A2.24 Polychaete/bivalve-dominated Atlantic littoral muddy sand

Summary

This habitat is comprised of muddy sand or fine sand, often occurring as extensive intertidal flats on open coasts and in marine inlets. Muddy sand habitats tend to support a relatively poor diversity of infaunal species, which are usually found in high abundances. These are predominately sessile tube-dwelling polychaetes with bivalves also well represented, amphipods and gastropods. This habitat is also important for wintering and passage birds for feeding and roosting.

This habitat is subject to pressures and threats that extend across all intertidal sedimentary habitat types, with both natural- (storm, tidal) and anthropogenically-mediated change (groyne/sea wall construction urbanisation etc.) constituting the greatest modifying influence. Documented threats include substratum loss due to coastal development, coast protection and flood defence works, changes in nutrient levels and eutrophication; synthetic chemical, heavy metal and hydrocarbon contamination; trampling/vehicle access and harvesting of infaunal species such as cockles. In the longer term, this habitat is vulnerable to sea level change. The threat from accumulation of microplastics by infauna is unknown but may be significant in the future.

Beneficial management measures include the regulation coastal developments and hard coastal defence structures, water quality improvement programmes to reduce the risk of toxic contamination and control, including restrictions on intertidal fisheries which affect the associated communities.

Synthesis

This habitat has a large natural range in the North East Atlantic, from the Atlantic coast of Portugal and Ireland, to the southern North Sea coasts of Denmark, Germany and the Netherlands. While there have been known losses as a result of human pressures, the scale of these losses are unknown when considered within a regional context. The same limitations apply when trying to determine any historical and recent trends in quality. Littoral sediment features are generally dynamic, and change in extent is difficult to quantify due to the natural processes, such as current/drift, wave action and wind, but historical losses are known to have occurred. The communities associated with this habitat are also naturally extremely variable often reflecting the shifting seasonal nature of the shore sediment, which is predominantly influenced by weather and tidal events.

This habitat has a large EOO and AOO, and therefore qualifies as Least Concern under criterion B. However the habitat is assessed as Data Deficient both at the EU 28 and EU 28+ levels because of a lack of information on the area covered and on any trends in quantity and quality.

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

A2.242 *Cerastoderma edule* and polychaetes in littoral muddy sand because of the pressures and impacts associated with cockle dredging.

Habitat Type

Code and name

A2.24 Polychaete/bivalve-dominated Atlantic littoral muddy sand

No characteristic photographs of this habitat currently available.

Habitat description

This muddy or fine sand habitat often occurs as extensive intertidal flats on open coasts and in marine inlets. It is predominantly a habitat of the mid and lower shore though can span the entire intertidal. Where it occurs in marine inlets, the habitat may be subject to variable salinity conditions. Fine sand or mobile sand communities may be present on the upper shore with muddy sand communities present lower down. The sediment generally remains water-saturated during low water and has a high organic content resulting from settlement of organic detritus and growth of heterotrophic autotrophic micro-organisms. There is also typically a high microbial population and high sediment stability due to cohesion. An anoxic layer may be present below 5 cm of the sediment surface, sometimes seen in the worm casts on the surface.

Muddy sand habitats tend to support a relatively poor diversity of species, which are usually found in high abundances. These are predominately sessile tube-dwelling polychaetes with bivalves also well represented, amphipods and gastropods. Some species characteristic of subtidal areas may also occur. This habitat is also important for wintering and passage birds for feeding and roosting.

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:

The species most typically found in this habitat is the Baltic tellin *Macoma balthica.* Other commonly occurring species include *Cerastoderma edule, Hydrobia ulvae, Pygospio elegans, Hediste diversicolor, Eteone longa, Scoloplos armiger* and *Arenicola marina.*

Classification

EUNIS (v1405):

Level 4. A sub-habitat of 'Atlantic littoral sand' (A2.2).

Annex 1:

1140 Mudflats & sandflats not covered at low tide

1160 Large shallow inlets and bays

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Littoral Sediment

EUSeaMap:

Not mapped

IUCN:

12.4 Mud shoreline and intertidal mud flats

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

Justification
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	Bay of Biscay and the Iberian Coast: Present Celtic Seas: Present Greater North Sea: Present Macaronesia: Present Kattegat: Uncertain	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	928,083 Km^2	457	Unknown 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.
EU 28+	>928,083 Km^2	>457	Unknown 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
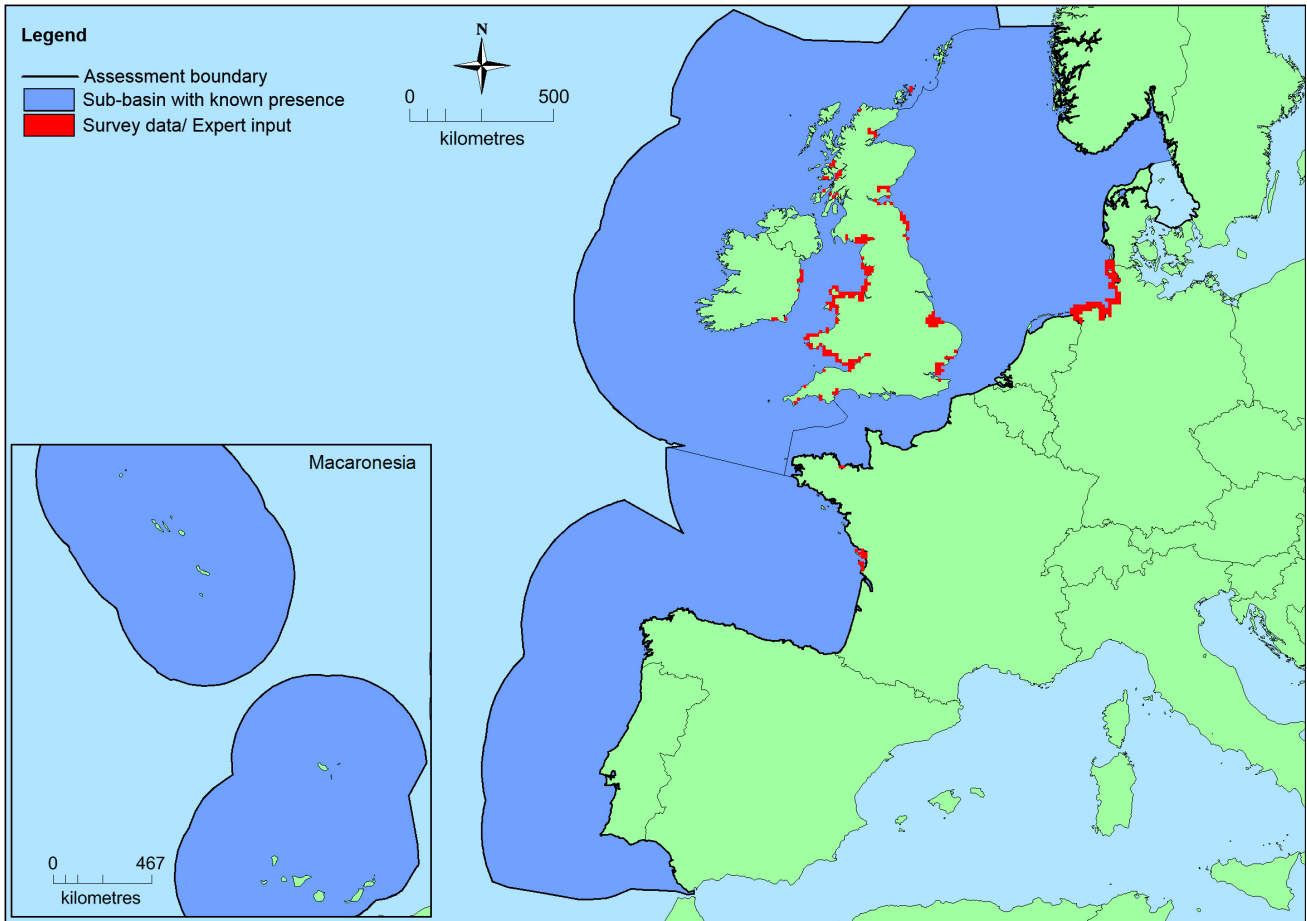
There are insufficient data to provide a comprehensive and accurate map of the distribution of this habitat. This map has been generated using EMODnet data from modelled/surveyed records for the North East Atlantic (and supplemented with expert opinion where applicable) (EMODnet 2010). EOO and AOO have 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 the EU 28 is likely to be between more than 90% but there is insufficient information to establish the exact figure.

Trends in quantity

Local and/or seasonal factors often exert a substantial influence on intertidal habitats making it difficult to distinguish any long-term trend across the region. This is further complicated by differences between localities, which are often linked to differences in geographical latitude and, therefore, to variation in climatic traits like temperature and/or ice cover.

The extent of this habitat has been mapped in detail in some locations e.g. the Rias Baixas of North West Spain, but there is insufficient information to provide an accurate report of area and extent for the entire North East Atlantic regional sea. There have been some substantial reductions in the extent of this habitat in historic times for example in Germany, the Netherlands and the UK due to land claim, embankments, coastal development, and harbour construction works. In Germany, where most changes took place before 1700, especially within estuaries, as a result of coast protection and flood defence works (embankment, dyking, dredging) up to 1950, further deepening of shipping channels proposed in the near future which could reduce the extent of this habitat.

There is some continuing loss of this habitat but insufficient data to make an overall assessment of trend in quantity.

- 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 large natural range in the North East Atlantic, from the Atlantic coast of Portugal and Ireland, to the southern North Sea coasts of Denmark, Germany and the Netherlands.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  This habitat has a large natural range in the North East Atlantic, from the Atlantic coast of Portugal and Ireland, to the southern North Sea coasts of Denmark, Germany and the Netherlands.

Trends in quality

Local and/or seasonal factors often exert a substantial influence on intertidal habitats making it difficult to distinguish any long-term trend across the region. This is further complicated by differences between localities, which are often linked to differences in geographical latitude and, therefore, to variation in climatic traits like temperature and/or ice cover. Whilst there are studies showing changes over various time periods in quality (species composition/biomass) in some locations e.g. where there has been cockle harvesting, there is insufficient information to determine any historical or recent trends for the regional as a whole.

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

Pressures and threats

This habitat is subject to pressures and threats that extend across all intertidal sedimentary habitat types, with both natural- (storm, tidal) and anthropogenically-mediated change (groyne/sea wall construction urbanisation etc.) constituting the greatest modifying influence.

Documented threats include substratum loss due to coastal development, coast protection and flood defence works, as well as synthetic chemical, heavy metal and hydrocarbon contamination. Organic enrichment can lead to increased coverage by opportunistic green macroalgae such as *Ulva* sp. and *Enteromorpha* sp. resulting in the formation of 'green tide' mats with anoxic conditions forming below the mats, reducing the diversity and abundance of infauna. Trampling/vehicle access and harvesting of infaunal species, particularly mechanical harvesting of cockles is known to result in large mortality of non-target invertebrates which in some situations have still been detected more than 80 days after harvesting.

In the longer term, this habitat is vulnerable to sea level change. The threat from accumulation of microplastics by infauna is unknown but may be significant in the future.

List of pressures and threats

Urbanisation, residential and commercial development

> Discharges

Biological resource use other than agriculture & forestry

> Fishing and harvesting aquatic resources
> > Professional active fishing
> > Benthic dredging
> > Leisure fishing
> > Bait digging / Collection

Natural System modifications

> Human induced changes in hydraulic conditions
> > Modification of hydrographic functioning, general

Climate change

> Changes in abiotic conditions
> > Wave exposure changes

Conservation and management

Beneficial management measures include the regulation of activities such as coastal developments and hard coastal defence structures that can have a direct impact by reducing the area of this habitat, as well as indirect effects by altering sediment movement and the wave exposure regime. Water quality improvement programmes to reduce the risk of toxic contamination and control, including restrictions on intertidal fisheries which affect the associated communities can also benefit this habitat.

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

> Restoring/Improving water quality

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

Measures related to urban areas, industry, energy and transport

> Urban and industrial waste management

Conservation status

Annex 1:

1140: MATL U2, MMAC XX

1160: MATL U2, MMAC FV

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

Recovery is dependent on the return of suitable sediment and recruitment of individuals. Overall recovery will vary between site location or hydrographic regime and the community may not recover exactly the

same species composition as existed prior to disturbance. Once suitable substratum returns, recolonisation is likely to be rapid, especially for rapidly reproducing species such as polychaetes, oligochaetes and some amphipods and bivalves. Recolonisation and hence recovery may be aided by bedload transport of juvenile polychaetes and bivalves.

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 %

Littoral sediment features are generally dynamic with the associated habitats exhibiting considerable natural variation. There have been historical losses in the quantity of this habitat and some continuing loss but insufficient data to make an assessment under this criterion. This habitat has therefore been assessed as Data Deficient under criterion 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	>50,000 Km^2	Unknown	Unknown	No	>50	Unknown	Unknown	No	No
EU 28+	>50,000 Km^2	Unknown	Unknown	No	>50	Unknown	Unknown	No	No

This habitat has a large natural range in the North East Atlantic region. The precise extent is unknown however as EOO >50,000km^2 and AOO >50, this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. Trends are unknown. 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 criteria B1(c) B2 (c) and B3 and Data Deficient for all other criteria.

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%

There are studies showing changes in habitat quality over various time scales as a result of human activities (e.g. cockle dredging) but no overview or quantitative data on reduction in abiotic and/or biotic quality of this habitat over the last 50 years.

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	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	DD	DD	DD	DD	LC	LC	LC	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)

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