A5.44 Atlantic upper circalittoral mixed sediments

Summary

This habitat occurs in mixed (heterogeneous) sediment in the circalittoral zone and includes well mixed muddy gravelly sands, or very poorly sorted mosaics of shell, cobbles and pebbles, embedded in, or lying upon mud, sand, or gravel. A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones are often present in this habitat and the hard substrata (shells and stones) on the surface enables epifaunal species to become established, particularly hydroids. The combination of epifauna and infauna can lead to species-rich communities.

Abrasion and physical disturbance from dredging and trawling activities are the predominant threats to the infaunal communities associated with this habitat. The infaunal communities of this habitat are extremely vulnerable to substratum loss, abrasion and physical disturbance from dredging and trawling activities. Such activity, which is known to degrade the quality of habitats associated with mixed substrates, has been widespread, for more than a century across the North East Atlantic region and particularly intensive in the North Sea and Celtic Sea. Beneficial management measures include the control of activities such as demersal fishing, dredging and depositing sediment which result in abrasion, smothering and physical disturbance or removal of seabed communities or change the hydrological conditions. Removal of such threats can also provide opportunities for habitat recovery.

Synthesis

This habitat has a large natural range in the North East Atlantic. A combination of survey data and modelling indicates that it does not have a restricted geographical distribution nor occur in only a few locations in the North East Atlantic and therefore qualifies as Least Concern under criterion B.

Most sedimentary benthic systems on the continental shelf of Europe have been modified by fishing activities, particularly bottom trawls and dredging, in the last 100 years and this habitat remains under fishing 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. Data for a single year (2013/2014) has revealed that just over 50% of this habitat in the North Sea and Celtic Sea was subject to fishing pressure by bottom otter, beam and mid-water trawls.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. Cumulative impacts are therefore also likely to have occurred.

Expert opinion is that there has been a substantial reduction in quality of this habitat, most likely an intermediate decline affecting more than 50% 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 Vulnerable 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
Vulnerable	C/D1	Vulnerable	C/D1

Sub-habitat types that may require further examination

None.

Habitat Type

Code and name

A5.44 Atlantic upper circalittoral mixed sediments

No characteristic photographs of this habitat currently available.

Habitat description

This habitat comprises mixed (heterogeneous) sediment in the circalittoral zone (generally below 15-20 m). These include areas of well mixed muddy gravelly sands, or very poorly sorted mosaics of shell, cobbles and pebbles, embedded in, or lying upon mud, sand, or gravel. It is fully saline with tidal streams ranging from moderately strong (1-3kn) to negligible.

A wide range of infaunal polychaetes, bivalves, echinoderms and burrowing anemones, are often present in this habitat and the hard substrata (shells and stones) on the surface enables epifaunal species to become established, particularly hydroids. The combination of epifauna and infauna can lead to species-rich communities.

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 mayface; 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 overtime.

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:

Polychaetes, bivalves, echinoderms and burrowing anemones, such as *Cerianthus lloydii:* hydroids, such as *Nemertesia* spp and *Hydrallmania falcata*. Echinoderms such as *Asterias rubens, Amphiura filiformis,* and *Ophiocomina nigra,* may also be common.

Classification

EUNIS (v1405):

Level 4. A sub-habitat of ‘Atlantic circalittoral mixed sediment’ (A5.4).

Annex 1:

1110 Sandbanks slightly covered all the time

1160 Large shallow inlets and bays

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral mixed sediment

EUSeaMap:

Shallow coarse or mixed sediments

IUCN:

9.4 Subtidal sandy

9.5 Subtidal sandy-mud

9.6 Subtidal muddy

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

Justification

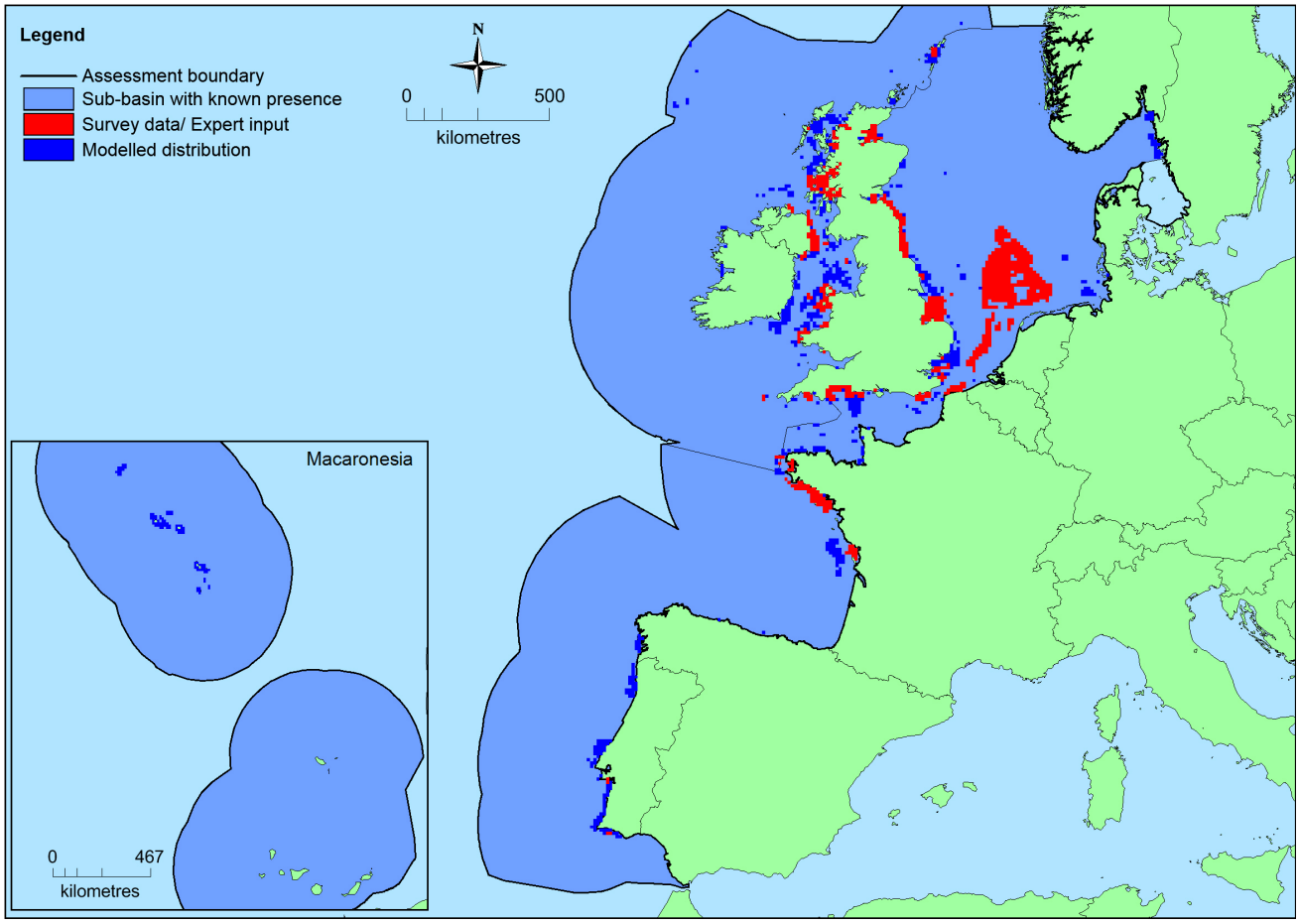
Geographic occurrence and trends

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	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	4,978,767 Km^2	1,801	>15,885 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+	>4,978,767 Km^2	>1,801	>15,885 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, 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. Even where the extent of this habitat, or its associated biotopes, has been mapped in detail (e.g. within some Marine Protected Areas) there is a lack of information on trends.

- 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 region with records from the north of Shetland to the coast of Portugal.
- 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 region with records from the north of Shetland to the coast of Portugal.

Trends in quality

The substantial extent of the likely impact of bottom fishing gears on this habitat throughout the North East Atlantic region is apparent from many studies including analyses which have combined Vessel Monitoring System (VMS) data with sensitivity maps of benthic habitats and disturbance caused by surface abrasion for the continental shelf area of the North East Atlantic. An investigation which included the potential effects of trawling on "combination sediments" in the Kattegat. In this location 38% of the area was trawled over a three year study period. Most recently, 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 around 30% of this habitat type was subject to trawling fishing pressure in the North Sea, with just under 10% of this being interpreted a high or moderate pressure. When combining data for the North Sea and Celtic Sea just over 50% 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

This habitat supports infaunal species that are extremely vulnerable to substratum loss, abrasion and physical disturbance from dredging and trawling activities. Mobile demersal fishing gears (such as otter trawls and beam trawls) disturb the upper layers of the sediment and damage both the associated epifauna and shallow infalunal communities. Associated increases in suspended sediments may also have a smothering effect on filter feeders. The degree of any damage will depend on the gear, frequency of use and species present. Frequent trawling may lead to a permanently altered community dominated by fast growing scavenger/predator species. In addition, activities such as construction works that alter current flow will have a significant impact on both infaunal and epifaunal community structure. A decreased water flow rate will reduce food particle availability, while an increased flow rate, particularly over extended periods, is likely to result in the loss of many species, due to the decrease of organic matter availability.

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

Natural System modifications

Human induced changes in hydraulic conditions
Modification of hydrographic functioning, general
Modification of water flow (tidal & marine currents)

Alteration of sea-floor/ Water body morphology

Conservation and management

Beneficial management measures for this habitat include the regulation of fishing methods and the control of other types of activities such as dredging and depositing sediment which may damage or disturb seabed communities or change the hydrological conditions.

List of conservation and management needs

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 special resouce use

Regulating/Managing exploitation of natural resources on sea

Conservation status

Annex 1:

1110: MATL U2, MMAC U1

1160: MATL U2, MMAC FV

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

Habitats on mosaics of muds, sands and gravel are belived to have a high recovery rate following disturbance by abrasion and displacement.

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 overall trends in quantity of this habitat in the North East Atlantic. 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	Yes	Yes	No	>50	Yes	Yes	No	No
EU 28+	>50,000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No

There has been a decline in quality of this habitat due to disturbance of benthic communities resulting from mobile demersal fishing gears in particular. This trend is considered likely to continue however, the distribution of the habitat is such that the identified threats are unlikely to affect all localities at once. Furthermore this habitat has a large natural range in the North East Atlantic region and as EOO >50,000 km^2 and AOO >50, this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. This habitat has therefore been assessed as Least Concern 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	>50 %	Intermediate %	unknown %	unknown %	unknown %	unknown %
EU 28+	>50 %	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%

Most sedimentary benthic systems on the continental shelf of Europe have been modified by fishing activity in the last 100 years and this remains a significant pressure. A recent 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 around 30% of this habitat type was subject to trawling fishing pressure in the North Sea, with just under 10% of this being interpreted a high or moderate pressure. When combining data for the North Sea and Celtic Sea just over 50% of this habitat type is considered to have been subject to such fishing pressure.

Expert opinion is that there is likely to have been a substantial reduction in quality of this habitat - an intermediate decline in quality affecting more than 50% 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 Vulnerable 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	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	DD	DD	DD	DD	LC	LC	LC	VU	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
Vulnerable	C/D1	Vulnerable	C/D1

Confidence in the assessment
Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

Assessors
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Reviewers
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Date of assessment
25/08/2015

Date of review
19/01/2016

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