

Epifaunal communities on Baltic infralittoral rock and mixed substrata (predominantly hard)

Summary

This habitat is very common being present along most coastal waters except possibly some of the eastern and southern Baltic where sand is the dominating substrate or in areas of low salinity, i.e. the Bothnian Bay and parts of Gulf of Finland. Detailed mapping of distribution and extent has not taken place although there are some data from regional studies (e.g. Estonia).

Eutrophication is a major threat to at least to some of the associated biotopes as the higher nutrient concentrations enhances the growth rate of annual macrophytic algae, restricting the available substrate for development of epifaunal turf communities. In contrast Mytilids are very tolerant to, and even favoured by, eutrophication (because it increases food availability). Potentially beneficial measures include reducing the diffuse run off from agricultural land and nutrient run off from point-sources by constructing waste water treatment plants. All actions to reduce physical disturbance from bottom trawling, offshore construction work and dredging, including prohibition in protected areas, would also be beneficial.

Synthesis

This habitat is present in all sub-basins of the Baltic therefore EOO exceeds 50,000 km² although the lack of quantitative data on extent, means that accurate calculations of EOO and AOO are not possible at the present time. There is believed to have been some deterioration in extent and quality of some of the associated biotopes, but expert opinion is that overall this habitat has not declined significantly (>25%) over the last 50 years.

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 all the associated Baltic biotopes as Least Concern (A1) except for those dominated by the bryozoan *Flustra foliacea* (AA.A1H2 and AA.M1H2) which were assessed as Near Threatened (A1). With no additional information on changes in extent or quality of this habitat, and because the biotopes assessed as Near Threatened by HELCOM are less common than the other biotopes, current expert opinion is that this habitat should be assessed as Least Concern for the EU 28 and EU 28+.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least Concern	-	Least Concern	-

Sub-habitat types that may require further examination

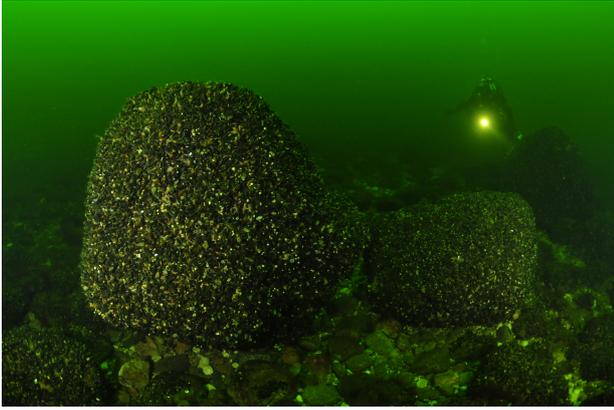
AA.A1H2 : Baltic photic rock and boulders dominated by erect moss animals, *Flustra foliacea*

AA.M1H2: Baltic photic mixed substrate dominated by erect moss animals, *Flustra foliacea*

Habitat Type

Code and name

Epifaunal communities on Baltic infralittoral rock and mixed substrata (predominantly hard)



Blue mussel beds (*Mytilus*) on boulders in the Northern Baltic Proper (© OCEANA/ C.Minguell).



Stony reef community, Fehmarn Belt, Germany (© BfN/ Krause.& Hübner) .

Habitat description

This is a Baltic Sea benthic habitat in the photic zone where at least 90% of the substrate is rock, boulders or stones and mixed (predominantly hard), according to the HELCOM HUB classification. Eleven associated biotopes have been identified dominated (at least 50% of the biomass) by either epibenthic bivalves, chordates, cnidarians, bryozoans, crustaceans or sponges. They are typically present in depths of between 2-20 meters but have varying distributions depending on salinity and exposure. For example those biotopes where Mytilidae such as *Mytilus* spp. or *Modiolus modiolus* dominate typically occur in depths of 5 - 20 meters, in all exposure classes and in salinities over 5 psu. Biotopes dominated by the mussel *Dreissena polymorpha* (AA.A1E2/AA.M1E2) usually occupy a depth zone of between 2 - 10 meters, in sheltered to moderate exposure and in salinities less than 5 psu. They occur in the eastern parts of the Gulf of Finland and along the Estonian west coast. 'Baltic photic rock and boulders/mixed sediment dominated by erect moss animals (*Flustra foliacea*)' (AA.A1H2/AA.M1H2) is found only in western and southwestern Baltic Sea due to salinity constraints (15 psu).

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 the dominant species and associated fauna are potential indicators of quality of this habitat

Characteristic species:

For mussel dominated biotopes *Mytilus* spp., *Modiolus modiolus*, *Dreissena*; for epibenthic chordate dominated biotopes - Sea squirts (Ascidiaceae), for example *Ciona intestinalis*, *Dendrodoa grossularia*, *Molgula* spp.; for epibenthic chordate dominated biotopes - Hydroids (e.g. *Cordylophora caspia*, *Gonothraea loveni*, *Laomedea* spp), sea anemones, corals. For moss animal dominated biotopes *Electra crustulenta*, *Flustra foliacea*, other Bryozoa (*Eucratea loricata*), also sponges, sea squirts or hydrozoans. For epibenthic crustacean dominated biotopes - Balanidae, for example *Amphibalanus improvises*, *Balanus crenatus*, *Semibalanus balanoides*. For sponge dominated biotopes - *Ephydatia fluviatilis*, *Chalinula limbata*, *Halichondria panicea*, *Haliclona oculata*.

Classification

EUNIS:

The closest correspondence in EUNIS (2004) level 4 is A3.4 Baltic exposed infralittoral rock, A3.5 Baltic moderately exposed infralittoral rock, and A3.6 Baltic sheltered infralittoral rock.

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:

1160 Large shallow inlets and bays

1170 Reefs

1650 Boreal Baltic narrow inlets

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral rock and biogenic reef

Shallow sublittoral mixed sediment

EUSeaMap:

Shallow photic rock or biogenic reef

Shallow coarse or mixed sediments

IUCN:

9.2 Subtidal rock and rocky reefs

9.3. Subtidal Loose Rock/Pebble/Gravel

Other relationships:

Level 5 of the HELCOM HUB classification (2013):

AA.A1E Baltic photic rock and boulders characterized by epibenthic bivalves

AA.M1E Baltic photic mixed characterized by epibenthic bivalves

AA.A1F Baltic photic rock and boulders characterized by epibenthic chordates

AA.M1F Baltic photic mixed substrate characterized by epibenthic chordates

AA.A1G Baltic photic rock and boulders characterized by epibenthic cnidarians.
AA.M1G Baltic photic mixed substrate characterized by epibenthic cnidarians.
AA.A1H Baltic photic rock and boulders characterized by epibenthic moss animals (Bryozoa).
AA.M1H Baltic mixed substrate characterized by epibenthic moss animals (Bryozoa).
AA.A1I Baltic photic rock and boulders characterized by epibenthic crustaceans.
AA.M1I Baltic photic mixed substrate characterized by epibenthic crustaceans
AA.A1J Baltic photic rock and boulders characterized by epibenthic sponges (Porifera).
AA.M1J Baltic photic mixed substrate characterized by epibenthic sponges (Porifera)
AA.A1V Baltic photic rock and boulders characterized by mixed epibenthic macrocommunity
AA.M1V Baltic photic rock and boulders characterized by mixed epibenthic macrocommunity

Biotopes on HUB level 6:

AA.A1E1 Baltic photic rock and boulders dominated by Mytilidae
AA.M1E1 Baltic photic mixed dominated by Mytilidae,
AA.A1E2 Baltic photic rock and boulders dominated by zebra mussel (*Dreissena polymorpha*)
AA.M1E2 Baltic photic mixed dominated by zebra mussel (*Dreissena polymorpha*).
AA.A1F1 Baltic photic rock and boulders dominated by sea squirts (Ascidiacea).
AA.M1F1 Baltic photic mixed substrate dominated by sea squirts (Ascidiacea).
AA.A1G1 Baltic photic rock and boulders dominated by Hydroids (Hydrozoa).
AA.M1G1 Baltic photic mixed substrates dominated by Hydroids (Hydrozoa).
AA.A1H1 Baltic photic rock and boulders dominated by crustose moss animals (*Electra crustulenta*),
AA.A1H2 Baltic photic rock and boulders dominated by erect moss animals (*Flustra foliaceae*).
AA.M1H1 Baltic photic mixed substrate dominated by crustose moss animals (*Electra crustulenta*),
AA.M1H2 Baltic photic mixed substrate dominated by erect moss animals (*Flustra foliaceae*)
AA.A1I1 Baltic photic rock and boulders dominated by barnacles (Balanidae).
AA.A1I1 Baltic photic mixed substrate dominated by barnacles (Balanidae).

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

Yes

Regions

Baltic

Justification

This habitat occurs in all parts of the Baltic with the associated species composition characteristic of Baltic brackish waters.

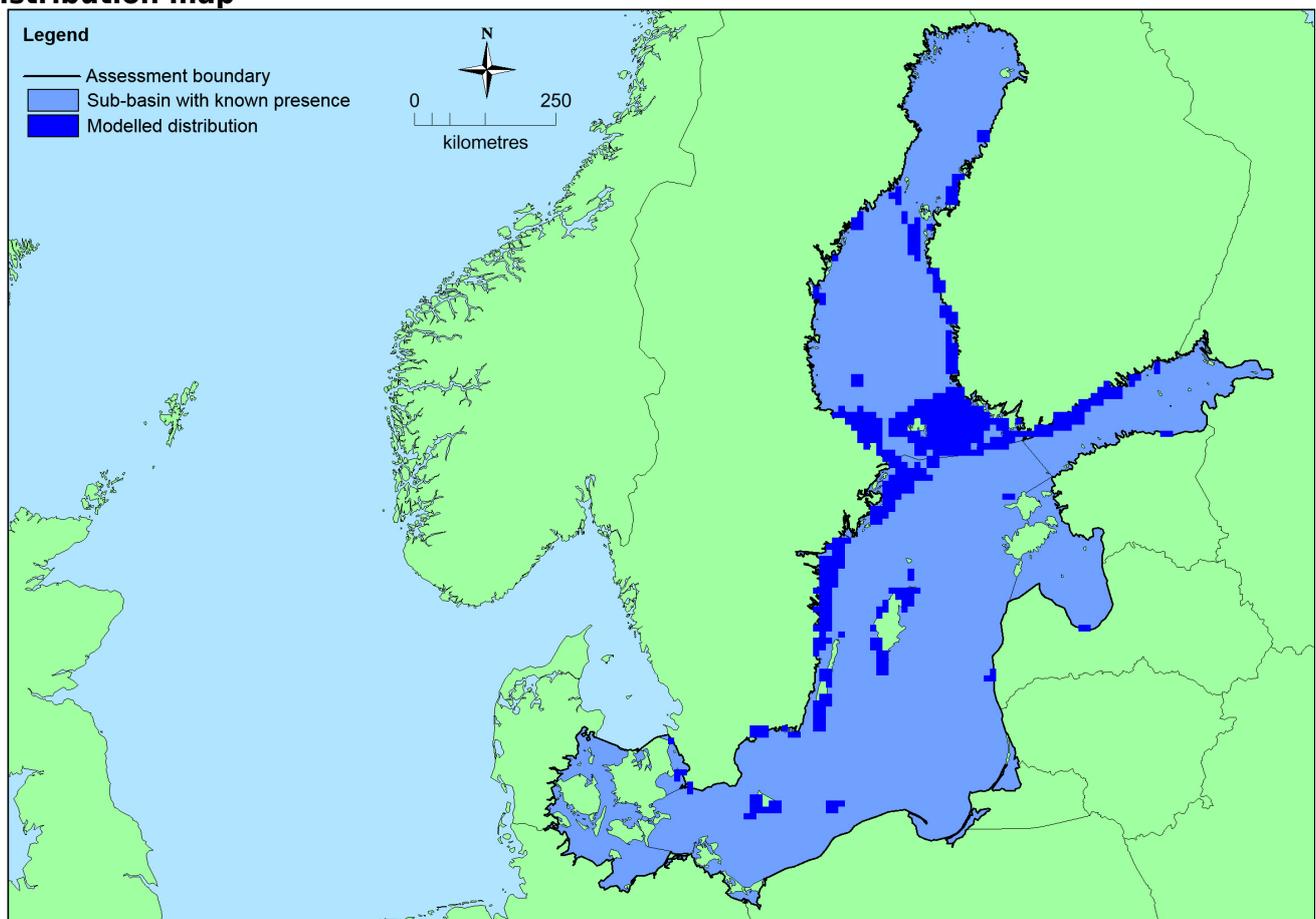
Geographic occurrence and trends

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Baltic Sea</i>	Baltic Proper: Present Belt Sea: Present Gulf of Bothnia: Present Gulf of Finland: Present Gulf of Riga: Present The Sound: Present	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
<i>EU 28</i>	>50,000 Km ²	>50	Unknown Km ²	This habitat is present in all the Baltic sub-basins.
<i>EU 28+</i>	>50,000 Km ²	>50	Unknown Km ²	This habitat is present in all the Baltic sub-basins

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?

Defined as a Baltic habitat therefore 100% occurs in the Baltic Sea. An estimated 95% occurs in EU 28. Similar habitats do occur in other European Regional Seas.

Trends in quantity

This habitat is common throughout the Baltic although some of the associated biotopes have a more limited distribution due to differences in salinity. Baltic biotopes dominated by erect moss animals, for example, only occur in western-most areas; biotopes dominated by zebra mussel are restricted to eastern parts of the Gulf of Finland and along the Estonian west coast. There have been declines in some of the associated biotopes due to eutrophication, siltation of hard bottom areas and physical removal of hard substrates (stone fishing) but overall the decline is considered to be less than 25%. No historic data on trends in quantity are available. Decline in some of the associated biotopes is predicted in the future, where climate change is predicted to result in changes in the salinity regime.

- 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 occurs in all the Baltic sub-basins so does not have a small natural range.

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

No

Justification

This habitat occurs in all the Baltic sub-basins so does not have a small natural range.

Trends in quality

There has been a reduction in quality of some of the associated biotopes (e.g. AA.A1E Baltic photic rock and boulders dominated by mussels) (10-20% over the past 50 years) but a lack of quantitative data on trends in quality for the habitat. The alien species *Dreissena polymorpha* has been present in the Baltic for more than a century with expansion most notable since the 1990s.

- Average current trend in quality

EU 28: Unknown

EU 28+: Unknown

Pressures and threats

Eutrophication is a major threat to at least to some of the associated biotopes as the higher nutrient concentrations enhances the growth rate of annual macrophytic algae, restricting the available substrate for development of epifaunal turf communities. Increased siltation or turbidity further reduces the availability of hard substrates impeding the settlement of larvae while higher particle concentration in the water can also impede filter feeding. e.g. of adult *Flustra foliacea*. Oxygen depletion due to eutrophication is seen as a smaller threat. In contrast Mytilids are very tolerant to, and even favoured by, eutrophication (because it increases food availability). These biotopes have been shown to increase in coastal areas where perennial macrophyte habitats are lost due to eutrophication. Other pressures on this habitat are physical disturbance by bottom trawling, offshore construction and dredging.

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

Pollution to surface waters (limnic, terrestrial, marine & brackish)
Nutrient enrichment (N, P, organic matter)

Natural System modifications

Human induced changes in hydraulic conditions
Removal of sediments (mud...)
Estuarine and coastal dredging
Siltation rate changes, dumping, depositing of dredged deposits
Dumping, depositing of dredged deposits
Other siltation rate changes

Conservation and management

The distribution of this habitat and the type of environmental conditions it requires is unclear. All actions reducing eutrophication in the Baltic are likely to be of benefit. This includes measures to reduce the diffuse run off from agricultural land and nutrient run off from point-sources by constructing waste water treatment plants. Actions to reduce physical disturbance from bottom trawling, offshore construction work and dredging, including prohibition of these activities in protected areas would constitute effective conservation measures.

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:

1160: MBAL U2

1170: MBAL U1

1650: MBAL U2

HELCOM (2013) assessments:

1170 VU C1

1160 VU C1

1650 VU C1

HELCOM (2013) assessed all the associated biotopes as LC (A1) except for (AA.A1H2/AA.M1H2) Baltic photic rock and boulders/mixed substrate dominated by erect moss animals (*Flustra folicea*) which were assessed as NT (A1).

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

This habitat has the potential to recover fairly quickly with epifauna recolonising damaged areas after pressure/threats have been removed and the environmental conditions have been restored.

Effort required

10 years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

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

There has been some reduction in extent of at least one of the associated biotopes but expert opinion is that, overall, this habitat has not declined in extent by more than 25% over the last 50 years. This habitat has therefore been assessed as Least Concern 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	Unknown	Unknown	No	>50	Unknown	Unknown	No	No
EU 28+	>50,000 Km ²	Unknown	Unknown	No	>50	Unknown	Unknown	No	No

This habitat is very common being present along most coastal waters except possibly some of the eastern and southern Baltic where sand is the dominating substrate or in areas of low salinity. There has been some reduction in extent of at least one of the associated biotopes but overall trends in extent and area are unknown. EOO >50,000 km² and AOO >50 (although exact figures are not available), and it is not limited to a few locations. This habitat has therefore been assessed as Least Concern under Criteria 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	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %

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 %

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 consider 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 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	LC	DD	DD	DD	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	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
Least Concern	-	Least Concern	-

Confidence in the assessment

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

Assessors

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Contributors

HELCOM RED LIST Biotope Expert Team 2013 and Baltic Sea Working Group for the European Red List of Habitats 2014 and 2015.

Reviewers

S.A. Wikstrom.

Date of assessment

09/07/2015

Date of review

16/01/2016

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