Epibenthic communities in Baltic upper circalittoral mixed sediment

Summary

This is a benthic habitat in the aphotic zone. It occurs in all the Baltic Sea sub-basins although some of the associated biotopes have a more restricted distribution. Areas dominated by epibenthic sponges for example are only present in the Belt Sea and Gulf of Bothnia, while those dominated by hydroids and sea anemones do not occur in the Gulf of Bothnia and Gulf of Riga.

Eutrophication is a major threat to this habitat. It is also threatened by physical disturbance by bottom trawling, offshore construction work and sand and gravel extraction. All actions which aim to reduce physical disturbance of aphotic habitats on mixed hard and soft substrates in the Baltic Sea are important for the conservation of this habitat. In addition, appointing protected areas where the habitat is known to occur and restricting activities which cause direct damage or disturbance to the seabed would be beneficial to this habitat. Further mapping activities should be carried out to better delineate the area of occurrence.

Synthesis

This habitat is known to occur in all the Baltic Sea sub-basins but quantiative data on the area covered is not available. There are considered to have been significant declines (up to 30%) in the extent of many of the associated biotopes and predicted future declines. Some decline in quality (up to an estimated 10%) has also been reported for some of the associated biotopes but the overall trend is uncertain.

The overall assessment for this EUNIS level 4 habitat has been based on the HELCOM (2013) assessments for the associated HELCOM HUB biotopes. Draft assessments were derived using a weighted approach whereby the HELCOM assessment outcomes were assigned a score. This was averaged across the relevant biotopes. The outcomes were reviewed by Baltic experts to reach a final conclusion. HELCOM (2013) assessed four of the associated biotopes as NT(A1), and four as LC(A1). One further biotope was not evaluated. On the basis of these assessments and expert opinion, this habitat is assessed as Near Threatened, since there has been an estimated 10-30% decline in quantity over the last 50 years.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	A1	Near Threatened	A1

Sub-habitat types that may require further examination

AB.M1F1 Baltic aphotic mixed hard and soft substrates dominated by sea squirts

AB.M1G2 Baltic aphotic mixed hard and soft substrates dominated sea anemones (Actiniarida)

AB.M1H2 Baltic aphotic mixed hard and soft substrates dominated by erect moss animals (*Flustra foliacea*)

AB.M1J Baltic aphotic mixed hard and soft substrates dominated by epibenthic sponges (Poriferra)

Habitat Type

Code and name

Epibenthic communities in Baltic upper circalittoral mixed sediment

No characteristic photographs of this habitat
currently available.

Habitat description

This is a Baltic Sea benthic habitat in the aphotic zone. The substrate is a mix of soft or crystalline rock, boulders or stones mixed with mobile substrates such as sand or coarse substrate as well as muddy sands as defined in the HELCOM HUB classification. It typically occurs in depths from 20-150m and seven associated biotopes have been described, some of which are more common in particular depth zones. The biotopes are variously characterised by epibenthic bivalves, chordates, cnidarians (soft corals and sea anemones), bryozoans, crustaceans, sponges and a mixed epibenthic macrocommunity. Some occur in all the sub-basins of the Baltic Sea whereas as others, such as aphotic mixed substrates characterised by epibenthic sponges, are only reported from the Belt Sea and the Gulf of Bothnia. Depending on the dominant species the biotope may either be encrusting or form a layer of living material extending 20cm about the substrate.

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. Diversity, abundance and biomass of fauna are potential indicators of quality.

Characteristic species:

The characteristic species differ depening on the dominant biotope. They include ; *Mytilus* spp. and *Modiolus modiolus;* Ascidians, such as *Ciona intestinalis, Dendrodoa grossularia, Molgula* spp., *Corella parallellogramma, Ascidia mentula, Ascidia virginea* and *Ascidia obliqua;* epibenthic cnidarians *Laomedea* spp., *Cordylophora caspia, Edwardsia spp, Metridium senile, Gonactinia prolifera, Urticina felina, Stomphia coccinea, Sagartia elegans;* bryozoans *Electra crustulenta, Flustra*

foliacea, Eucratea loricata) as well as barnacles *Amphibalanus improvises, Balanus crenatus, Semibalanus balanoides and sponges* such as *Haliclona oculata*.

Classification

EUNIS:

The closest correspondence in EUNIS (2004) level 4 is A5.41 Sublittoral mixed sediment in low or reduced salinity

Annex 1:

The relationship between HUB biotopes and Annex 1 habitats has not yet been mapped by HELCOM, however this habitat may occur in the following Annex 1 habitats:

1110 Sandbanks slightly covered all the time

1160 Large shallow inlets and bays

1650 Boreal Baltic narrow inlets

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral coarse sediment

Shallow sublittoral mixed sediment

EUSeaMap:

Shallow coarse or mixed sediments

IUCN:

9.3 Subtidal loose rock/pebble/gravel

9.4 Subtidal sandy

9.5 Subtidal sandy mud

Other relationships:

Level 5 of the HELCOM HUB (2013) classification:

AB.M1E– Baltic aphotic mixed substrate characterized by epibenthic bivalves This habitat has one sub-habitat on HUB level 6; 'Baltic aphotic mixed substrates dominated by Mytilidae' (AB.M1E1).

AB.M1F–Baltic aphotic mixed substrate characterized by epibenthic chordates

AB.M1G–Baltic aphotic mixed substrate characterized by epibenthic cnidarians This habitat has in total four sub-habitats on HELCOM HUB level 6, of which two (AB.M1G3 'Baltic aphotic mixed sediment dominated by stone corals (Scleractinida)' and

AB.M1G4 'Baltic aphotic mixed sediment dominated by soft corals (Alcyonacea)') are only encountered in Kattegat and are thus excluded from the Baltic Sea European Red List of habitats assessment. The two sub-habitats included in the Baltic Sea European Red List of habitats are 'Baltic aphotic mixed substrate dominated hydroids (Hydrozoa)' (AB.M1G1), and 'Baltic aphotic mixed substrate dominated by sea anemones (Actiniarida)' (AB.M1G2)

AB.M1H–Baltic aphotic mixed substrate characterized by epibenthic moss animals (Bryozoa) This habitat has two sub-habitats on HUB level 6; 'Baltic photic mixed substrate dominated by crustose moss animals (Electra crustulenta)' (AB.M1H1) 'Baltic photic mixed substrate dominated by erect moss animals (Flustra foliaceae)' (AB.M1H2)

AB.M1I– Baltic aphotic mixed substrate characterized by epibenthic crustacea This habitat has one sub-habitat on HUB level 6; 'Baltic aphotic mixed substrate dominated by barnacles (Balanidae)' (AB.M1I1).

AB.M1J: Baltic aphotic mixed substrate characterized by epibenthic sponges

AB.M1V–Baltic aphotic mixed substrate characterized by mixed epibenthic macrocommunity.

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

Regions
Baltic

Justification
This habitat occurs throughout the Baltic with the associated biotopes (e.g. dominated by Mytilidae and by bryozoans) mostly typical and characteristic for the Baltic brackish waters although some, such as the biotopes dominated by epibenthic sponges are more unusual.
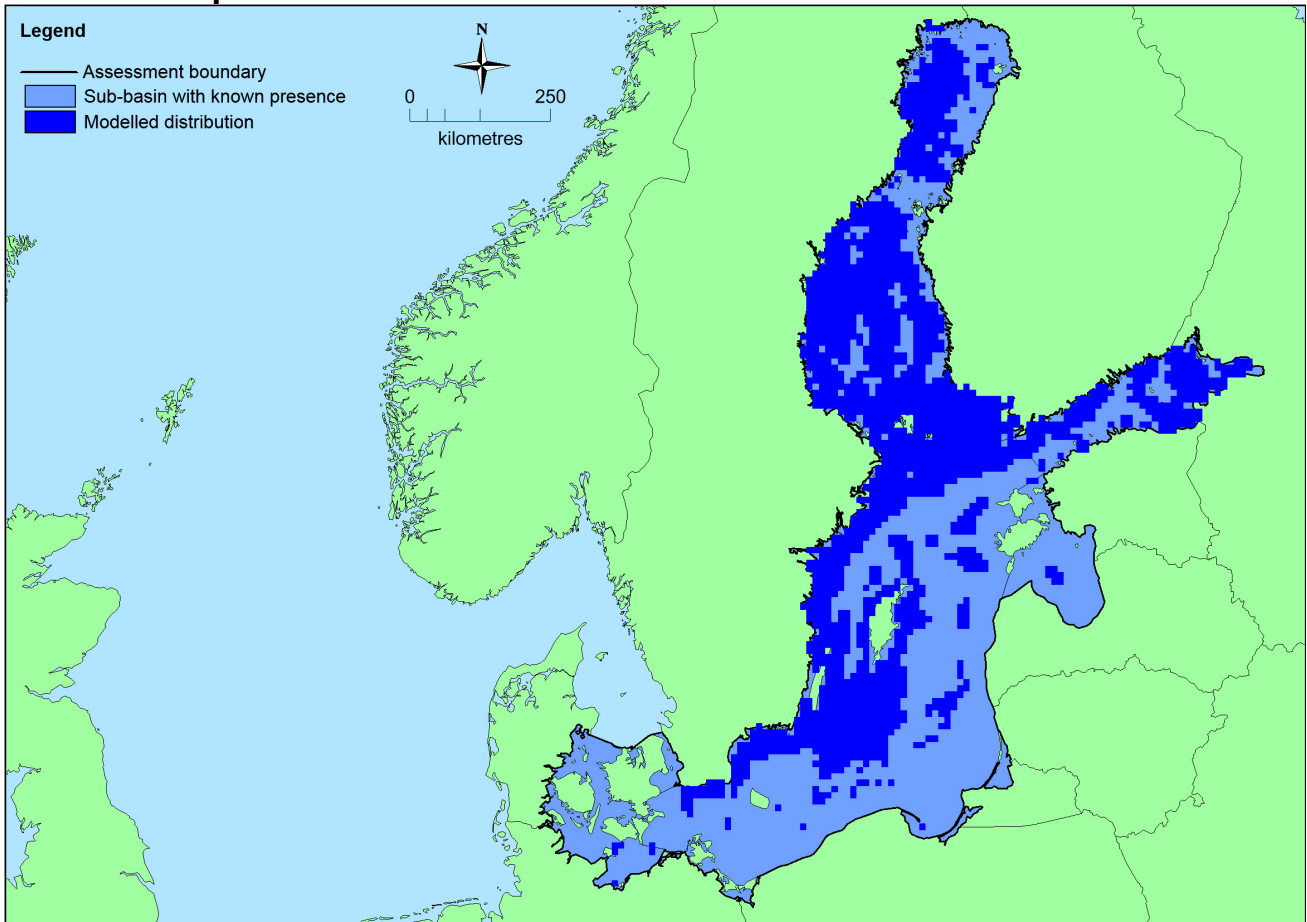
Geographic occurrence and trends

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Baltic Sea	Baltic Proper: Present Belt Sea: Present Gulf of Bothnia: Present Gulf of Finland: Present Gulf of Riga: Present The Sound: Present	Unknown Km^2	Decreasing	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	>50,000 Km^2	Unknown	Unknown Km^2	This habitat is present in all the Baltic sub-basins however there is insufficient information for accurate calculation of EOO and AOO.

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28+	>50,000 Km^2	Unknown	Unknown Km^2	This habitat is present in all the Baltic sub-basins however there is insufficient information for accurate calculation of EOO and AOO.

Distribution map

There are insufficient data to provide a comprehensive and accurate map of the distribution of this habitat. This map has therefore been generated using the modelled data available on EMODnet for EUNIS level 3 habitats in the Baltic Sea (EMODnet, 2010). This means it indicates potential areas in which this habitat may occur, not the actual distribution of this EUNIS level 4 habitat. EOO and AOO cannot be calculated at the present time, although the habitat is known to occur in all the Baltic Sea sub-basins.

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

This habitat occurs in the EU 28+ (Russia). The percentage hosted by EU 28 is therefore less than 100% but there is insufficient information to establish the proportion. This habitat may be present in other European regional seas.

Trends in quantity

Different trends in quantity have been identified for the different associated biotopes, with all except one believed to have declined between 10-30% over the last 50 years. Future declines in extent are predicted for those biotopes dominated by bryozoans and by Mytilids.

- Average current trend in quantity (extent)
  EU 28: Decreasing

EU 28+: Decreasing
- <u>Does the habitat type have a small natural range following regression?</u>
  No
  Justification
  Overall no, but some of the associated biotopes do have a small natural range following regression. This is the case for areas dominated by erect bryozoans and those dominated by epibenthic sponges.
- <u>Does the habitat have a small natural range by reason of its intrinsically restricted area?</u>
  No
  Justification
  This habitat occurs in all the Baltic Sea sub-basins therefore does not have a small natural range.

Trends in quality

There have been some declines in quality of some of the associated biotopes (e.g. in the order of 10% for biotopes dominated by Mytilidae) but in most cases there is insufficient information to make a trend analysis.

- <u>Average current trend in quality</u>
  EU 28: Unknown
  EU 28+: Unknown

Pressures and threats

Eutrophication is a major threat to this habitat. The growth rate of annual macrophyte algae is known to increase due to higher nutrient concentrations in the water, which might restrict the available substrate for the settlement by epifaunal turf communities. The increased siltation rate due to eutrophication, further reduces the availability of hard substrates especially impeding the settlement of larvae. A higher particle concentration in the water may also impede the filter feeding efficiency of some characteristic species such as adult *Flustra foliacea*. Oxygen depletion due to eutrophication is seen as less serious threat. This habitat is also threatened by physical disturbance by bottom trawling, offshore construction work and exploitation of soil resources, in the same way as several other hard bottom habitats.

List of pressures and threats

Mining, extraction of materials and energy production

Mining and quarrying
Sand and gravel extraction
Exploration and extraction of oil or gas

Biological resource use other than agriculture & forestry

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

Pollution

Pollution to surface waters (limnic, terrestrial, marine & brackish)
Nutrient enrichment (N, P, organic matter)
Input of contaminants (synthetic substances, non-synthetic substances, radionuclides) - diffuse sources, point sources, acute events

Conservation and management

All actions which aim to reduce physical disturbance of aphotic habitats on mixed hard and soft substrates in the Baltic Sea would benefit this habitat. In addition, appointing protected areas where the habitat is known to occur and restricting bottom trawling, offshore construction work and exploitation of sand and gravel in these areas would constitute an effective conservation measure. Further mapping activities should be carried out to better delineate the area of occurrence.

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality

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

Conservation status

Annex 1:

1110: MBAL U1

1160: MBAL U2

1650: MBAL U2

HELCOM (2013) assessments:

1110 VU C1

1160 VU C1

1650 VU C1

HELCOM (2013) have assessed AB.M1E1, AB.M1G1, AB.M1H1 and AB.M1I1 as LC(A1), and AB.M1F1, AB.M1G2, AB.M1H2, and AB.M1J as NT(A1). AB.M1V was not evaluated.

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

The associated biotopes dominated by bryozoans have the potential to fairly quickly recolonise destroyed areas after the pressure/threat has been removed and the environmental conditions are restored. The recovery potential is unknown for the other associated biotopes. The overall capacity for recovery is therefore unknown.

Effort required

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	>25 %	Unknown %	Unknown %	Unknown %

Criterion A	A1	A2a	A2b	A3
EU 28+	>25 %	Unknown %	Unknown %	Unknown %

All except one of the associated biotopes are believed to have declined, and in some cases this has been estimated to be up to 30% in the last 50 years. This habitat is therefore assessed as Near Threatened under Criterion A. Future declines in extent are predicted for those biotopes dominated by bryozoans and by Mytilids.

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	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
EU 28+	>50,000 Km^2	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

This habitat is found in all the Baltic sub-basins therefore EOO exceeds 50,000 km^2 however with no quantitative data on habitat extent or area, accurate calculation of EOO and AOO is not possible at the present time. Future declines in extent are predicted for those biotopes dominated by bryozoans and by Mytilids but the overall future trend is unknown.

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 considered there to be insufficient data on which to assess 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 that estimates 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	NT	DD	DD	DD	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	NT	DD	DD	DD	LC	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
Near Threatened	A1	Near Threatened	A1

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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Reviewers
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References

Barthel D., Wolfrath B. 1989. Tissue sloughing in the sponge *Halichondria panacea*: afouling organism prevent being fouled. Oecologia 78: 357-360.

Bitschofsky F., Forster S., Scholz J. 2011. Introduction in: 'Regional and temporal changes in epizoobiontic bryozoan-communities of Flustra foliacea (Linnaeus, 1758) and implications for North Sea ecology'. Estuarine, Coastal and Shelf Science 91(3): 423–433.

HELCOM. 1998. Red List of marine and coastal biotopes and biotopes complexes of the Baltic Sea, Belt Sea and Kattegat. Baltic Sea Environmental Proceedings No. 75. Helsinki Commission, Helsinki. 115pp.

HELCOM. 2013. Red List of Baltic Sea underwater biotopes, habitats and biotope complexes. *Baltic Sea Environmental Proceedings* No. 138.

Hiscock, K., Wilson, E. 2007. *Metridium senile*. Plumose anemone. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme. Plymouth: Marine Biological Association of the United Kingdom. Available at: http://www.marlin.ac.uk/speciesfullreview.php?speciesID=3806

Moen, E., Svenson, E. 2009. Djurliv i havet: Nordeuropeisk marin fauna. *Nordstedts*. 768 pp.

OCEANA. 2011. Conservation proposals for ecologically important areas in the Baltic Sea. http://oceana.org/sites/default/files/reports/OCEANA_Baltic_report_2011_ENG.pdf

OSPAR 2008. OSPAR List of Threatened and/or Declining Species and Habitats.

Stresemann E., Hannemann H.-J., Klausnitzer B. Senglaub K. 1992. Exkursionsfauna von Deutschland. Band 1, Wirbellose (ohne Insekten). Volk und Wissen Verlag gmbH Berlin.

Picton, B.E., Morrow, C.C. 2010. Encyclopedia of Marine Life of Britain and Ireland. Available at: http://www.habitas.org.uk/marinelife/index.html (viewed may 29 2013)

Ryland J.S., Hayward P.J. 1977. *British anascan bryozoans*. Synopses of the British Fauna (New Series), No. 10. Academic Press, London.

Stresemann E., Hannemann H.-J., Klausnitzer B. Senglaub K. 1992. *Exkursionsfauna von Deutschland*. Band 1, Wirbellose (ohne Insekten). Volk und Wissen Verlag gmbH Berlin.

Tyler-Walters H., Ballerstedt S. 2007. Flustra foliacea. Hornwrack. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 08/07/2013]. Available at: http://www.marlin.ac.uk/generalbiology.php?speciesID=3342