Report under The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended), Regulation 6A

**2019-2024**

Conservation status assessment for the habitat:

# H1170 - Reefs

**United Kingdom Offshore**

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This report was produced by JNCC.

**This document should be cited as:**

JNCC. (2026). Conservation status assessment for the habitat: H1170 Reefs.

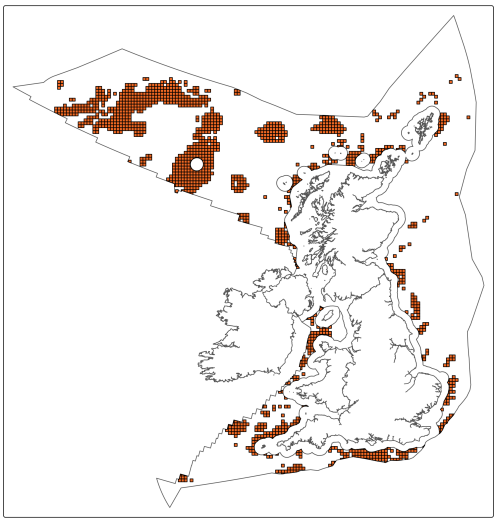
**Important note - Please read**

- The information in this document represents United Kingdom Offshore Report under The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended), Regulation 6A, for the period 2019-2024.
- It is based on supporting information provided by JNCC.
- The Habitats Regulations reporting 2019-2024 Approach Document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- Maps showing the distribution and range of the habitat are included.
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the assessments. Further underpinning explanatory notes are available in the related country reports.
- 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 not relevant to this habitat (section 11 National Site Network coverage for Annex I habitats).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the JNCC website.

# Assessment Summary: Reefs

## Distribution Map



## Range Map

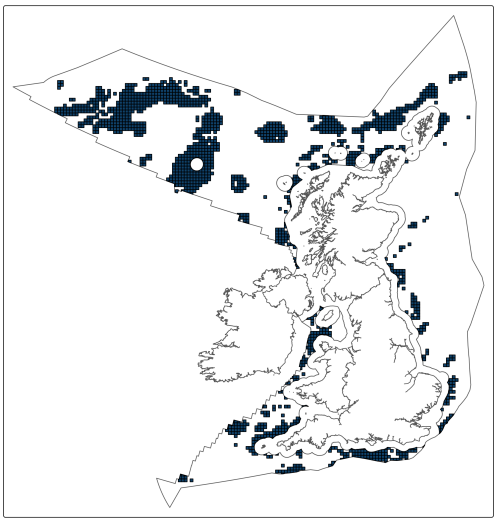


**Figure 1:** United Kingdom Offshore distribution and range map for H1170 - Reefs. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available habitat records which are considered to be representative of the distribution within the current reporting period.

The range map was developed from the distribution area map, but additionally included an area of iceberg ploughmarks off North-West Scotland in offshore waters, where cobble reefs have been recorded.

**Table 1:** Table summarising the conservation status for H1170 - Reefs. Overall conservation status for habitat is based on assessments of range, area covered by habitat, structure and functions, and future prospects.

## Overall Conservation Status (see section 10)

**Unfavourable-bad (U2)**

## Breakdown of Overall Conservation Status

| | |
|---|---|
| **Range** (see section 4) | **Unknown (XX)** |
| **Area covered by habitat** (see section 5) | **Unfavourable-inadequate (U1)** |
| **Structure and functions** (see section 6) | **Unfavourable-bad (U2)** |
| **Future prospects** (see section 9) | **Unfavourable-bad (U2)** |

# List of Sections

# National Level

## 1. General information

| | |
|---|---|
| **1.1 Country** | United Kingdom Offshore |
| **1.2 Habitat code** | H1170 - Reefs |

## 2. Maps

| | |
|---|---|
| **2.1 Year or period** | 1960-2024 |
| **2.2 Distribution map** | Yes |
| **2.3 Distribution map; Method used** | Based mainly on extrapolation from a limited amount of data |

**2.4 Additional information**

No additional information

# Biogeographical Level

## 3. Biogeographical and marine regions

| | |
|---|---|
| **3.1 Biogeographical or marine region where the habitat occurs** | MATL |

**3.2 Sources of information**

See section 13 References

## 4. Range

| | |
|---|---|
| **4.1 Surface area (km²)** | 51,308 |
| **4.2 Short-term trend; Period** | 2013-2024 |
| **4.3 Short-term trend; Direction** | Uncertain |
| **4.4 Short-term trend; Magnitude** | |

**a) Estimated minimum**

| | |
|---|---|
| **b) Estimated maximum** | |
| **c) Pre-defined range** | |
| **d) Unknown** | |
| **e) Type of estimate** | |
| **f) Rate of decrease** | |
| **4.5 Short-term trend; Method used** | Based mainly on extrapolation from a limited amount of data |
| **4.6 Long-term trend; Period** | |
| **4.7 Long-term trend; Direction** | |
| **4.8 Long-term trend; Magnitude** | |
| **a) Minimum** | |
| **b) Maximum** | |
| **c) Rate of decrease** | |
| **4.9 Long-term trend; Method used** | |

**4.10 Favourable Reference Range (FRR)**

| | |
|---|---|
| **a) Area (km²)** | |
| **b) Pre-defined increment** | |
| **c) Unknown** | Yes |
| **d) Method used** | |
| **e) Quality of information** | |

**4.11 Change and reason for change in surface area of range**

| | |
|---|---|
| **a) Change** | Yes |
| **b) Genuine change** | No |
| **c) Improved knowledge or more accurate data** | Yes |
| **d) Different method** | No |

| | |
|---|---|
| **e) No information** | No |
| **f) Other reason** | No |
| **g) Main reason** | Improved knowledge/more accurate data |

### 4.12 Additional information

The range map was developed from the UK distribution map, but additionally includes an area of iceberg plough marks off North-West Scotland, where cobble reefs had been recorded. As a result of improved mapping of the habitat, the surface area of range for UK reefs is smaller than the figure reported in 2019 (58191 km²).

The majority of the reef feature is composed of rocky reefs which are widely distributed and composed of robust species. The current range of the feature covers most of its potential range, with adequate provision for the full range of ecological variation. Although many individual biogenic reefs may have suffered declines due to anthropogenic impacts, we do not know how this has affected their overall distribution, therefore FRV and short term trends are unknown and uncertain respectively.

## 5. Area covered by habitat

| | |
|---|---|
| **5.1 Year or period** | 1960-2024 |
| **5.2 Surface area (km²)** | |
| **a) Minimum** | |
| **b) Maximum** | |
| **c) Best single value** | 44,950 |
| **5.3 Type of estimate** | Best estimate |
| **5.4 Surface area; Method used** | Based mainly on extrapolation from a limited amount of data |
| **5.5 Short-term trend; Period** | 2013-2024 |
| **5.6 Short-term trend; Direction** | Decreasing |
| **5.7 Short-term trend; Magnitude** | |
| **a) Estimated minimum** | |
| **b) Estimated maximum** | |
| **c) Pre-defined range** | Decreasing 0 - 12% |

| | |
|---|---|
| **d) Unknown** | No |
| **e) Type of estimate** | Best estimate |
| **f) Rate of decrease** | Decreasing <=1% (one percent or less) per year on average |
| **5.8 Short-term trend; Method used** | Based mainly on extrapolation from a limited amount of data |
| **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** | |
| **d) Rate of decrease** | |
| **5.12 Long-term trend; Method used** | |
| **5.13 Favourable Reference Area (FRA)** | |
| **a) Area ($km^2$)** | |
| **b) Pre-defined increment** | |
| **c) Unknown** | Yes |
| **d) Method used** | |
| **e) Quality of information** | |

**5.14 Change and reason for change in surface area of range**

| | |
|---|---|
| **a) Change** | Yes |
| **b) Genuine change** | Yes |
| **c) Improved knowledge or more accurate data** | Yes |

| | |
|---|---|
| **d) Different method** | No |
| **e) No information** | No |
| **f) Other reason** | No |
| **g) Main reason** | Improved knowledge/more accurate data |

### 5.15 Additional information

Annex 1 Reef habitat is comprised of both rocky and biogenic reefs. The surface area for UK reefs is smaller than the figure reported in 2019 (50727 km²). This is mainly as a result of improved mapping of the habitat, however losses of biogenic reef have occurred due to anthropogenic impacts, therefore trend has been marked as decreasing though the true magnitude is unknown.

While evidence offshore is limited, it is known that biogenic reefs are affected by a number of pressures. Biogenic reef features are assessed through OSPAR's list of Threatened and Declining features (OSPAR, 2023a) and features such as Lophelia pertusa reefs have shown declines due to fishing (OSPAR, 2022a). Furthermore, in the latest UK Marine Strategy assessment (MOAT, 2024), UK horse mussel reefs (Modiolus modiolus) were assessed through the Potential Physical Loss of predicted seafloor habitats indicator. This showed a predicted decrease in estimated extent across their potential range as a result of assessed anthropogenic activities, therefore, not meeting the thresholds for Good Environmental Status. The main identified causes aquaculture, followed by dredge and spoil disposal, towed bottom-contact fishing, and navigational dredging.

## 6. Structure and functions

### 6.1 Condition of habitat (km²)

| | |
|---|---|
| **Area in good condition** | |
| **ai) Minimum** | 34,014 |
| **aii) Maximum** | 34,014 |
| **Area not in good condition** | |
| **bi) Minimum** | 10,193 |
| **bii) Maximum** | 10,193 |
| **Area where condition is unknown** | |
| **ci) Minimum** | 744 |

| | |
|---|---|
| **cii) Maximum** | 744 |
| **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** | 2013-2024 |
| **6.4 Short-term trend of habitat area in good condition; Direction** | Uncertain |
| **6.5 Short-term trend of habitat area in good condition; Method used** | Based mainly on extrapolation from a limited amount of 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**

The area of habitat in ‘good’ (favourable), ‘not good’ (unfavourable) and unknown condition was assessed using the UK Marine Strategy ‘Extent of Physical Disturbance to Benthic Habitats (BH3a)’ indicator specifically calculated for the Annex I Reef habitat area. This suggested that Annex I Reefs are highly disturbed as a result of widespread use of mobile bottom-contacting fishing gears. Results showed that 75.67% of the area designated as reefs are predicted to be in ‘good condition’, 22.68% in ‘not good’ condition and the remaining 1.66% is unknown. There is low confidence in this assessment.

While there has been in increase in the area predicted to be in ‘good’ condition since 2019, the trend has been classed as uncertain in the 2024 assessment and is likely decreasing. There is not enough data to make this assessment. In addition to limited data, trend is unknown due to differences in applying the BH3a methodologies and low confidence in the assessment results. In 2019, 70 .48% of reefs were predicted to be in ‘good condition’, 29.52% in ‘not good’ condition and 0% was unknown. The trend in 2019 was classed as Decreasing.

While there is limited evidence relating to offshore biogenic reefs, this aspect of Annex I Reefs are known to be impacted by and at risk from fishing pressures and habitat loss

(OSPAR, 2023b). For example, evidence from OSPARs Threatened and Declining feature assessments indicates that habitats associated with biogenic reefs are in poor status (OSPAR, 2023), including Lophelia pertusa reefs (OSPAR, 2022a). Furthermore, in the latest UK Marine Strategy assessment, UK horse mussel reefs (Modiolus modiolus) were assessed through the Potential Physical Loss of predicted seafloor habitats indicator. An estimated decrease in extent across their potential range as a result of assessed anthropogenic activities was predicted. This meant that this feature did not meet the threshold for Good Environmental Status (MOAT, 2024). The main identified causes include aquaculture, followed by dredge and spoil disposal, towed bottom contact fishing, and navigational dredging.

## 7. Main pressures

### 7.1 Characterisation of pressures

**Table 2:** Pressures affecting the habitat, including timing and importance/impact ranking. Pressures are defined as factors acting currently and/or during the reporting period (2019–2024). Rankings are: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

| Pressure | Timing | Ranking |
|---|---|---|
| PG01: Marine fish and shellfish harvesting causing reduction of species/prey populations and disturbance of species (professional) | Ongoing and likely to be in the future | High (H) |
| PG03: Marine fish and shellfish harvesting activities causing physical loss and disturbance of seafloor habitats | Ongoing and likely to be in the future | High (H) |
| PJ01: Temperature changes and extremes due to climate change | Ongoing and likely to be in the future | Medium (M) |
| PJ10: Change of habitat location, size, and / or quality due to climate change | Only in future | Medium (M) |
| PJ11: Desynchronisation of biological / ecological processes due to climate change | Only in future | Medium (M) |
| PJ12: Decline or extinction of related species (e.g. food source / prey, predator / parasite, symbiote, etc.) due to climate change | Only in future | Medium (M) |
| PJ13: Change of species distribution (natural newcomers) due to climate change | Ongoing and likely to be in the future | Medium (M) |

| | | |
|---|---|---|
| PC06: Dumping/depositing of inert and dredged materials from terrestrial and marine extraction | Ongoing and likely to be in the future | Medium (M) |

### 7.2 Sources of information

See section 13 References

### 7.3 Additional information

No additional 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** | Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions') |
| **8.3 Location of the measures taken** | Both inside and outside National Site Network |
| **8.4 Response to measures** | Long-term results (after 2036) |

### 8.5 List of main conservation measures

**Table 3:** Key conservation measures addressing current pressures and/or anticipated threats during the next two reporting periods (2025–2036). Measures are ranked by importance/impact: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

| Conservation measure | Ranking |
|---|---|
| MG01: Management of professional/commercial fishing, shellfish and seaweed harvesting (incl. restoration of habitats) | Medium (M) |
| MC02: Adapt/manage exploitation of energy resources | Medium (M) |
| MC03: Adapt/manage renewable energy installation, facilities and operation (excl. hydropower and abstraction activities) | Medium (M) |

### 8.6 Additional information

There is overlap between the feature and pressures known to impact the feature. This feature is known to be in ‘unfavourable’ condition in most offshore MPAs where it is protected, with objectives to ‘restore’ or ‘maintain’ the feature to ‘favourable’ condition.

Licensable activities, such as renewable energy developments, oil and gas, CCUS and aggregate extraction: The assessment and management of impacts on SACs from plans and projects in UK waters is carried out through the implementation of the Conservation of Offshore Habitats and Species Regulations 2017 requirements throughout the consenting process. The Conservation of Offshore Marine Habitats and Species Regulations are, amongst other things, mechanisms used to implement conservation measures for offshore European sites.

Fisheries: Management was introduced in England in 2024 to protect all reef features in offshore MPAs from bottom towed gear. There are also proposals going through consultation for Scottish offshore MPAs aiming to exclude demersal trawls, dredges and seine nets to protect Annex I ‘Reefs’ feature within the sites management boundaries.

Sensitivity and resilience of reef species to fishing pressure is ranked from low to high, this means that full recovery from fishing pressure could take at least 25 years to recover structure and function for some species.

## 9. Future prospects

### 9.1a Future trends of parameters

| | |
|---|---|
| **ai) Range** | Unknown |
| **bi) Area** | Negative - decreasing <=1% (one percent or less) per year on average |
| **ci) Structure and functions** | Negative - slight/moderate deterioration |

### 9.1b Future prospects of parameters

| | |
|---|---|
| **aii) Range** | Unknown |
| **bii) Area** | Poor |
| **cii) Structure and functions** | Bad |

### 9.2 Additional information

While the future trends for Range will potentially be negative due to impacts towards biogenic reefs, we do not fully understand how their distribution has been impacted by pressures outlined in Section 7, or how distribution would be affected by pressures over the next 12 years. The range of the rocky reef component is determined by geological processes and is unlikely to change. Therefore the Future Prospects for Range are unknown.

Future trends for Area will likely be negative due to ongoing and future impacts from pressures, particularly with regards to ongoing impacts of fisheries on biogenic reef. Therefore, the Future Prospects for Area are poor.

The future trends for Structure and Function are negative as a result of the number of high pressures identified and because fisheries management measures are not currently in place. In addition, while trend is uncertain, the conclusion for Structure and Function is Unfavourable-Bad. Therefore the Future Prospects for Structure and Functions are Bad.

## 10. Conclusions

| | |
|---|---|
| **10.1 Range** | Unknown (XX) |
| **10.2 Area** | Unfavourable-inadequate (U1) |
| **10.3 Specific structure and functions (incl. typical species)** | Unfavourable-bad (U2) |
| **10.4 Future prospects** | Unfavourable-bad (U2) |
| **10.5 Overall assessment of Conservation Status** | Unfavourable-bad (U2) |
| **10.6 Overall trend in Conservation Status** | Unknown |

### 10.7 Change and reason for change in conservation status

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

### 10.7 Change and reason for change in conservation status trend

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

### 10.8 Additional information

The conclusion on Range is reached because the short term trend is uncertain and the FRR is unknown.

The conclusion on Area is reached because the short term trend is decreasing and the FRA is unknown. Some evidence suggests losses of biogenic reef, however there are still uncertainties around this evidence in offshore UK, therefore the precautionary principle has been applied to reach this conclusion.

The conclusion on Structure and Function is reached through limited evidence expert judgement and the precautionary principle. The extent of reef in ‘good’ and ‘not good’ condition does not automatically meet the thresholds required for Favourable or Unfavourable-Inadequate status. At time of assessment, with the exception of one MPA, all MPAs are classed as Unfavourable, therefore expert judgement concludes that this feature should be Unfavourable. While no conclusions were made at the offshore scale in 2019, Unfavourable-bad would have been the outcome based on the assessment criteria, therefore, applying the precautionary principle, the Structure and Function for this feature is considered Unfavourable-Bad. In addition, the trend for this feature is uncertain due to limited time series data.

As a result of the combination of these factors, the overall conservation status is considered to be Unfavourable-Bad. The trend is unknown based on uncertain trends for the different parameters.

## 11. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex I habitat types

### 11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (km²)

| | |
|---|---|
| **a) Minimum** | |
| **b) Maximum** | |
| **c) Best single value** | 25,201 |
| **11.2 Type of estimate** | Best estimate |
| **11.3 Habitat area inside the network; Method used** | Based mainly on extrapolation from a limited amount of data |

| | |
|---|---|
| **11.4 Short-term trend of habitat area within the network; Direction** | Stable |
| **11.5 Short-term trend of habitat area within the network; Method used** | Based mainly on extrapolation from a limited amount of data |
| **11.6 Short-term trend of habitat area in good condition within the network; Direction** | Uncertain |
| **11.7 Short-term trend of habitat area in good condition within the network; Method used** | Based mainly on extrapolation from a limited amount of data |

### 11.8 Additional information

The known area of this feature was intersected with SACs that contain qualifying marine habitats (designated grades A-C). Monitoring is in the initial stages and time series data is limited to assess condition within the site network. All sites (at time of assessment) are in Unfavourable condition with the exception of Pisces Reef Complex (Favourable).

## 12. Complementary information

### 12.1 Justification of percentage thresholds for trends

No justification information

### 12.2 Other relevant information

No other relevant information

# 13. References

## Biogeographical and marine regions

### 3.2 Sources of information


Castle L., Lillis H., Duncan G. & Manca E., 2021. Method for creating a EUNIS level 3 seabed habitat map integrating fine- and broad-scale maps for the North-East Atlantic. JNCC report in Prep.

Hoppit, G., Schmidt, D., 2022. A Regional View of the Response to Climate Change: A Meta-Analysis of European Benthic Organisms' Responses. Frontiers in Marine Science. 9:896157.

ICES, 2021. OSPAR request on the production of spatial data layers of fishing intensity / pressure. ICES Technical service.

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, 2022. Pressures-Activities Database v1.5. https://hub.jncc.gov.uk/assets/97447f16-9f38-49ff-a3af-56d437fd1951 [Accessed 12/24]

Matear, L., Vina-Herbon, C., Woodcock, K.A., Duncombe-Smith, S.W., Smith, A.P., Schmitt, P., Kreutle, A., Marra, S., Curtis, E.J., and Baigent, H.N. 2023. Extent of Physical Disturbance to Benthic Habitats: Fisheries. In: OSPAR, 2023: The 2023 Quality Status Report for the Northeast Atlantic. OSPAR Commission, London. Available at: https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/indicator-assessments/phys-dist-habs-fisheries/

MOAT 2024. Marine Online Assessment Tool - Potential Physical Loss of Predicted Biogenic Habitats. Available from https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/benthic-habitats/potential-physical-loss-of-predicted-biogenic-habitats/

Moore, P., Smale, D., 2020. Impacts of climate change on shallow and shelf subtidal habitats relevant to the coastal and marine environment around the UK. MCCIP Science Review 2020, 272–292

OSPAR 2022a. Status Assessment 2022 - Lophelia pertusa reefs. BDC2022/Lophelia pertusa reefs. https://oap.ospar.org/en/ospar-assessments/committee-assessments/biodiversity-committee/status-assesments/lophelia-pertusa-reefs/

OSPAR, 2023a. Benthic Habitats Thematic Assessment. In: OSPAR, 2023: Quality Status Report 2023. OSPAR Commission, London. Available at: https://oap.ospar.org/

en/ospar-assessments/quality-status-reports/qsr-2023/thematic-assessments/benthic-habitats/

OSPAR, 2023b. Human Activities Thematic Assessment. In: OSPAR, 2023: Quality Status Report 2023. OSPAR Commission, London. Available at: https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/thematic-assessments/human-activities

Pidduck, E., Jones, R., Daglish, P., Farley, A., Morley, N., Page, A. & Soubies, H. 2017. Identifying the possible impacts of rock dump from oil and gas decommissioning on Annex I mobile sandbanks. JNCC Report No. 603. JNCC, Peterborough.

OSPAR 2022. Status Assessment 2022b - Coral Gardens. BDC2022/Coral gardens. https://oap.ospar.org/en/ospar-assessments/committee-assessments/biodiversity-committee/status-assesments/coral-gardens/

Scottish Government, 2024. Marine Protected Area network: 2024 report to the Scottish Parliament. https://www.gov.scot/publications/marine-protected-area-network-2024-report-scottish-parliament/documents/

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, p. 145. Available from: 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

JNCC, 2025. Special Areas of Conservation (SACs) with marine components. Available from: https://jncc.gov.uk/our-work/sacs-with-marine-components/

## Main pressures

### 7.2 Sources of information

No sources of information

## 14. Explanatory Notes

| Field label | Note |
|---|---|
| 2.3: Distribution map; Method used | The distribution map represents areas of occurrence of the habitat in 10km grid squares up to 2024. |
| 4.1: Surface area | The Offshore range map was developed from the Offshore surface area map, but additionally included an area of iceberg plough marks off North-West Scotland in offshore waters, where cobble reefs had been recorded. |
| 4.10: Favourable Reference Range (FRR) | The majority of the reef feature is composed of rocky reefs which are widely distributed and composed of robust species. Thus, the current range of the feature probably covers most of its potential range, with adequate provision for the full range of ecological variation. Although many individual biogenic reefs may have suffered declines due to anthropogenic impacts and we do not know how this has affected their overall distribution. In conclusion, as we can only estimate the range of the feature, it is not possible to give a favourable reference range. |
| 5.13: Favourable Reference Area (FRA) | The current surface area map is comprised of both high confidence reef data and potential rocky reef data. Biogenic reefs may have suffered declines due to anthropogenic impacts and we do not know how this has affected their overall distribution. As we can only estimate that area of the feature, it is not possible to give a favourable reference area. |
| 5.2: Surface area | JNCC created the Annex I Reef habitat map. It is composed of both high confidence reef data (where survey data is available to verify the records) and potential rocky reef data derived from habitat modelling (where the UK Statutory Nature Conservation Bodies (SNCBs) believe, from the best available evidence, that Annex I Reef might be present. |
| 6.2: Condition of habitat; Method used | Methodology - The indicator Disturbance to Benthic Habitats: Fisheries with mobile bottom-contacting gears (BH3a; Matear et al., 2023) was used to assess the area of |

the UK offshore (beyond 12nm) Annex I Reef. The indicator spatially combines different levels of fishing intensity pressure and habitat sensitivity data to estimate the distribution and degree of seafloor disturbance across the UK. Sensitivity of species and habitats to specific pressures is categorised as a combination of their ability to tolerate or withstand a given pressure (resistance), and their ability to recover structure and function (resilience). Potential disturbance estimates were calculated from aggregated 2016 to 2020 fishing pressure data (ICES, 2021). BH3a layers were intersected with Habitats Regulations feature layers for the offshore UK.

Disturbance categories were calculated for the aggregated pressure assessment periods (2016 - 2020). The disturbance categories are grouped as followed for summary; Zero: No reported VMS data or 0 SAR values; Low: Categories 1-4; Moderate: Categories 5-7; High: Categories 8 and 9; and Unassessed Disturbance: Areas where SAR values greater than 0 were reported but disturbance could not be assessed due to an absence of sensitivity information. Disturbance categories Zero and Low (0-4) are used to report Section 6.1a 'area in good condition' and disturbance categories Moderate and High (5-9) are used to report 6.1b 'area in not good condition'.

Caveats - For a full list of caveats associated with fishing pressure data provided by ICES, please refer to ICES (2021). Key caveats to consider when interpreting indicator results in this report are as follows:

• Fishing pressure was assumed to be homogeneous in distribution throughout each ICES c-square. This assumption can result in an overestimate of the extent of fishing pressure and an underestimate of intensity of fishing pressure within a c-square. It should be noted, this assumption is due to the restrictions on national fishing datasets that contributed to the ICES data call.

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| | • Conversely, distribution and / or intensity of fishing pressure may be underestimated due to no VMS data for vessels less than 12m in length. Such vessels predominantly operate in coastal areas.<br><br>• There is a maximum interval of two hours between VMS pings; such a time gap creates uncertainty between interpolated vessel tracks and actual vessel position between VMS records.<br><br>Habitat data for the BH3a indicator was obtained from an OSPAR scale combined habitat map produced by JNCC (Castle et al., 2021). Consequently, there may be discrepancies with the habitat information used for the BH3a indicator, and the ranges and extent of Habitats Regulations feature layers.<br><br>Additionally, in instances where pressure data intersected areas without sensitivity information, due to a lack of EUNIS habitat data or sensitivity assessment for the habitat in the QSR 2023 assessment, outputs were classified as 'Unassessed Disturbance' (unknown condition). |
| 7.1: Characterisation of pressures | For Offshore Reefs, the pressure and threats and their rankings mostly have not changed since 2019, however two climate change threats and rock dump are now considered ongoing pressures. The OSPAR thematic assessment of benthic habitats (OSPAR, 2023a) highlights that benthic habitats are impacted by activities operating and/or interacting with the biotic and abiotic components of the seafloor. Factors such as the need for new renewables developments, continued oil exploration and new carbon capture storage all have the potential to affect benthic habitats. Key pressures include shipping, fish and shellfish harvesting, extraction of minerals, tourism and leisure, renewable energy, submarine cables, oil and gas, agriculture, aquaculture and climate change causing physical disturbance, physical loss, and alterations to biological communities. Reefs 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.

Due to the increasing impacts from offshore wind, oil and gas, CCUS and cabling activities (most notably introducing hard substrata to the seabed via protective materials such as rock dump), this will continue to affect the benthic features of offshore MPAs, specifically the attributes extent and distribution as well as structure and function, and move these sites further away from achieving their conservation objectives. PC06: it is currently difficult to ascertain the full scale of impact for this pressure, however it is known to occur during construction, operation, maintenance and decommissioning of industries such as oil and gas. While efforts are made to avoid reef and introduced hard material has the potential to act as an artificial reef, repeated rock dump over many years will result in further direct impact and increased cumulative impacts with historic rock dump on biogenic reef and therefore is now considered a Medium pressure (Pidduck et al, 2017). Other industrial activity pressures associated with these activities are not considered High or Medium based on the methodology used for assessment. These pressures are still present and detrimental to habitats and are therefore marked as low due to limited spatial area affected (in comparison to the entire Annex I feature) or difficulties in measuring spatial scale of the pressure.

Medium and High ranked pressures include:

PGO1 and PG03: The ranking of this pressure is considered high due to the sensitivity of this habitat to the effects of demersal trawling and fishing causing physical disturbance and physical loss, and the spatial overlap of >25% identified from human activity layers. Trends reported until 2030 are uncertain, however there has been an increase in fisheries activities in the Celtic Seas and Greater North Sea (OSPAR, 2023b). There has been an increase in areas protected from physical disturbance from

fishing gear, however further evidence is required to assess the effectiveness of measures.

Fishing pressures resulting in the removal of target and non-target species refer to any damage, loss or removal of species defined as a designated feature, or species integral to the integrity of a designated feature (for example key structural or influential species). Biogenic reefs formed by species such as Sabellaria spinulosa may be impacted in this way.

PJ10, PJ11, PJ12: Climate change and ocean acidification cause direct and indirect pressures which can significantly alter the environmental conditions (e.g. decreases in pH, increases in sea surface temperature) necessary for benthic ecosystem processes and functions (OSPAR, 2023a). Calcifying organisms are thought to be vulnerable to ocean acidification under climate change, with some models predicting up to 13% of cold water coral reefs being in low-aragonite areas (Hoppit & Schmidt 2022, Moore & Smale 2020). Climatic models predict there will be changes to area of suitable habitat in the future depending on the climatic scenario (Moore & Smale, 2020). Other studies suggest ecosystem-level responses could remain stable over long periods of time, depending on the species involved (Moore & Smale, 2020). While confidence in evidence has increased from low to medium, there are still knowledge gaps meaning we are unable to fully assess the scale of benthic species and community responses in relation to climate change for broadscale habitats (Moore & Smale, 2020).

PJ01, PJ13: The timing of these pressures are now considered ongoing now and in the future due to evidence to suggest temperature changes and extremes and changes in species distributions due to climate change is already occurring. Confidence in available evidence has increased from low to medium (Moore & Smale, 2020). Benthic habitats are predicted to face increased

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| | temperatures and frequency of heatwaves under climatic projections in the future. Offshore circalittoral rocks are thought to face a strong effect of increased temperatures in the future (OSPAR, 2023a). Benthic invertebrates and macroalgal species distributions and range shifts of local species, with some increase in warm-water affinity species especially in the South-West. |
| 7.3: Additional information | The following steps were taken to identify ongoing pressures of the highest importance in the offshore:<br><br>- The human activities and associated pressures to which the habitat's communities were highly and moderately sensitive were identified (JNCC, 2022. Tillin et al 2010).<br><br>- These human activities/pressures were matched to the Habitats Regulations pressures list using the JNCC Pressures-Activities Database (JNCC, 2022).<br><br>- Spatial overlap between the habitat and human activities was identified using the UK offshore benthic monitoring options risk assessment results (JNCC,2017). This overlap was sense checked against the most recent habitat extent and human activities layers.<br><br>- Pressures were marked as high importance (H) when a high or moderate sensitivity was identified AND there was an overlap of >25% with the habitat<br><br>- Pressures were marked as medium importance (M) when a high or moderate sensitivity was identified AND there was a 10-25% overlap with the habitat<br><br>- Expert judgement used the best available information to determine if future impacts identified in the previous reporting cycle had transitioned into ongoing impacts or past impacts in the current reporting cycle. No pressures were determined to be acting in the past only.<br><br>The following steps were taken to identify future pressures |

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| | of the highest importance:<br><br>- Expert judgement used the best available information and trends identified in the Quality Status Report (2023) to predict the main human activities (pressures) that are thought to have a future impact on the feature within the next two reporting cycles. Habitat sensitivity and spatial overlap were considered as they were for ongoing pressures with predicted future overlap considered where available.<br><br>Caveats-Human activities data - The monitoring options UK benthic habitats risk assessment and was completed in 2016 and so uses habitat and human activity data updated in that year (JNCC, 2017). The UK risk assessment gave results for rocky reef and Sabellaria spinulosa habitats down to 200 m depth. Deep-sea reefs were not included in this assessment; however, the results were thought to be broadly representative of the UK offshore reef area .<br><br>Caveats - Habitat sensitivity - Caveats associated with the MarESA sensitivity information can be found in the Tyler-Walters, (2018) reports. - If sensitivity of the broadscale habitat is a range then the highest is taken. This results in the highest possible disturbance category being selected as a precautionary approach.<br><br>Caveats - Habitat map - The pressures section only considers the activities that occur over the known mapped area of the feature, as the full extent of the feature is uncertain.<br><br>Caveats – Future - The evidence used in relation to climate change has moderate confidence (Moore & Smale, 2020). The details of the proposed windfarms have not yet been confirmed. |
| 8.1: Status of measures | There is overlap between Annex I 'Reefs' feature and pressures known to impact this feature. |

This feature is known to be in 'unfavourable' condition in most offshore MPAs where it is protected.

Licensable activities, such as renewable energy developments, oil and gas, CCUS and aggregate extraction: The assessment and management of impacts from plans and projects in UK waters is carried out through the implementation of the Conservation of Offshore Habitats and Species Regulations 2017 requirements throughout the consenting process. The Conservation of Offshore Marine Habitats and Species Regulations 2017 are, amongst other things, mechanisms used to implement conservation measures for offshore European sites.

Management was introduced in England in 2024 to protect all reef features in offshore MPAs from bottom towed gear. There are also proposals going through consultation for Scottish offshore MPAs. The proposals aim at excluding demersal trawls, dredges and seine nets to protect Annex I 'Reefs' feature within the sites management boundaries. Examples of some measures currently in place:

- NEAFC (North east Atlantic Fisheries Commission) fisheries closure areas are in place in an area that include Hatton Bank SAC (NEAFC, 2018). The Hatton Bank and Hatton Rockall Basin North East Atlantic Fisheries Commission (NEAFC) fisheries closures for the protection of VME (Recommendation 19:2014 (as amended by Rec 09:2015, Rec 10:2018, Rec 10:2021, Rec 06:2023, Rec 07:2023, Rec 12:2024 and Rec 13:2024))

- the restriction on bottom trawling in waters deeper than 800 m (Regulation (EU) 2016/2336 (as amended by S.I. 2019/753).

- Byelaws are in place to protect biogenic ross worm (Sabellaria spinulosa) reefs by prohibiting the use of bottom towed fishing gear in specified areas of the Inner Dowsing, Race Bank and North Ridge and Haisborough, Hammond

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| | and Winterton SCIs (MMO, 2018).<br><br>- Closures are in place in Darwin Mounds and North West Rockall SACs under Regulation (EC) No 850/98 and Regulation (EU) No 227/2013 respectively.<br><br>- Regulation (EU) 2016/2336 establishes specific conditions for fishing for deep-sea stocks in the north-east Atlantic, banning bottom trawling in waters deeper than 800m. |
| 8.2: Main purpose of the measures taken | Conservation measures can help SACs to achieve their conservation objectives.<br><br>For European sites designated for Annex I 'Reefs' features, and where the condition of the Annex I 'Reefs' feature has been assessed it is generally considered to be in 'unfavourable' condition. Where objectives have been set for each attribute (Extend and Distribution, Structure and Function and Supporting Processes), 'restore' objectives have been set with the aim of restoring the feature to 'favourable' condition.<br><br>The pressure, causing physical loss and disturbance of seafloor habitats and reduction of species/prey populations and disturbance of species deriving from fisheries, can be limited through the implementation of fisheries management areas where restrictions on gear apply. |
| 8.3: Location of the measures taken | The Conservation of Offshore Marine Habitats and Species Regulations 2017 are, amongst other things, mechanisms used to implement conservation measures for offshore European sites. If Annex I features are identified during surveys outside of European sites, they may be given consideration in terms of the mitigation hierarchy. |
| 8.4: Response to the measures | MarESA (Marine Evidence based Sensitivity Assessment) indicates that the habitat is sensitive to the pressures caused by renewables energy projects and fishing including 'physical change to another seabed type'. The assessment suggests that the habitat has high sensitivity and very low resilience to the pressure 'physical change to another |

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| | seabed type'. Sensitivity to surface and subsurface abrasion ('abrasion/disturbance of the surface of the substratum or seabed' and 'penetration or disturbance of the substratum subsurface') ranges from low to medium with resilience ranging from medium to high.<br><br>MB0102 sensitivity matrix has L-H for sensitivity to the fishing pressures abrasion and physical loss for reef broad-scale habitats. 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 | MG01: Two fishing pressures (PG03 and PG01) were ranked high in terms of both pressures and threats for Annex I 'Reefs'. Some fisheries management measures are already in place while there is potential for others to be implemented over the next two reporting cycles. Conservation measures consisting of fisheries management areas/closures can be ranked as medium where operational and requiring gear restriction; these measures can remove or reduce significantly the pressure deriving from this type of activity, however, these measures only act over part of the area where the feature is found.<br><br>MC02: Adapt/manage exploitation of energy resources and MC03: Adapt/manage renewable energy installation, facilities and operation (excl. hydropower and abstraction activities) have been included as medium conservation measures due to their importance in protecting habitats. Industry is required to report these activities and limit impact. While pressures associated with these activities are ranked as low based on the methodology used to assess pressures, measures are in place and required to protect habitats.<br><br>Conservation measures linked to the high and medium pressures/threats (Section 7) but ranked as low:<br><br>MJ01: Implement climate change mitigation measures: The |

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| | Climate Change Act 2008 is the basis for the UK's approach to tackling and responding to climate change. The measure is ranked as low as it is unknown how this will impact marine habitats in the next two reporting periods. |
| 6.4: Short-term trend of habitat area in good condition; Direction | There is insufficient data to support an appropriate assessment of trend direction in this current reporting round. There are indications that the trend is decreasing, particularly for biogenic habitats (e.g. Coral gardens; OSPAR, 2022b). |
| 9.1:Future trends and prospects of parameters | 9.1a) The Future prospects are unknown because the future trend for range is unknown and the range conclusion is unknown. Future prospects were combined for the whole of the UK and not reported separately for the offshore in 2019.<br><br>9.1b) The future prospects are poor because the future trend for area is negative and the area conclusion is unknown. Future prospects were combined for the whole of the UK and not reported separately for the offshore in 2019.<br><br>9.1c) The future prospects are bad because the trend for structure and functions is negative and the structure and functions conclusion is unfavourable-bad. Future prospects were combined for the whole of the UK and not reported separately for the offshore in 2019.<br><br>At time of assessment, a public consultation is underway proposing closure of the MPAs in England to bottom towed gear. If enacted, this will affect some sites in England, particularly biogenic reef where the proposals prohibit the use of static gear over areas of biogenic reef. |
| 6.1: Condition of habitat | This parameter has been assessed through the use of the BH3a indicator. At time of assessment, with the exception of one MPA (Pisces Reef Complex which is Favourable), all MPAs are classed as Unfavourable |