishing data from 2013 to 2016 (The specific version used was Version 1 of sr.2017.17, published 25 August 2017, https://doi.org/10.17895/ices.pub.2861). In 2012, EU Regulations came into force, changing the minimum vessel size for VMS reporting from 15 m to 12 m, therefore, increasing the size of the fleet that were required to report this data. The extent to which the changed minimum reporting size has increased contributed to changes in the datasets is being investigated but is not currently known.
- VMS datasets have been improving year on year as the method of preparation has developed and the minimum reporting size has changed to give a more accurate representation of fishing activity.
- The mapped area of Annex I sandbanks has improved so that a larger area was assessed with the BH3 indicator (22% increase). The accuracy of habitat maps are constantly being improved with increased survey data.
- Additionally, the interpretation of the sandbank definition changed in 2013 to include biological communities in the description of the feature. This led to sandbank delineation extending to areas that were not previously included (JNCC, 2018).
- There has been an increase in the evidence and understanding of habitat sensitivity incorporated into the BH3 method; in particular, where resistance and resilience scores are assigned to groups of species with similar biological traits (ecological groups), for example, burrowers (Tillin and Tyler Walters, 2014).
Caveats - Indicator targets
For the 2018 UK MSFD Assessment, BH3 indicator has been used to assess the UK environmental targets of Good Environmental Status for predominant habitats including Soft Sediments and Sublittoral Rock and Biogenic habitats. The quantitative thresholds used for MSFD purposes are based on <15% cut off when combined with the qualitative threshold of moderate as explained above. This means that for an assessment area to achieve the indicator target less than 15% of the assessed habitats needs to be within the highly disturbed categories. In Art 17 <5% of the habitat can be in unfavourable condition to achieve FCS. However, the current assessments round of MSFD undertaken with the BH3 indicator was focused on broad-scale habitats whereas Art 17 is focusing on listed Annex I habitats.
Caveats - Areas of 'unknown' disturbance
The BH3 assessment was run during the Article 17 pilot phase on a previous version of the sandbank area map. The final sandbank area map was <1km2 larger, so that additional area was not included in the BH3 assessment. This resulted in the condition being reported as unknown in <1% of the sandbank area, however, the process was not re-run with the latest maps due to time constraints and it not being deemed cost-effective (considering the small proportion of feature affected).
Caveats - Human activities
- The indicator only assesses the physical disturbance pressure of bottom trawling.

	However, the impact of bottom trawling is considered the most widespread physical impact. Fishing is ranked as high importance in Section 7. - In addition to fishing activities (G01 and G03), the deposition of rocks on the seabed to maintain infrastructure (C06) is also thought to be impacting the condition of UK offshore sandbanks, through physical loss (See section 7). - An assessment of the cumulative impacts of the all of the reported high and medium importance pressures (Section 7) as well as low importance pressures (listed in the audit) has not been undertaken. - ICES fishing vessel monitoring system data from 2013 to 2016 were used for the pressure layers (The specific version used was Version 1 of sr.2017.17, published 25 August 2017, https://doi.org/10.17895/ices.pub.2861). Data from 2017 and 2018 were not available at the time of the assessments. - Fishing data is for fishing vessels > 12 m only meaning the disturbance is likely to be an underestimate in those areas where small fishing vessels operate. - Fishing pressure data is at the 0.05 degree grid cell (c-square) resolution. This level of resolution is due to the limitations of data availability, as only aggregated fishing activities are submitted by countries. It is not certain that disturbance from fishing is homogenously distributed across the whole cell, but the pressure intensity per cell was estimated using a robust method outlined below to take account of data limitations. The swept area is calculated using the parts of the fishing gear in contact with the seabed and is calculated on the width of fishing gear (in metres) multiplied by the average vessel speed (in knots) and the time fished. This calculation is undertaken on a cell-by-cell (grids or c-squares) basis per gear and per year. The swept area ratio (proportion of cell area swept per year; SAR) is then calculated by dividing the swept area by the grid cell area. The trawling effort is classified with an intensity scale ranging from 'none' to 'very high' (cell area swept more than 300% or three times per year). An intensity score is assigned to the whole grid cell, even if the fishing was occurring in one section of the cell. Caveats - Habitat sensivitiy - Caveats associated with MB0102 sensitivity information can be found in the Tillin et al. (2010) report. - A more in-depth sensitivity matrix (MARESA) is available (Tyler-Walters et al., 2018), but does not yet provide sensitivity assessments at the broader feature level. Therefore, MB0102 sensitivity information was used - If sensitivity of the broad-scale habitat is given as a range of then the highest is taken. This will result in the highest possible disturbance category being selected as a precautionary approach. -All species point data were used to derive sensitivity rather than just those species typical of sandbanks.
6.3 Short term trend of habitat area in good condition; Period	See 6.4
6.4 Short term trend of habitat area in good condition; Direction	The results of the extent of physical damage indicator (BH3), which was used to assess the condition of sandbanks (6.1), suggest that sandbanks are highly disturbed because of widespread fishing. Therefore, it is likely that the condition of sandbanks would have declined over the last 12 years. There is low confidence in this assessment. Monitoring surveys have only recently started on offshore sandbanks and so there aren't yet time-series data available. Fishing data has been constantly improving (see Section 6.2 audit) making it difficult to compare data from the previous reporting round. A pilot assessment of the OSPAR benthic communities indicator, in the Southern North Sea, showed significant changes in the diversity of the benthic communities in relation to fishing pressure (Defra, in prep).

6.5 Short term trend of habitat area in good condition; Method used	See 6.4
7.1 Characterisation of pressures/ threats	Pressures and threats ranked as low: C01: Extraction of minerals (e.g. metal ores, rock, gravel, sand), C03: Extraction of oil and gas including infrastructure, C07: Dumping depositing of dredged material from marine extraction, D01: Wind, wave and tidal power including infrastructure (note: ranked as a low pressure but a medium threat), D06: Transmission of electricity of communication cable, D07: Oil and gas pipelines, E02: Shipping lanes and ferry lanes transport operations,I02: Other invasive alien species (other than species of Union concern) Pressures: Although sensitivity to these activities and the pressures they generate were assessed as mostly medium from the MB0102 sensitivity matrix, the lack of (or limited) spatial overlap (<5%) (derived from the offshore benthic habitats monitoring options risk assessments (JNCC, 2017)) means that the feature has limited exposure. A description of how these pressures are thought to affect offshore sandbanks is detailed in Section 2.5 of the 2013 Art 17 offshore sandbanks report (JNCC, 2013). It is suggested that the cumulative impacts of multiple pressures could have negative affect on habitat condition. The relative importance/impact of marine water pollution on Annex I Sandbanks in UK offshore waters is considered to be low because of its low direct and indirect influence on the habitat. Sandbanks are exposed to marine pollution from oil and gas operations and spillages and release from shipping. Pollution is, therefore, covered under the relevant pressure/threat codes. Threats: Although sensitivity to these activities and the pressures they generate were assessed as mostly high, from the MB0102 sensitivity matrix (Tillin et al., 2010) they are not expected to impact more than 10% of the feature within the next two reporting cycles.

7.1 Characterisation of pressures/ threats	Method - Pressures The following steps were taken to identify the pressures of highest importance: - The human activities and associated pressures to which the sandbank communities were highly and moderately sensitive were identified (JNCC, 2015; Tillin et al., 2010). - These human activities/pressures were matched to the Article 17 pressures list. - A spatial overlap was performed between human activities data and the offshore sandbanks habitat map - Article 17 pressures were marked as high importance (H) when a high or moderate sensitivity was identified AND there was an overlap of >25% (unfavourable-bad condition threshold) with offshore sandbanks. - Article 17 pressures were marked as medium importance (M) when a high or moderate sensitivity was identified AND there was a 10-25% (unfavourable-inadequate threahold) overlap with offshore sandbanks. Resources used -Pressures The spatial overlap between sandbanks and human activities were identified using the UK offshore benthic monitoring options risk assessment results (JNCC, 2017). These were sense checked against the most recent human activities layers. The JNCC Pressures-Activities Database was used to link Article 17 human activities/pressures to MB0102 pressures (JNCC, 2015). The MB0102 sensitivity matrix was then used to identify the sensitivity of sandbank consituent sediments (sand, coarse, mixed, and mud) to pressures (Tillin et al., 2010). C06: Consultation with the JNCC Offshore Industries Advisors clarified that rock dump is a pressure of high importance for offshore sandbanks. It is an activity of note in four MPAs that are designated for Annex I Sandbanks and that comprise most of the offshore sandbank area. Methods - Threats Expert judgement used the best available information to predict the main human activities (Article 17 pressures) that are thought to have a future impact on sandbanks, within the next two reporting cycles. Habitat sensitivity and spatial overlap were considered as they were for the list of pressures. For the climate change codes, the confidence in the prediction led these to being listed as medium threats. Expert judgement was used for the listing of C06, in line with the method used for the pressures section. Comparison of results between reporting periods The lists of pressures and threats listed and the rank given has mostly remained the same except for: the addition of C06, to pressures and threats; the addition of D01 to threats; and the addition of climate change codes (N01, N05, N06, N07, N08) to threats. There was no equivalent to C06 in the 2013 EU pressures and threats list. The installation of wind energy infrastructure has begun in the southern North Sea and is expected to continue. The climate change threats were added as a result of predictions made in the 2013 Birchenough et al., report which was part of the MCCIP 2013 report card. Caveats - Human activities data - The monitoring options UK benthic habitats risk assessment and offshore MPA risk assessment (JNCC, 2017) were completed in 2016 and so use habitat and human activity data updated in that year. - The UK risk assessment gave results for sublittoral sediments (0m-70m in UK waters, which were thought to be broadly representative of the offshore sandbank area. The MPA risk assessment gave results for Annex I sandbanks within MPAs. - An assessment of the cumulative impacts of the all of the reported high and medium importance pressures (Section 7) as well as low importance pressures (listed in the audit) has not been undertaken. - Fishing data is for fishing vessels > 12 m length only, meaning the disturbance is likely to be an underestimate. - Fishing pressure data is at the 0.05 degree grid cell (c-square) resolution. It is not possible to distinguish the distribution of disturbance within the grid due to the constraints regarding the availability of fisheries data, but the pressure intensity per cell was estimated using a robust method outlined below. The swept area is calculated using the parts of the fishing gear in contact with the seabed and is calculated on the width of fishing gear (in metres) multiplied by the average vessel speed (in knots) and the time fished. This calculation is undertaken on a cell-by-cell (grids or c-squares) basis per gear and per year, The swept area ratio (proportion of cell area swept per year; SAR) is then calculated by dividing the swept area by the grid cell area. - It currently not possible to quantify the loss of extent from rock dump. - The details of the proposed windfarms have not yet been confirmed. - The evidence used in relation to climate change has low confidence.

7.1 Characterisation of pressures/ threats	G01 & G03: Pressure: Section 6 shows that fishing is thought to result in higher disturbance in 52% (>25%) of offshore sandbanks. The ranking of this pressure is considered high due to the sensitivity of this habitat to the effects of demersal trawling and fishing, and the large spatial overlap. The MB0102 sensitivity matrix assigns a medium sensitivity score to the pressure generated by this activity (physical disturbance and physical loss). Threat: Trends reported until 2020 predict a decrease in fisheries activities in the Celtic Seas and Greater North Sea, however, there is low confidence in this trend (OSPAR Commission, 2009). Another study predicts no change in the overall level of expected fishing activity up until 2020/2030, but details that revisions to the Common Fisheries Policy and possible national measures are expected to increase management of fisheries within a broader ecosystem framework (HM Government, 2012).
7.1 Characterisation of pressures/ threats	C06: Pressure: Consultation with the JNCC Offshore Industries Advisors clarified that rock dump is a pressure of high importance for offshore sandbanks. It is an activity of note in four MPAs that are designated for Annex I Sandbanks and that comprise most of the offshore sandbank area. Rock dump occurs in these sites in association with oil and gas infrastructure, pipelines, cables and windfarm construction. It is a persistent alteration of the surface sediment resulting in habitat that is not expected to be suitable for sandbank communities. As such, some of the sandbank's extent and distribution is lost, in that there are areas present within the site that no longer represent sandbank feature, as defined by sediment composition and/or biological communities, because the substrate has been changed. However, due to lack of evidence about deposits present within the site (i.e. not based on anticipated worst-case scenario estimates), it is currently not possible to quantify the loss of extent. A restore objective for extent and distribution and structure and function of Annex I sandbanks is set in North Norfolk Sandbanks and Saturn Reef SAC, Dogger Bank SAC, Haisborough, Hammond and Winterton SAC and Inner Dowsing, Race Bank and North Ridge SAC. The advice states that activities must look to minimise as far as practicable, changes in substratum and the biological assemblages within the site to minimise further impact on feature. Threat: Further offshore windfarm construction is expected to start in the southern North Sea in the next year or so. Developments and associated rock dump activities in North Norfolk Sandbanks and Dogger Bank are expected to have increasing cumulative impacts on the Annex I sandbanks. In the last reporting round there was no code in the list corresponding to this pressure, and it wasn't reported.

7.1 Characterisation of pressures/ threats	N01, N05, N06, N07, N08: Threat: 'There is evidence that climatic processes influence species abundance and community composition in soft-sediment habitats in the North Sea' (Birchenough et al., 2013). 'Climate change is likely to impact the benthos in future. The changes documented in soft-sediment communities are expected to continue, and probably escalate, in response to the cumulative effects of seawater warming and ocean acidification' (Birchenough et al., 2013). 'Kroncke (2011) conducted an integrated analysis on the benthic communities of the Dogger Bank over 1920-2010. These results suggested that the communities were mainly influenced by the biological regime shift (during the 1980s and in 2001). Some of the community changes observed at the Dogger Bank were an indication of the climate driven effects in water masses, currents, storms, food availability and turbidity. The results from this study indicated that both the direct human impact resulting from the fisheries activity as well as climate change affected the Dogger Bank macrofauna in the 20th century (Birchenough et al., 2013). 'There are knowledge-gaps in a number of areas. We are currently unable to fully assess the scale of benthic species and community responses in relation to climate change, understand how climate interacts with other marine stressors or model future species distributions for many benthic species. An appropriate benthic monitoring programme, coupled with continued involvement in international initiatives, is essential for characterising climate impacts on UK benthos' (Birchenough et al., 2013). Although, this pressure could potentially affect the entire UK offshore sandbanks, it has been listed as medium importance due to the low confidence in the current evidence.
7.1 Characterisation of pressures/ threats	D01: Threat: The installation of windfarm infrastructure including windfarm export cables can lead to immediate physical loss, damage or changes (to another seabed type) to sandbank constituent sediments. Trends reported until 2020 predict an increase in the number of windfarms in the Celtic Seas and Greater North Sea (OSPAR Commission, 2009). Larger areas are leased for development up until 2020/2030 in the Southern North Sea, Northern North Sea, Eastern Channel and Irish Sea (HM Government, 2012). Construction has begun in the offshore section of the Inner Dowsing and Race Bank MPA, whilst further construction is expected to start in the southern North Sea in the next year or so; including Dogger Bank SAC and North Norfolk Sandbanks and Saturn Reef SAC. The importance of the pressure was ranked as low, however, an increase in wind energy operations would potentially lead to a larger proportion (>5%) of the UK offshore sandbank area being exposed to this threat.
8.1 Status of measures	There is overlap between the feature and pressures known to impact the feature. The feature is in unfavourable condition in some MPAs where it is protected, and conservation objectives are to restore. Renewable energy developments: The management of impacts from developments, plans and projects in UK waters is carried out through the implementation of the Environmental Impact Assessment Directive (85/337/EEC) requirements through the consenting process, which also ensures that the requirements of the Habitats and Birds Directives are met. This can be considered a conservation measure identified and taken for this feature with regard to pressures deriving from this type of activities. Fisheries: A number of draft proposals have been recommended for the majority of offshore sites but have not been submitted yet to the European Commission and therefore are not yet operational. When fisheries management measures are required to protect offshore sites Member States must submit a proposal for measures to the European Commission. This process involves working with other member states who have a direct management interest to develop suitable management proposals. Management areas are proposed for some of the SACs where this habitat is present. The proposals aim at excluding demersal trawls, dredges and seine nets to protect Annex I sandbanks feature within the sites management boundaries.
8.2 Main purpose of the measures taken	All offshore sandbanks are within five SACs that all have restore as the conservation objective for the feature.

8.3 Location of the measures taken	Through the Environmental Impact Assessment, Habitats and Birds Directives, conservation measures are implemented both inside and outside Natura 2000 sites; if features of conservation interest are identified during surveys for EIA outside Natura 2000 sites, they are still given consideration in terms of impact limitation and mitigation.
8.4 Response to the measures	MB0102 sensitivity matrix has L-H for sensitivity to the fishing pressures abrasion and physical loss for sandbank constituent sediments. MB0102 resilience scores are, therefore, high to very low which ranges from full recovery within 2 years to negligible or prolonged recovery; at least 25 years to recover structure and function (Tillin et al., 2010).
8.5 List of main conservation measures	CG01: Ranked as high. Fisheries management measures are proposed in all five offshore MPAs with Annex I sandbanks. The gear restrictions can remove or significantly reduce the pressure deriving from this type of activity. The proposed measures have the potential to be take place over the next two reporting cycles and to occupy a large proportion of offshore sandbanks. CC03: Ranked as medium. With regard to renewable energy installation, facilities and operation (CC03) licensable activities have to submit an environmental impact assessment (EIA) to assess potential impacts of proposed development and identify mitigation measures where applicable. Activities are managed but not fully restricted. Conservation measures linked to the high and medium pressures/threats (Section 7) but ranked as low: CC02 Adapt/manage exploitation of energy resources: C06 was listed as a high pressure and threat, however, industry is required to report these activities and limit impact. This measure is not thought to have a medium impact in the next two reporting periods and so has been ranked as low. CC06 Reduce impact of service corridors and networks: C06 was listed as a high pressure and threat, however, industry is required to report these activities and limit impact. This measure is not thought to have a medium impact in the next two reporting periods and so has been ranked as low. CN01 Adopt climate mitigation measures: The Climate Change Act 2008 is the basis for the UK's approach to tackling and responding to climate change (https://www.theccc.org.uk/tackling-climate-change/the-legal-landscape/the-climate-change-act/). The measure is ranked as low as it is unknown how this will impact marine habitats in the next two reporting periods. Comparison of results between reporting periods The European list of conservation measures has changed considerably between reporting rounds. Fisheries management measures (CG01) were also listed as a conservation measure (under 1.2 measures needed, but not implemented) in the 2013 offshore report and were given the same ranking of 'high importance'. In 2013, '9.2: Regulating/Managing exploitation of natural resources on sea' was reported as a conservation measure of high importance. The 2019 list is more detailed as such conservation measures were described for the equivalent pressures and threats that were reported (high or medium). As such CC03 was listed in relation to wind energy and was ranked medium as the activity will be managed but not fully restricted. In 2013, '6.1 Establish protected areas/sites' was reported as a conservation measure of high importance, however, the equivalent measure was not on list of conservation measures for the current reporting round.

9.1 Future prospects of parameters	Methods Overview The UK Approach was to identify the future trend of the three parameters (range, area, structure and functions) at the offshore / country level to enable the future prospects of each to be determined at the UK aggregation stage. Identified current activities, associated pressures and the sensitivity (MB0102) to those pressures. - Sensitivity is derived from resilience (recovery time). - If there is high sensitivity then resilience is either low (full recovery within 10 - 25 years) or very low (negligible or prolonged recovery possible; at least 25 years to recover structure and function. - Looked at sensitivity to physical loss for the area parameter (Section 9.1b) and sensitivity to physical damage for the structure and functions parameter (Section 9.1 c). Identified conservation measures - the majority not in place and are not thought to have a positive impact within the next 2 reporting cycles (12 years). Caveats MB0102 sensitivity matrix results are based on expert judgement and have low confidence scores associated with them. Range-Future trend As this feature is defined by topography and substrate type rather than by a specific biological community, its range is determined by geological and/or hydrodynamic processes depending on the type of sandbank (http://jncc.defra.gov.uk/page-1452). The nature of these processes means that the geographic range of this feature is likely to have remained the same in recent geological times and is not expected to change within the next 12 years. Area - Future trendCurrent pressures and future threats The reduction in area of a feature is known as physical loss. Sandbank constituent sediments are moderately to highly sensitive to physical loss (Tillin et al., 2010). This is a pressure that can be caused by fishing, rock dumping, and installation of windfarm infrastructure, as they can lead to a persistent change in substrate which is not suitable habitat for characterising sandbank communities. These activities are all listed as predicted future threats to sandbanks in Section 7. Fishing is known to be occurring over most of the sandbank area (Sections 6 & 7) and a study looking at activity trends until 2020/2030 predicted no change in the overall level of fishing activity. Windfarm development has begun on the offshore sandbanks within Inner Dowsing and Race Bank MPA (Activities layer). Further offshore windfarm construction is expected to start in the southern North Sea in the next year or so. Developments and associated rock dump activities in North Norfolk Sandbanks and Dogger Bank are expected to have increasing cumulative impacts on the Annex I sandbanks. Current measures There are no fisheries management measures currently in place in the offshore sandbank area. Current trend It is hard to tell how much of the area could be subject to physical loss or change to another seabed type, but the current trend may be negative. Future measures There are proposed fisheries management measures but it unknown when they will come into place. Recoverability Sandbank constituent sediments are moderately to highly sensitive to the pressures physical loss and physical change to another seabed type. The associated resilience (recoverability) scores show that the habitat could take 10-25 years to recover or may not recover from the habitat loss. Future trend The resilience (recoverability) scores suggest even if the fisheries management measures come into place within the next 12 years any lost areas due to fishing may not recover in that time. Fishing is widespread throughout the Annex I sandbanks area and could lead to a negative trend across the next 12 years. It should be noted that the MB0102 resilience scores are based on expert judgement, therefore, there is low confidence in this prediction. It is possible that the condition could decline by >1% per year, however, low confidence in the data means that a negative future trend has been selected (<1% change per year). Additionally, the impacts and cumulative impacts of all human activities acting upon the feature have not been considered; although the impact of bottom trawling is considered the most widespread physical impact. Additionally, the proposed windfarm developments in Dogger Bank SAC and North Norfolk Sandbanks SAC are predicted to affect large parts of the MPAs. Structure and Functions-Short-term trendCurrent pressures and future threats The structure and functions of sandbanks are thought to be affected by the physical damage to sediments and typical species (Tillin et al 2010). This is a pressure that can be caused by fishing and installation of windfarm infrastructure. Physical

	damage indicator (BH3) has shown that 52% of offshore sandbanks are thought to be highly disturbed as a result of fishing (Section 6). A study looking at activity trends until 2020/2030 predicted no change in the overall level of fishing activity. A pilot assessment of the OSPAR BH2 benthic communities indicator, in the Southern North Sea, showed significant changes in the diversity of the benthic communities in relation to fishing pressure (Defra, in prep). Windfarm development has begun on the offshore sandbanks within Inner Dowsing and Race Bank MPA (Activities layer). Further offshore windfarm construction is expected to start in the southern North Sea in the next year or so. Developments and associated rock dump activities in North Norfolk Sandbanks and Dogger Bank are expected to have increasing cumulative impacts on the Annex I sandbanks. Current measures There are no fisheries management measures currently in place in the offshore sandbank area. Current trend The physical damage indicator results (see above) suggest that the current trend is very negative. Recoverability The sensitivity of sandbank constituent sediments to surface and subsurface abrasion pressures ranges from not-sensitive to high. The precautionary approach considers that the sensitivity is high and therefore the MB0102 resilience (recoverability) scores show that the habitat could take 10-25 years to recover or may not recover from the habitat loss (Tillin et al., 2010). The recoverability is already considered within the physical damage tool and this tool suggests that sandbanks are in unfavourable condition (Section 6). Future trend Fishing pressure is expected to negatively impact the structure and functions of offshore sandbanks in the next two reporting cycles. It is thought that >25% of offshore sandbanks are highly disturbed and this is expected to continue if fishing activities remain the same. It is not certain when the proposed management measures will come into place. However, they are not expected to lead to feature recovery in the next 12 years; based on the MB0102 resilience scores that are highlighted above, however, the scores are based on expert judgement and have low associated confidence. Fishing is widespread throughout offshore sandbanks. Additionally, the proposed windfarm developments in Dogger Bank SAC and North Norfolk Sandbanks SAC are predicted to affect large parts of the MPAs. These activities could potentially lead to 22651% change per year across the next 12 years, however, low confidence in the data means that a negative trend has been selected (<1% change per year). Additionally, the impacts or cumulative impacts of all human activities acting upon the feature have not been considered; although the impact of bottom trawling is considered the most widespread physical impact.
11.4 Short term trend of habitat area in good condition within the network; Direction	The results of the extent of physical damage indicator (BH3), which was used to assess the condition of sandbanks (6.1), suggest that sandbanks are highly disturbed because of widespread fishing. Therefore, it is likely that the condition of sandbanks would have declined over the last 12 years. There is low confidence in this assessment. Monitoring surveys have only recently started on offshore sandbanks and so there aren't yet time-series data available. Fishing data has been constantly improving (see Section 6.2 audit) making it difficult to compare data from the previous reporting round. A pilot assessment of the OSPAR benthic communities indicator, in the Southern North Sea, showed significant changes in the diversity of the benthic communities in relation to fishing pressure (Defra, in prep).
11.5 Short term trend of habitat area in good condition within the network; Method used	See 11.4