

Unvegetated communities on Baltic infralittoral shell gravel

Summary

This habitat is limited in its distribution and is not found in all the Baltic Sea sub-basins as the shell gravel substrate is relatively rare. The associated species are vulnerable to direct disturbance, for example as a result of the removal of substrate, but also to indirect effects such as through eutrophication, siltation and in the future increasing acidity of the oceans which is predicted as a response to climate change. Conservation measures include protected areas within which activities that directly damage the shell gravel substrate are restricted or prohibited, and improvements in water quality.

Synthesis

This habitat is only present in the EU 28. 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 the associated biotope AA.E1E1 as Least Concern (A1) and biotope AA.E1F1 as Vulnerable (B1A[ii]).

There is a lack of quantitative data on baseline conditions and trends in quantity and quality of this habitat but declines of between 30-50% have been reported for one of the associated biotopes. Because of an estimated overall decline of 25% and likely future declines (linked to ocean acidification, eutrophication and activities which directly disturb the seabed) this habitat has been assessed as Near Threatened for both 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
Near Threatened	A1, A2a	Near Threatened	A1, A2a

Sub-habitat types that may require further examination

AA.E1F1 Baltic photic shell gravel dominated by vase tunicate (*Ciona intestinalis*).

Habitat Type

Code and name

Unvegetated communities on Baltic infralittoral shell gravel



Small groups of the vase tunicate, *Ciona intestinalis*, on shell gravel (© A.Darr).

Habitat description

This Baltic Sea benthic habitat occurs on with at least 90% coverage of shell gravel according to the HELCOM HUB classification. Four biotopes and two sub-biotopes have been associated with this habitat. The sub-biotope 'Baltic photic shell gravel dominated by Mytilidae' (AA.E1E1), sessile/semi-sessile epibenthic bivalves cover at least 10% of the seabed and more than other perennial attached erect groups. This biotope is identified by a large representation of Mytilidae, at least 50% of the biomass among the epibenthic bivalves and often encountered in high energy exposure areas. It has been reported from the Baltic proper and Belt Sea. 'Baltic photic shell gravel dominated by vase tunicate (*Ciona intestinalis*)' (AA.E1F1) is only reported from the Belt Sea and occurs in areas where the bottom consists largely of mollusc shells or small shell fragments, often constituting small patches inside other sediments. Due to the combination of the extended interstitial space and the presence of biotic hard substrates, it is inhabited by a unique combination of endobenthic and epibenthic species, such as the vase tunicate (*Ciona intestinalis*). The biotopes 'Baltic photic shell gravel characterized by sparse or by mixed epibenthic macrocommunities (AA.E2T and AA.E1V)' are characterised by a low (0-10%) coverage of macroscopic vegetation or sessile macroscopic epifauna and most often encountered in high energy exposure areas.

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:

Mytilus spp., *Modiolus modiolus*, *Ciona intestinalis*.

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 with seawater 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

Other relationships:

Level 5 of the HELCOM HUB classification (2013).

AA.E1E Baltic shell gravel characterized by epibenthic bivalves

AA.E1F Baltic photic shell gravel characterized by epibenthic chordates

AA.E1V Baltic photic shell gravel characterized by mixed epibenthic macrocommunity

AA.E2T Baltic photic shell gravel characterized by sparse epibenthic macrocommunity

Level 6 of the HELCOM HUB classification (2013).

AA.E1E1: Baltic photic shell gravel dominated by Mytiidae

AA.E1F1: Baltic photic shell gravel dominated by vase tunicate (*Ciona intestinalis*).

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

Unknown

Justification

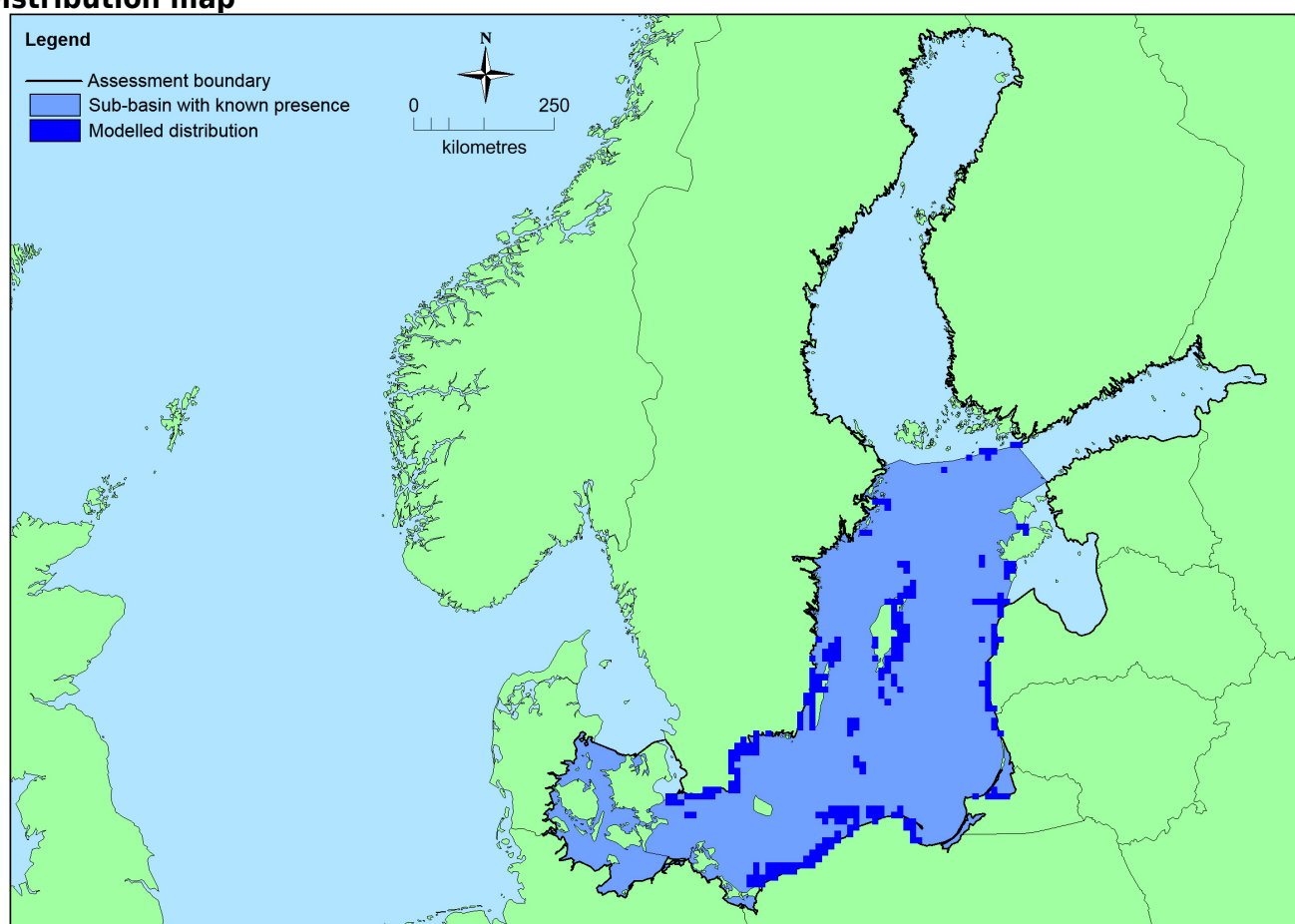
Geographic occurrence and trends

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Baltic Sea</i>	Baltic Proper: Present Belt Sea: 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
<i>EU 28</i>	Unknown Km ²	Unknown	Unknown Km ²	
<i>EU 28+</i>	Unknown Km ²	Unknown	Unknown Km ²	

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.

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

This habitat is believed to be limited to the EU 28 in the Baltic.

Trends in quantity

This habitat is limited in its occurrence in the Baltic Sea, confined to the Belt Sea and the Baltic Proper. One associated biotope (Baltic photic shell gravel dominated by vase tunicates) is considered rare and restricted to small patches. There have been reductions in extent of this habitat due to increased siltation and bottom trawling but a lack of quantitative historical data.

- Average current trend in quantity (extent)

EU 28: Decreasing

EU 28+: Decreasing

- Does the habitat type have a small natural range following regression?

Unknown

Justification

One of the associated biotopes (Baltic photic shell gravel dominated by vase tunicates AA.E1F1) is considered to be rare, limited to small patches and have a restricted distribution.

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

Unknown

Justification

One of the associated biotopes (Baltic photic shell gravel dominated by vase tunicates AA.E1F1) is considered to be rare, limited to small patches and have a restricted distribution.

Trends in quality

There is a lack of information on which to determine any trends in quality of this habitat.

- Average current trend in quality

EU 28: Unknown

EU 28+: Unknown

Pressures and threats

The current threats to this habitat are from eutrophication, contaminant pollution, bottom trawling, oil and gas exploration, sand and gravel extraction and climate change. Of these, oxygen depletion and increased siltation caused by eutrophication are considered to be the main threats. In addition, bottom trawling threatens the physical integrity of the habitat.

Since the habitat consist of an organic substrate, produced by bivalves, the state and distribution of the substrate-producing bivalve species affect the habitat directly. Predicted ocean acidification caused by increasing atmospheric CO₂ is a potential future threat, both to the occurrence and durability of the habitat and to the substrate-producing species. Acidification may affect the shell gravel substrate severely as the natural degradation process of the calcium carbonate shells may accelerate if the waters become more acidic resulting in a more restricted distribution of this habitat in the future. Additional threats are hazardous substances introduced to the Baltic, pollution from offshore installations and sand and gravel extraction, although the impacts of these are currently considered to be smaller than those associated with eutrophication.

List of pressures and threats

Mining, extraction of materials and energy production

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

Natural System modifications

Human induced changes in hydraulic conditions

Removal of sediments (mud...)

Dredging/ Removal of limnic sediments

Estuarine and coastal dredging

Siltation rate changes, dumping, depositing of dredged deposits

Dumping, depositing of dredged deposits

Other siltation rate changes

Climate change

Changes in abiotic conditions

pH-changes

Conservation and management

To conserve this habitat, its distribution should be mapped in order to better understand its environmental requirements. Where it occurs, it should be protected and bottom trawling prohibited. Further eutrophication should be stopped or reversed to improve the oxygen conditions and reduce overgrowth for example of annual brown algae on vase tunicates.

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

Measures related to special resource use

Regulating/Managing exploitation of natural resources on sea

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) assessed (AA.E1E1: Baltic photic shell gravel dominated by Mytilids) as LC (A1) and (AA.E1F1: Baltic photic shell gravel dominated as vase tunicates *Ciona intestinalis*) as VU (B1a[ii]).

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

Unknown

Effort required

Red List Assessment

Criterion A: Reduction in quantity

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

This habitat is only present in the EU 28. There is no quantitative information on reduction in quantity for this habitat, although the HELCOM (2013) assessment indicated a decline of between 30-50% of one of the three associated biotopes. Expert opinion is that an overall decline of more than 25% of this habitat in recent years and over the next 50 years (linked to ocean acidification, eutrophication and activities which directly disturb the seabed) is possible. This habitat has therefore been assessed as Near Threatened under Criteria A.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	Unknown Km ²	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Unknown
EU 28+	Unknown Km ²	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Unknown

There is insufficient information to determine the EOO and AOO for this habitat. One of the associated biotopes has a restricted distribution and has suffered some decline in spatial extent and quality. Threatening processes are believed likely to cause continuing declines within the next 20 years although this cannot be quantified. This habitat has been assessed as Data Deficient 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 %
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%

One of the associated biotopes has suffered some decline in abiotic environmental quality although it is not possible to quantify this. 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	NT	NT	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	NT	NT	DD	DD	DD	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, A2a	Near Threatened	A1, A2a

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

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Reviewers

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09/07/2015

Date of review

18/01/2016

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