A5.45 Atlantic lower circalittoral mixed sediment

Summary

This type of offshore (deep) circalittoral habitat consists of slightly muddy mixed gravelly sand and stones, or shell. It is known to cover large areas of the offshore continental shelf in depths ranging from 20-150m. This and similar habitats are known to often be highly diverse supporting large numbers of infaunal polychaete and bivalve species.

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. Moreover, hydrocarbon or heavy metal contamination is known to be harmful to the larval and embryonic stages of bivalves species, disrupting feeding rates which subsequently reduces growth and reproductive success. The control and regulation of demersal fishing activity and sand and gravel extraction, which disturbs and damages the infaunal communities, will 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 2103/2014 year has revealed that more than 70% 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

A5.45 Atlantic lower circalittoral mixed sediment

No characteristic photographs of this habitat currently available.

Habitat description

This habitat comprises offshore (deep) fully saline circalittoral habitats with slightly muddy, mixed gravelly sand and stones or shell. It may cover large areas of the offshore continental shelf in depths ranging from 20-150m although there are relatively little data available on its precise extent. This and similar habitats are known to often be highly diverse supporting large numbers of infaunal polychaete and bivalve species. Epibenthos include sea anemones, sponges and sea urchins.

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 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:

Animal communities in this habitat are closely related to those found in offshore gravels and coarse sands and in some areas populations of the horse mussel *Modiolus modiolus* may develop (A5.622). Species which occur at a high frequency and/or are abundant or common in this habitat include *Pseudomystides limbata, Eumida sanguinea, Nereiphylla lutea, Glycera lapidum Sphaerosyllis tetralix, Lumbrineris gracilis, Aonides paucibranchiata, Lanonice bahusinesis, Polydora caulleryi, Mediomastus fragilis, Hydroides norvegica, Anoplodactylus petiolatus, Leptochiton asellus, Glycymeris glycymeris*, and *Timoclea ovate*. Characteristic species of epibenthos include *Echinus acutus, Spatangus purpureus, Parazoanthus* and *Phakellia*.

Classification

EUNIS (v1405):

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

Annex 1:

No relationship

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

Marine - Shelf

MSFD:

Shallow sublittoral mixed sediments

Shelf sublittoral mixed sediment

EUSeaMap:

Shallow coarse or mixed sediments

Shelf coarse or mixed sediments

IUCN:

9.4 Subtidal sandy

9.5 Subtidal sandy-mud

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

Justification

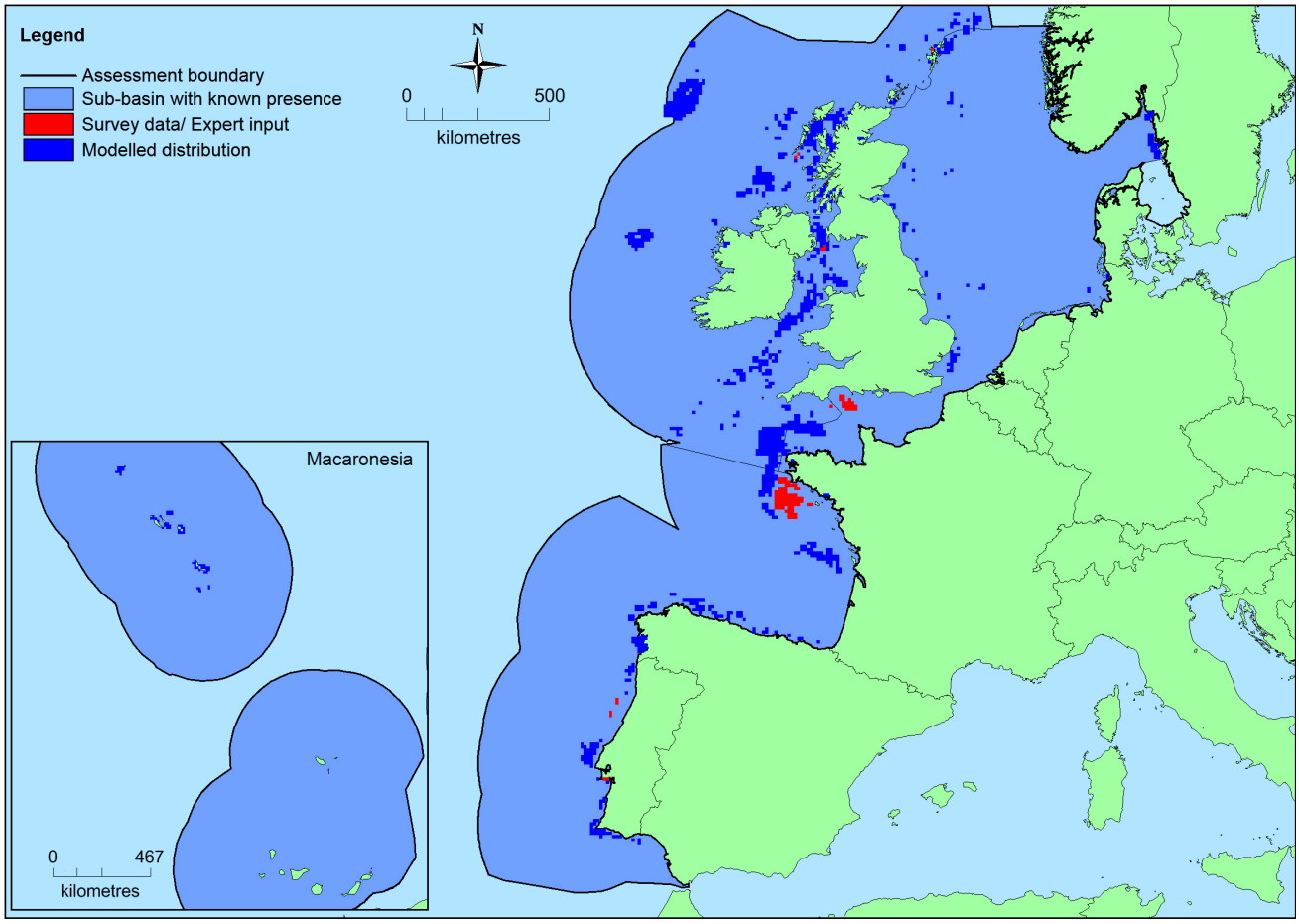
Geographic occurrence and trends

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	5,109,391 Km^2	1,232	>31,057 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+	>5,109,391 Km^2	>1,232	>31,057 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. Even where the extent of this habitat or its associated biotopes has been mapped in detail (e.g. as part of resource assessments for sand and gravel extraction or within 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 Atlantic coast of Spain, the Bay of Biscay and the western Channel.
- 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 Atlantic coast of Spain, the Bay of Biscay and the western Channel.

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 VMS data with sensitivity maps of benthic habitats and disturbance caused by surface abrasion for the continental shelf area of the North East Atlantic. 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 70% of the area of Atlantic circalittoral mixed sediment was subject to such fishing pressure in the North Sea and Celtic Sea. 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 is known to support a high abundance of infaunal polychaetes and bivalve species, which 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 communites. 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.

The larval and embryonic stages of bivalves are particularly intolerant of heavy metal contamination. In addition, the communities associated with this habitat are very intolerant of hydrocarbons contamination as contact with oil increases energy expenditure and reduces feeding rates in bivalves, resulting in less energy available for growth and reproduction.

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
- Oil spills in the sea
- Toxic chemical discharge from material dumped at sea
- Non-synthetic compound contamination
- Synthetic compound contamination
- Radionucleide contamination

Introduction of other substances (e.g. liquid, gas)

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 sand and gravel extraction which damage or disturb seabed communities. In addition, the control of chemical contaminants from discharges and spills may be important, particularly when this habitat occurs close to coasts and river/estuarine catchments.

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality

Measures related to marine habitats

Restoring marine habitats

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

No Annex 1 or OSPAR types.

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

The capacity for this habitat to recover once severly damaged is unknown.

Effort required

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 70% of Atlantic circalittoral mixed sediment was subject to such fishing pressure in the North Sea and Celtic Sea. 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 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
North East Atlantic Working Group: S. Gubbay, G. Saunders, H. Tyler-Walters, N. Dankers, F.Otero-Ferrer, J. Forde, K. Fürhaupter, R. Haroun Tabraue, N. Sanders.

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

Reviewers
S.Beal.

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