# A4.24 Mussel beds on moderate energy Atlantic circalittoral rock

## Summary

This habitat occurs on moderately wave-exposed upper circalittoral bedrock subject to strong or moderately strong tidal streams. Mussels *Mytilus edulis* or *Musculus discors* can form dense beds, to the exclusion of other species, on the upper faces of bedrock, boulders and mixed substrata. The information presented in this asssessment is predominantly based on *Mytilus edulis* beds.

This habitat is vulnerable to activities such trawling and dredging, as these can damage or dislodge the mussels or cause substratum loss. The habitat is also sensitive to smothering as the mussels, a characteristic species, are unlikely to be able to burrow up through deposited spoil or other smothering agents. However, mussel beds are often subject to natural predation by starfish and may 'disappear' from a location until a larval settlement and subsequent recovery occurs. Beneficial management and conservation measures for this habitat could potentially include some protection within Marine Protected Areas, and the regulation of dredging and fishing methods which damage or disturb seabed communities.

## Synthesis

The available information on the occurrence of this habitat is limited. The existing data suggests that it could potentially be considered  Near Threatened under Criterion B if there were grounds for believing that this habitat was undergoing a decline in extent or quality. There are, however, no data on the present status or trends of this habitat and the accuracy of the mapping data cannot be verified at this time. This habitat is therefore considered to be Data Deficient for both the EU 28 and EU 28+.

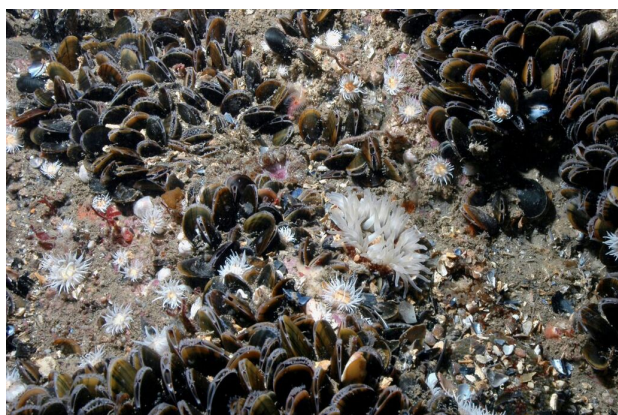| Overall Category & Criteria | | | |
|---|---|---|---|
| EU 28 | | EU 28+ | |
| Red List Category | Red List Criteria | Red List Category | Red List Criteria |
| Data Deficient | - | Data Deficient | - |

## Sub-habitat types that may require further examination
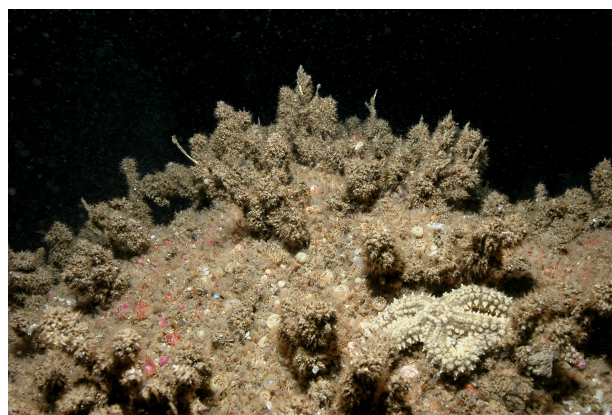
None.

## Habitat Type

### Code and name

A4.24 Mussel beds on moderate energy Atlantic circalittoral rock



*Mytilus edulis* communities on circalittoral rock in a situation very exposed to wave action. Lundy, UK (© K.Hiscock).



Circalittoral rock with *Musculus* siphons and amphipod tubes visible. Lundy Island, UK (© K.Hiscock).

## Habitat description

This habitat occurs on moderately wave-exposed upper circalittoral bedrock subject to strong or moderately strong tidal streams. Mussels *Mytilus edulis* or *Musculus discors* can form dense beds, to the exclusion of other species, on the upper faces of bedrock, boulders and mixed substrata. The *Musculus* biotope occurs in much more wave sheltered and silted situations. There may also be an associated layer of pseudofaeces, forming a thick, silty matrix.

Indicators of quality:

Both biotic and abiotic indicators have been used to describe marine habitat quality. These include: the presence of characteristic species as well as those which are sensitive to the pressures the habitat may face; water quality parameters; levels of exposure to particular pressure, and more integrated indices which describe habitat structure and function, such as trophic index, or successional stages of development in habitats that have a natural cycle of change over time.

There are no commonly agreed indicators of quality for this habitat, although particular parameters may have been set in certain situations e.g. protected features within *Natura* 2000 sites, where reference values have been determined and applied on a location-specific basis. The overall quality and continued occurrence of this habitat is, however, largely dependent on the presence of *Mytilus edulis* or *Musculus discors* which creates the biogenic structural complexity on which the characteristic associated communities depend. The density and the maintenance of a viable population of this species is a key indicator of habitat quality, together with the visual evidence of presence or absence of physical damage. However, beds of *Mytilus edulis* at least may disappear (most likely because of predation by starfish) but are likely to re-colonise at some time in the future (which may be several years) dependent on larval recruitment.

Characteristic species:

This complex is characterised by dense aggregations of the mussels *Mytilus edulis* or *Musculus discors* carpeting the underlying substrata. Sponges that may be recorded in this complex are *Scypha ciliata*, *Tethya aurantium*, *Pachymatisma johnstonia*, *Dysidea fragilis* and *Cliona celata*. A sparse hydroid/bryozoan turf composed primarily of *Nemertesia antennina*, *Alcyonidium diaphanum* and *Flustra foliacea* is often recorded. Anemones present are *Urticina felina* and *Sagartia elegans*. Other species recorded are the crabs *Cancer pagurus, Carcinus maenas* and *Necora puber*, the starfish *Crossaster papposus* and *Asterias rubens*, and *Alcyonium digitatum* and in this upper circalittoral complex, algae species such as *Dictyota dichotoma, Cryptopleura ramosa* and *Plocamium cartilagineum*. The barnacle *Balanus crenatus* may be seen attached to the mussels themselves.

## Classification

EUNIS (v1405):

Level 4. A sub-habitat of 'Atlantic circalittoral rock' (A4.2).


Annex 1:

1170 Reefs


MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral rock and biogenic reef

EUSeaMap:

Shallow photic rock or biogenic reef

IUCN:

9.2 Subtidal rock and rocky reefs

**Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?**
Yes

Regions
Atlantic

Justification
Mussel beds are often extensive and, for *Mytilus edulis*, are characteristic of North East Atlantic ecosystems.

## Geographic occurrence and trends

| Region | Present or Presence Uncertain | Current area of habitat | Recent trend in quantity (last 50 yrs) | Recent trend in quality (last 50 yrs) |
|---|---|---|---|---|
| *North-East Atlantic* | Celtic Seas: Present Greater North Sea: Present Bay of Biscay and the Iberian Coast: Present Kattegat: Present | Unknown Km$^2$ | Unknown | Unknown |

## Extent of Occurrence, Area of Occupancy and habitat area

| | Extent of Occurrence (EOO) | Area of Occupancy (AOO) | Current estimated Total Area | Comment |
|---|---|---|---|---|
| *EU 28* | >44,447 Km$^2$ | >10 | Unknown Km$^2$ | Based on a limited data set. EOO amd AOO known to be an underestimate.v |
| *EU 28+* | >44,447 Km$^2$ | >10 | Unknown Km$^2$ | Based on a limited data set. EOO amd AOO known to be an underestimate.v |

## Distribution map
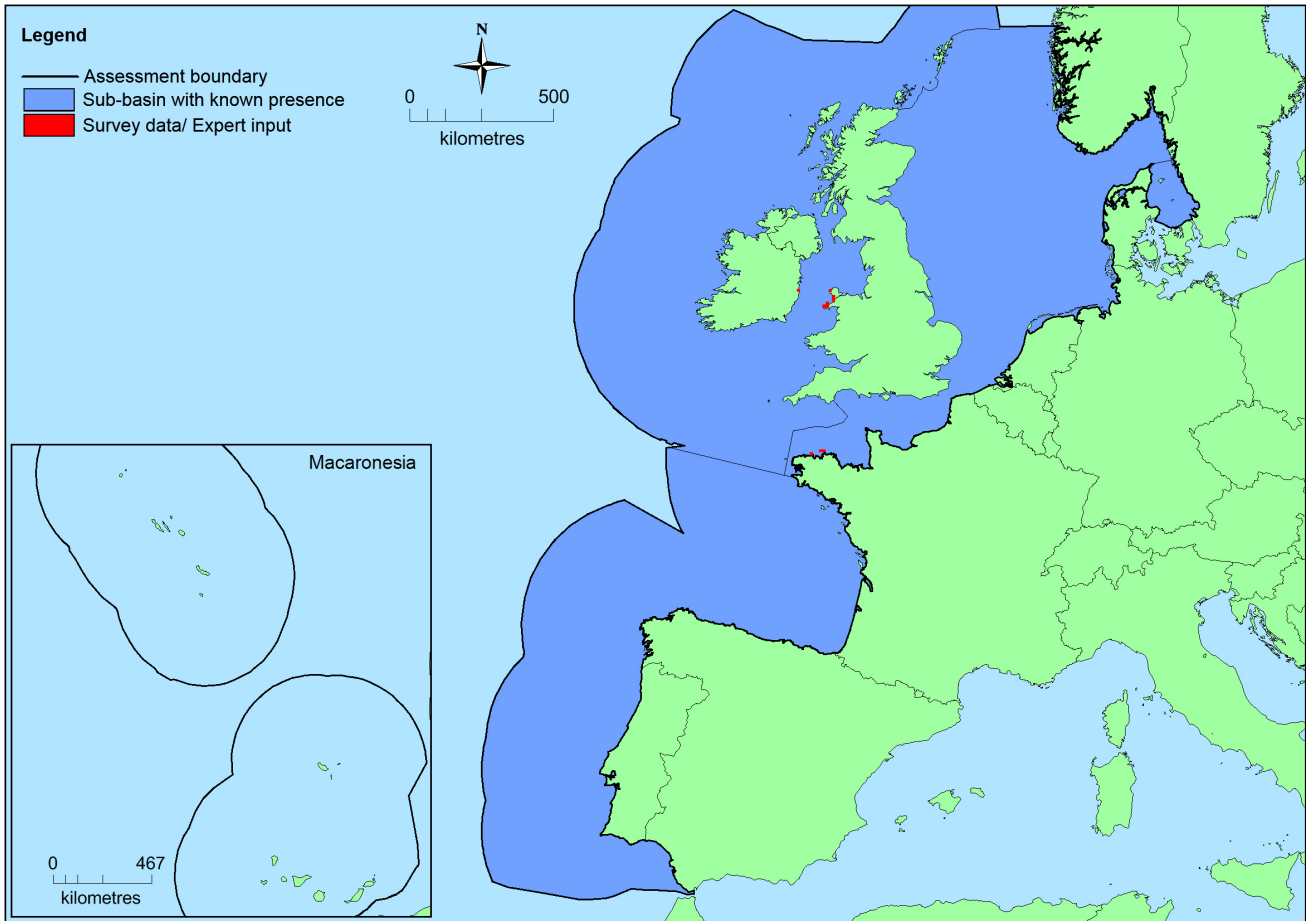
There are insufficient data to provide a comprehensive and accurate map of the distribution of this habitat. This map has been generated using EMODnet data from modelled/surveyed records for the North East Atlantic (and supplemented with expert opinion where applicable) (EMODnet 2010). EOO and AOO have been calculated on the available data presented in this map however these should be treated with caution as expert opinion is that this is not the full distribution of the habitat.

## How much of the current distribution of the habitat type lies within the EU 28?

This habitat occurs in the EU 28+ (e.g. Norway). The percentage hosted by the EU 28 is likely to be between 85-90% but there is insufficient information to establish the exact figure.

## Trends in quantity

 Historical, recent and estimated future trends in quanity of this habitat are unknown.

- Average current trend in quantity (extent)
  EU 28: Unknown
  EU 28+: Unknown
- Does the habitat type have a small natural range following regression?
  No
  *Justification*
  There are insufficient data to accurately map the extent of this habitat but it is not believed to have a small natural range. There are insufficient data to determine any declines during the last 50 years.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  *Justification*
  There are insufficient data to accurately map the extent of this habitat but it is not believed to have a small natural range.

## Trends in quality

Historical, recent and estimated future trends in quality of this habitat are unknown.

- Average current trend in quality
  EU 28: Unknown
  EU 28+: Unknown

## Pressures and threats

The main pressures and threats on this habitat are associated with direct damage, removal and smothering of the associated biotopes. *Musculus discors* lives in fixed nests of byssus threads on the surface of the substratum. While the nest will protect the bivalve from the direct effects of smothering, they are unlikely to be able to burrow up through deposited spoil or other smothering agents. Thus, smothered individuals will probably succumb to the effects of anoxia. Trawling or dredging on subtidal rock can damage or dislodge mussels and remove other associated species, resulting in a decline in species richness but this unlikely to take place intentionally as exploitation of wild mussels from the circalittoral is likely to be unusual.

### List of pressures and threats

**Biological resource use other than agriculture & forestry**

Fishing and harvesting aquatic resources
   Professional active fishing
   Benthic or demersal trawling

**Natural System modifications**

Human induced changes in hydraulic conditions
   Siltation rate changes, dumping, depositing of dredged deposits
   Dumping, depositing of dredged deposits
   Other siltation rate changes

## Conservation and management

This habitat is afforded protection within some Marine Protected Areas. Beneficial management measures include the regulation of fishing methods and the control of any activity which damages or disturbs seabed communities.

### List of conservation and management needs

**Measures related to spatial planning**

Other spatial measures
Establish protected areas/sites

**Measures related to hunting, taking and fishing and species management**

Regulation/Management of fishery in marine and brackish systems

### Conservation status

Annex 1:

1170: MATL U2, MMAC FV

**When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?**

Mussels, as a generalisation, are considered to have a strong ability to recover from natural disturbance due to high production rates. The more firmly attached, stable communities on subtidal rock can have significantly more diverse associated communities (than those on mixed sediments); comprised of typically 50-100 species. Effects of mussel loss may therefore be significant at the community level, particularly as mussels settle preferentially on conspecifics and reduction of adults may reduce subsequent recruitment, although this relationship is poorly understood. Mussels are also likely to build up longer-lived beds on subtidal rock; *Mytilus edulis* has been reported as reaching 18-24 years in age in the Danish Wadden Sea. The MarLIN sensitivity reviews record the habitat as 'Moderate' or 'low' sensitivity to several pressures/activities.

**Effort required**

| 10 years |
|----------|
| Naturally |

## Red List Assessment

### Criterion A: Reduction in quantity

| Criterion A | A1 | A2a | A2b | A3 |
|-------------|-----|------|------|-----|
| EU 28 | Unknown % | Unknown % | Unknown % | Unknown % |
| EU 28+ | Unknown % | Unknown % | Unknown % | Unknown % |

There is insufficient information to determine any trends in quantity of this habitat. It is therefore considered to be Data Deficient under criteria A for both the EU 28 and EU 28+.

### Criterion B: Restricted geographic distribution

| Criterion B | B1 | | | | B2 | | | | B3 |
|-------------|-----|---|---|---|-----|---|---|---|-----|
| | EOO | a | b | c | AOO | a | b | c | |
| EU 28 | > 44,446 Km$^2$ | Unknown | Unknown | Unknown | > 10 | Unknown | Unknown | Unknown | unknown |
| EU 28+ | > 44,446 Km$^2$ | Unknown | Unknown | Unknown | >10 | Unknown | Unknown | Unknown | unknown |

The available information on the occurrence of this habitat is limited. The existing data obtained from EMODnet suggests that it could potentially be considered Near Threatened under Criterion B (EOO<50,000 km$^2$, AOO≤10) if there were grounds for believing that this habitat was undergoing a decline in extent or quality. There are, however, no data on the present status or trends of this habitat and the accuracy of the mapping data cannot be verified at this time so the full distribution and extent is considered to be unknown. This habitat is therefore considered to be Data Deficient under criteria B for both the EU 28 and EU 28+.

### Criterion C and D: Reduction in abiotic and/or biotic quality

| Criteria C/D | C/D1 | | C/D2 | | C/D3 | |
|--------------|------|------|------|------|------|------|
| | Extent affected | Relative severity | Extent affected | Relative severity | Extent affected | Relative severity |
| EU 28 | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % |
| EU 28+ | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % |

| Criterion C | C1 | | C2 | | C3 | |
|---|---|---|---|---|---|---|
| | Extent affected | Relative severity | Extent affected | Relative severity | Extent affected | Relative severity |
| EU 28 | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % |
| EU 28+ | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % | Unknown % |

| Criterion D | D1 | | D2 | | D3 | |
|---|---|---|---|---|---|---|
| | Extent affected | Relative severity | Extent affected | Relative severity | Extent affected | Relative severity |
| EU 28 | Unknown % | Unknown% | Unknown % | Unknown% | Unknown % | Unknown% |
| EU 28+ | Unknown % | Unknown% | Unknown % | Unknown% | Unknown % | Unknown% |

Experts consider there to be insufficient data on which to assess criteria C/D. It is therefore considered to be Data Deficient under criteria C/D.

### Criterion E: Quantitative analysis to evaluate risk of habitat collapse

| Criterion E | Probability of collapse |
|---|---|
| EU 28 | Unknown |
| EU 28+ | Unknown |

There is no quantitative analysis available to estimate the probability of collapse of this habitat type. It is therefore considered to be Data Deficient under criteria E.

### Overall assessment "Balance sheet" for EU 28 and EU 28+

| | A1 | A2a | A2b | A3 | B1 | B2 | B3 | C/D1 | C/D2 | C/D3 | C1 | C2 | C3 | D1 | D2 | D3 | E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EU28 | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD |
| EU28+ | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD |

| Overall Category & Criteria | | | |
|---|---|---|---|
| EU 28 | | EU 28+ | |
| Red List Category | Red List Criteria | Red List Category | Red List Criteria |
| Data Deficient | - | Data Deficient | - |

### Confidence in the assessment
Low (mainly based on uncertain or indirect information, inferred and suspected data values, and/or limited expert knowledge)

### Assessors
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### Contributors
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### Reviewers
K.Hiscock.

### Date of assessment
14/12/2015

**Date of review**
11/01/2016

## References

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