

A5.26 Atlantic upper circalittoral muddy sand

Summary

This habitat comprises circalittoral non-cohesive muddy sands (silt content from 5% to 20%), generally found in water depths of over 15-20m in the North East Atlantic region, where they support rich infaunal communities. Off the coast of mainland Portugal, however, their presence has been reported in depths of 44-77 m in areas of weak current with a high silt content. This habitat supports animal-dominated communities characterised by a wide variety of polychaetes, bivalves and echinoderms.

The biota of muddy sand communities are known to be particularly vulnerable to beam trawling, otter trawling and scallop dredges with initial impacts most severe and recovery time in the order of years. There is also evidence that shifts in community structure of the benthos have occurred in the North Sea corresponding to more widespread climatic changes.

Beneficial management measures for this habitat include regulation of fishing methods which damage or disturb seabed communities including the establishment of marine protected areas to safeguard these habitats and their associated biodiversity. Additionally, appropriate regulation and control of chemical discharges from outfalls to reduce the levels entering into, and being retained by, muddy sediments and measures to reduce run off from sewage outfalls and agricultural land to the marine environment can be used to avoid eutrophication effects associated with nutrient enrichment.

Synthesis

This habitat is relatively common and has a considerable natural range in the North East Atlantic although a patchy distribution.

Most sedimentary benthic systems on the continental shelf of Europe are believed to have been modified by fishing activities in the last 100 years, particularly by mobile demersal gears, and this habitat remains under fishing pressure. Data from a single year, 2013/2014, has revealed that than 40% of circalittoral fine sands and muddy sand were subject to trawling fishing pressure in the North Sea, with over 10% of this being interpreted a high or moderate pressure. When combining data for the North Sea and Celtic Sea more than 80% of this habitat type is considered to have been subject to such fishing pressure. Given that this is based on a single year of data, and that this type of pressure has been taking place for decades, it is likely

to be an underestimate of the total area of this habitat which has been subject to such pressure. Disturbance of the substratum due to intensive fishing activities using bottom trawls or dredges can damage or modify infaunal communities, with burrowing echinoderms and bivalves being particularly vulnerable and therefore affect habitat quality.

Expert opinion is that there has been a very substantial reduction in quality of this habitat, most likely an intermediate decline affecting more than 80% of its extent although it is clear that in some locations there has also been a severe decline. The severity will depend on factors such as the intensity and frequency of disturbance. This habitat has therefore been assessed as Endangered for both the EU 28 and EU 28+ because of both past and likely continuing declines in quality.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	C/D1	Endangered	C/D1

Sub-habitat types that may require further examination

None.

Habitat Type

Code and name

A5.26 Atlantic upper circalittoral muddy sand



Seabed sediment of fine muddy sand with siphons of the razor shell *Ensis* visible. Landing Bay, UK (© K.Hiscock).

Habitat description

This habitat comprises circalittoral non-cohesive muddy sands with the silt content of the substratum typically ranging from 5% to 20%. It is generally found in water depths of over 15-20 m. These circalittoral habitats tend to be more stable than their infralittoral counterparts and as such support a richer infaunal community. This habitat supports animal-dominated communities characterised by a wide variety of polychaetes, bivalves and echinoderms.

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.

Characteristic species:

Bivalves such as *Abra alba* and *Nucula nitidosa*, echinoderms such as *Amphiura* spp. (e.g. *A.brachiata*), *Ophiura* spp. (e.g. *O.albida*, *O.ophiura*), and *Astropecten irregularis*. Other common or frequently occurring species include *Cerianthus lloydii*, *Nephtys hombergii*, *Scoloplos armiger*, *Spiophanes bombyx*, *Ghaetozone setosa*, *Pagurus bernhardus*, *Nucula nitidosa*, *Fabulina fabula*, and *Asterias rubens*. Off the coast of Portugal this habitat is characterised by polychaetes *Chaetozone gibber*, *Galathowenia oculata*, *Spiophanes bombyx*, *Prionospio fallax*, *Spiophanes kroyeri*, *Pectinaria koreni*, *Myriochele danielsseni*, *Lumbrineris lusitanica*, *Nephtys hombergii*, *Paradoneis ilvana*, *Phyllodoce rosea* and the amphipod *Harpinia antennaria*.

Classification

EUNIS (v1405):

Level 4. A sub-habitat of 'Atlantic circalittoral sand' (A5.2).

Annex 1:

1160 Large shallow inlets and bays

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral sand

EUSeaMap:

Shallow sands

IUCN:

9.4 Subtidal sandy

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

Yes

Regions

Atlantic

Justification

There are extensive areas of circalittoral sand habitat in the offshore areas of the North East Atlantic.

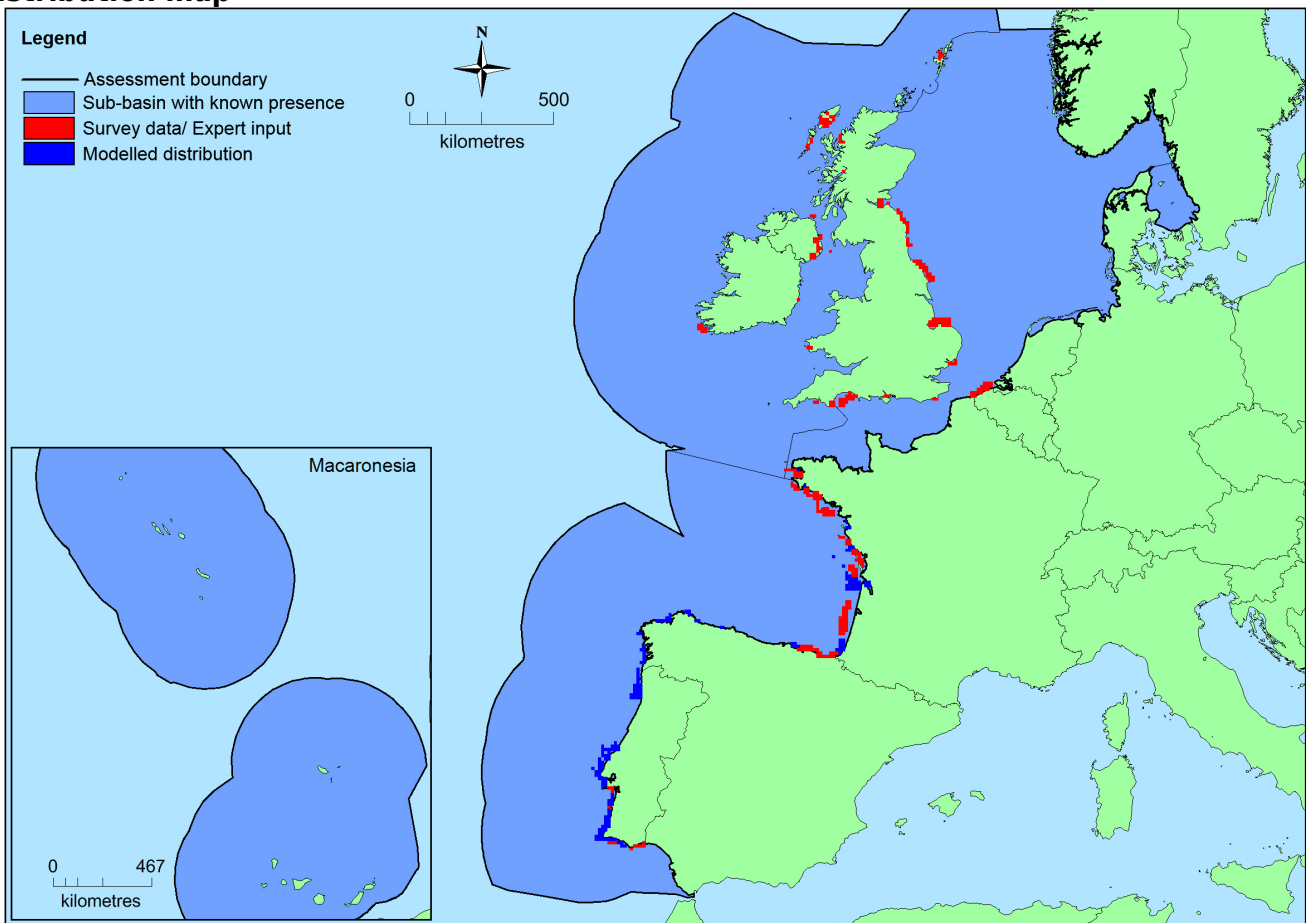
Geographic occurrence and trends

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>North-East Atlantic</i>	Bay of Biscay and the Iberian Coast: Present Celtic Seas: Present Greater North Sea: Present Kattegat: Present Macaronesia: Present	Unknown Km ²	Unknown	Decreasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	3,496,903 Km ²	500	>2,853 Km ²	The area estimate for this habitat has been derived from a synthesis of EUNIS seabed habitat geospatial information for the European Seas but is recognised as being an underestimate.
EU 28+	>3,496,903 Km ²	>500	>2,853 Km ²	EOO and AOO have been calculated on the available data. Although this data set is known to be incomplete the figures exceed the thresholds for threatened status.

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, Isle of Man, Channel Islands). The percentage hosted by EU 28 is therefore less than 100% but there is insufficient information to establish the proportion.

Trends in quantity

It is difficult to establish the quantity of this habitat as it often has a patchy distribution, grading into

other soft sediment habitats, or interspersed amongst rocky areas. There is insufficient information to determine historical and current trends in quantity. Future trends have not been estimated.

- 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

This habitat has a widespread distribution in the North East Atlantic.

- Does the habitat have a small natural range by reason of its intrinsically restricted area?

No

Justification

This habitat has a widespread distribution in the North East Atlantic.

Trends in quality

Most sedimentary benthic systems on the continental shelf of Europe have been modified by fishing activities in the last 100 years, particularly by bottom trawls and dredging.

Scientific evidence, supplemented with expert judgement to develop fisheries measures in protected areas for the Dutch sector of the North Sea, for example indicated that the most significant threat to the conservation status of the Dogger Bank comes from bottom gear, notably from beam trawling with tickler chains. The main effect is on abiotic conditions, hence on structure and function, which results in reduction of the abundance of typical species. This initial effect is greater in where the seabed is sandy rather than muddy however this is compensated somewhat by shorter recovery times where the seabed is predominantly sandy.

An analysis of the fishing intensity of EU trawlers (bottom otter, beam and mid-water trawls) using Automatic Identification System (AIS) ship tracking data over one year (2013/2014) shows high coverage in all European coastal waters and over the continental shelf. When combined with the modelled distribution of EUNIS marine habitat types it is possible to examine the extent of likely impact on a particular benthic habitat. For example, over this time period more than 40% of circalittoral fine sands and

muddy sand were subject to trawling fishing pressure in the North Sea, with over 10% of this being interpreted a high or moderate pressure. When combining data for the North Sea and Celtic Sea more than 80% of this habitat type is considered to have been subject to such fishing pressure. Given that this is based on a single year of data and that this type of pressure has been taking place for decades it is likely to be an underestimate of the total area of this habitat affected by mobile demersal fishing gears.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

The biota of muddy sand communities are known to be vulnerable to beam trawling, otter trawling and scallop dredges with initial impacts most severe and recovery time in the order of years. Significant effects have also been observed in response to long-term chronic disturbance from otter trawling, for example, with negative effects on benthic infauna abundance, biomass and species richness with clear changes in community composition. There is also some evidence that shifts in community structure of the benthos having occurred in the North Sea corresponding to more widespread climatic changes.

Synthetic compound contamination is also a physical factor that could cause a decline in the species

richness as deposit feeding may be a particularly important route for exposure to synthetic chemicals.

List of pressures and threats

Biological resource use other than agriculture & forestry

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

Pollution

- Marine water pollution
 - Toxic chemical discharge from material dumped at sea
 - Synthetic compound contamination

Climate change

- Changes in abiotic conditions
 - Water flow changes (limnic, tidal and oceanic)
 - Wave exposure changes

Conservation and management

Beneficial management measures for this habitat include the regulation of fishing activity which damage or disturb seabed communities including through the establishment of marine protected areas. Additionally, appropriate regulation and control of chemical discharges from outfalls to reduce the levels entering into, and being retained by, muddy sediments.

List of conservation and management needs

Measures related to marine habitats

- Other marine-related measures

Measures related to spatial planning

- Establish protected areas/sites

Measures related to hunting, taking and fishing and species management

- Regulation/Management of fishery in marine and brackish systems

Measures related to urban areas, industry, energy and transport

- Urban and industrial waste management

Conservation status

Annex 1:

1160: MATL U2, MMAC FV

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

This habitat is naturally subject to disturbance therefore likely to recover character and functionality relatively quickly if the substrate and hydrographic conditions are the same. For example meta-analysis of data on fishing impacts on muddy sand communities indicate that the recovery of biota can be measured in years.

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 %

Estimates of the area and extent of this habitat show considerable variation and are recognised as being biased and an underestimate. No assessment of trends in quantity have therefore been made. This habitat is Data Deficient under criteria A.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50,000 Km ²	Yes	Yes	No	>50	Yes	Yes	No	No
EU 28+	>50,000 Km ²	Yes	Yes	No	>50	Yes	Yes	No	No

This habitat has a large natural range in the North East Atlantic region. The precise extent is unknown however as EOO >50,000 km² and AOO >50, this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. There has been a decline in the biotic quality of this habitat and the major threat (demersal fisheries) is likely to cause continuing declines in quality within the next 20 years, however, the distribution of the habitat is such that the identified threats are unlikely to affect all localities at once. This habitat has therefore been assessed as Least Concern under criterion B.

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	>80 %	Intermediate %	unknown %	Unknown %	unknown %	unknown %
EU 28+	>80 %	Intermediate %	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 %

Substantial reductions in quality in at least some parts of this habitat are known to have occurred and continue to take place (as revealed by fishing distribution and intensity maps).

An analysis of the fishing intensity of EU trawlers (bottom otter, beam and mid-water trawls) using Automatic Identification System (AIS) ship tracking data over one year (2013/2014) shows high coverage in all European coastal waters and over the continental shelf. When combined with the modelled distribution of EUNIS marine habitat types it is possible to examine the extent of likely impact on a particular benthic habitat. For example, over this time period more than 40% of circalittoral fine sands and muddy sand were subject to trawling fishing pressure in the North Sea, with over 10% of this being interpreted a high or moderate pressure. When combining data for the North Sea and Celtic Sea more than 80% of this habitat type is considered to have been subject to such fishing pressure. Given that this is based on a single year of data, and that this type of pressure has been taking place for decades, it is likely to be an underestimate of the total area of this habitat which has been subject to such pressure.

Expert opinion is that there is likely to have been a very substantial reduction in quality of this habitat - an intermediate decline in quality affecting more than 80% of this habitat in the North East Atlantic region although it is also possible that more than 30% has been subject to a severe decline. This will depend on factors such as the intensity and frequency of disturbance. This habitat has therefore been assessed as Endangered under criteria C/D for both the EU 28 and EU 28+.

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.

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	LC	LC	LC	EN	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	DD	DD	DD	DD	LC	LC	LC	EN	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
Endangered	C/D1	Endangered	C/D1

Confidence in the assessment

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

Assessors

G. Saunders & C. Karamita.

Contributors

C. Karamita and the North East Atlantic Working Group: S. Gubbay, G. Saunders, H. Tyler-Walters, N. Dankers, F. Otero, J. Forde, K. Fürhaupter, R. Haroun, N. Sanders.

Reviewers

A.Darr.

Date of assessment

25/08/2015

Date of review

19/01/2016

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