

## Infaunal communities on Baltic infralittoral shell gravel

### Summary

This benthic habitat is currently only known in a few small patches in the German waters of the Baltic Sea. Whilst macroscopic infauna are present, there is typically no macrovegetation or epibenthic macrofauna. The benthic macroinfauna species vary depending on the coarseness of the shell gravel. For example where the interstitial spaces are small, burrowing polychaetes and amphipods build tunnels using the small grains.

Eutrophication affects the sand-like shell gravel biotope adversely by increasing the organic loading. This can lead to local oxygen depletion and some of the sand-like shell gravel patches may also become covered by overgrowth of algae. Effects associated with climate change are likely to be an additional pressure. Ocean acidification as a result of increase in atmospheric CO<sub>2</sub> is assumed to increase the rate by which calcium carbonate of mollusc shells dissolve but it is unclear how this might affect the sand-like shell gravel. More detailed mapping of the extent of the habitat, and investigation into potential effects of climate change is required. Other beneficial management activities include improvements in water quality and limiting or prohibiting activities which damage the seabed.

### Synthesis

The habitat has a restricted distribution in the Baltic, currently only reported within the German EEZ. It is believed to have declined in extent, although by less than 25% in the last 50 years, due to degradation of the environmental quality caused by pollution. Current information suggests that the maximum area may be around 2,000 km<sup>2</sup>, based on presence in 100 x 100 km grid squares mapped by HELCOM.

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.E3Y Baltic photic shell gravel characterised by mixed infaunal macrocommunity in fine sand-like shell fragments as Near Threatened (B1a(ii)). The other associated biotope (AA.E3X) was not evaluated.

Expert opinion is that this habitat should be assessed as Endangered (B1a(ii), B3) for both the EU 28 and EU 28+. This is because of the relatively restricted distribution of the shell gravel habitat combined with past and predicted future decline in abiotic environmental quality. It is important to note some shortcomings with the EOO and AOO calculations. The data used to calculate EOO and AOO was based on HELCOM mapping in 100 x 100 km<sup>2</sup> cells of only one of the two associated biotopes. The full extent and area covered by the habitat could therefore be greater. Equally relevant is that HELCOM information has been converted to 10 x 10 km cells to derive AOO. As the habitat may not occur in all the cells mapped this figure could be an over estimate. The confidence in this assessment is therefore given as Low.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	B1a(ii), B3	Endangered	B1a(ii), B3

### Sub-habitat types that may require further examination

AA.E3Y Baltic photic shell gravel characterised by mixed infaunal macrocommunity in fine sand-like shell

fragments.

## **Habitat Type**

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### **Code and name**

Infaunal communities on Baltic infralittoral shell gravel

No characteristic photographs of this habitat currently available.

### **Habitat description**

This is a Baltic Sea benthic habitat in the photic zone where at least 90% of the substrate is shell gravel according to the HELCOM HUB classification. The shell gravel fragments are coarse and well-sorted. This habitat is most often encountered in high energy exposure areas and is only found in the southern parts of the Baltic. Whilst macroscopic infauna are present, there is typically no macrovegetation or epibenthic macrofauna. Two associated biotopes have been identified: 'Baltic photic shell gravel characterised by mixed infaunal macrocommunity in coarse and well-sorted shells and shell fragments' (AA.E3X) and 'Baltic photic shell gravel characterized by mixed infaunal macrocommunity in fine sand-like shell fragments' (AA.E3Y). The benthic macroinfauna species vary as the interstitial spaces are smaller in the latter sand-like shell gravel substrate, enabling burrowing polychaetes and amphipods to build tunnels using the small grains.

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:

Insufficiently studied to list at the present time.

## Classification

EUNIS:

The closest correspondence in EUNIS (2004) level 4 is A5.11 Infralittoral coarse 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

Other relationships:

This habitat has two sub-habitats on HUB level 6; 'AA.E3X Baltic photic shell gravel characterised by mixed infaunal macrocommunity in coarse and well-sorted shells and shell fragments' and 'AA.E3Y: Baltic photic shell gravel characterised by mixed infaunal macrocommunity in fine sand-like shell fragments'

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

Unknown

Justification

**Geographic occurrence and trends**

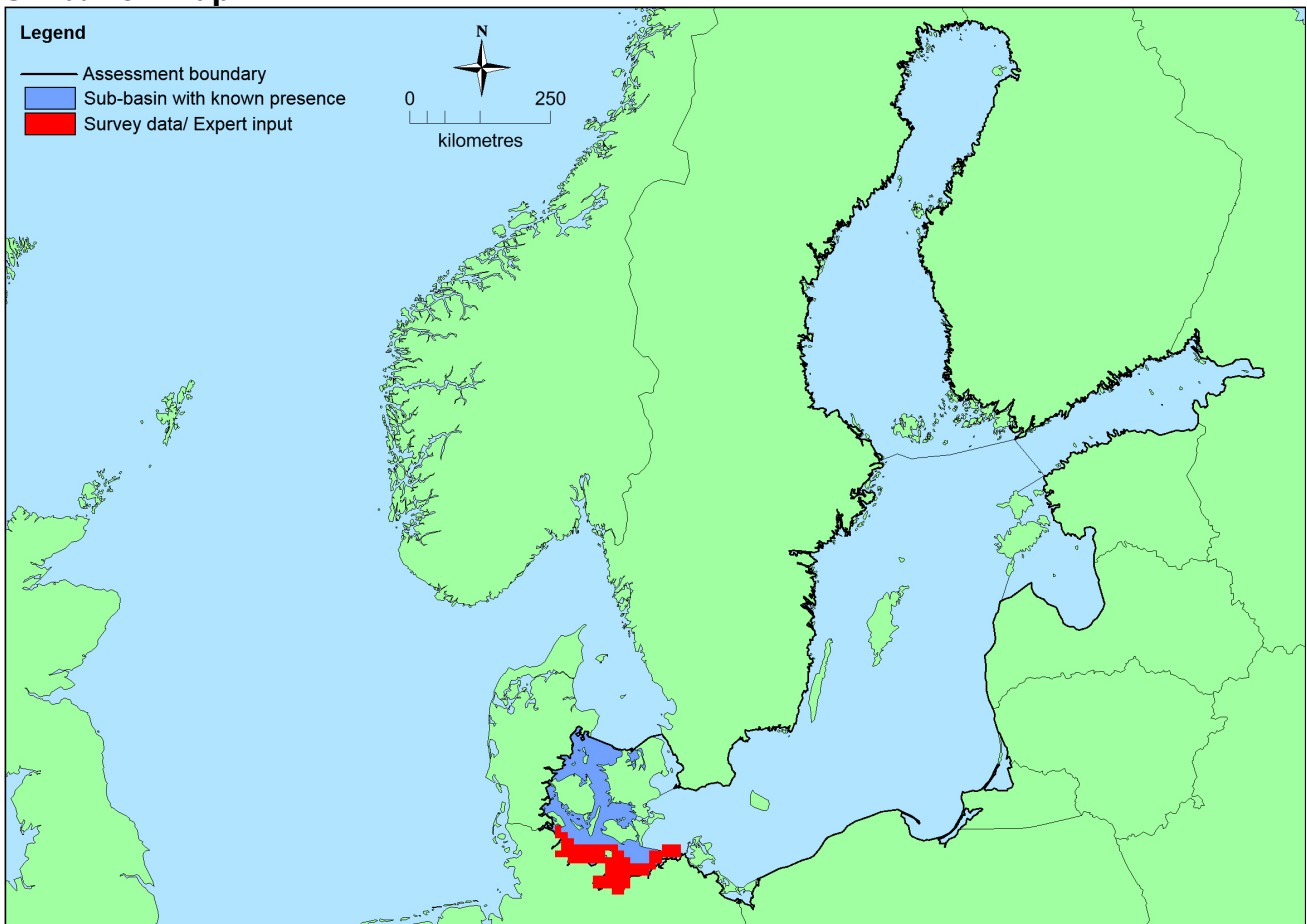
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Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Baltic Sea</i>	Belt Sea: Present	2,000 Km <sup>2</sup>	Decreasing	Unknown

### 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>	max 14,200 Km <sup>2</sup>	max 73	max 2,000 Km <sup>2</sup>	Based on presence in 100 x 100km grid squares therefore maximum potential EOO and AOO
<i>EU 28+</i>	n/a Km <sup>2</sup>	n/a	n/a Km <sup>2</sup>	not present in EU28+ in the Baltic

### 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 presence in 100 x 100km grid squares indicated by HELCOM converted to 10 x 10 km cells and therefore shows a maximum potential AOO and EOO based on current knowledge.

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

All of the current known distribution is hosted by EU 28 (Germany). A similar habitat is known to be present in the Kattegat and therefore in the North East Atlantic regional sea.

### Trends in quantity

This habitat is reported to have declined in the last 50 years due to degradation of water quality caused by pollution but there is a lack of quantitative data. There is insufficient information to identify any historical

trends and no future trends have been estimated.

- Average current trend in quantity (extent)

EU 28: Decreasing

EU 28+: Decreasing

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

Yes

*Justification*

At the present time only a few small patches of this habitat have been recorded and it is believed to have declined in extent over the last 50 years although there is a lack of quantitative data.

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

Yes

*Justification*

Only a few small patches of this habitat have been recorded. These are in German waters in the Belt Sea.

## **Trends in quality**

There is insufficient information on which to assess the current quality of this habitat or any historical trends. No future trends have been estimated.

- Average current trend in quality

EU 28: Unknown

EU 28+: Unknown

## **Pressures and threats**

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Eutrophication (increase in N, P and organic matter), pollution and ocean acidification, predicted as a result of climate change, are the main threats to this habitat. Eutrophication affects the sand-like shell gravel habitat adversely by increasing the organic load with some of the sand-like gravel patches at risk of being covered by overgrowth of algae. Localised oxygen depletion may also result. Ocean acidification is assumed to increase the dissolving rate of the calcium carbonate in the mollusc shells which are the principal substrate of this habitat. However, it is unclear how the process will affect the sand-like shell gravel. Due to higher acidity, shell gravel may be ground down to a sand-like substrate at increasing rates possibly making the sand-like shell gravel more common. Alternatively the increased acidity may increase the dissolving rate of the grains thus decreasing the amount of sand-like shell gravel.

## **List of pressures and threats**

### **Pollution**

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

### **Climate change**

Changes in abiotic conditions  
pH-changes

## **Conservation and management**

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The extent and occurrence of the habitat needs to be mapped in more detail to establish whether it exists outside the German Exclusive Economic Zone. Measures to improve water quality are likely to benefit this habitat.

## 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

## 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 the associated biotope AA.E3Y Baltic photic shell gravel characterized by mixed infaunal macrocommunity in fine sand-like shell fragments as NT(B1a(ii)). The other associated biotope (AA.E3X) was not evaluated.

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

Unknown

## Effort required

## Red List Assessment

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### Criterion A: Reduction in quantity

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

This habitat has a restricted distribution in the Baltic Sea, currently only reported within the German EEZ. There is a lack of quantitative data on changes in quantity of this habitat. There has been some decline in extent but it is believed to be less than 25% over the last 50 years. No estimates have been made on possible future trends in quantity. This habitat has been assessed as Least Concern under criterion A.

### Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	14,200 Km <sup>2</sup>	Yes	Unknown	unknown	73	Unknown	Unknown	unknown	Yes

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28+	14,200 Km <sup>2</sup>	Yes	Unknown	unknown	73	Unknown	Unknown	unknown	Yes

This habitat has a restricted distribution in the Baltic Sea, currently only reported within the German EEZ. It is believed to have declined in extent although by less than 25% in the last 50 years. Because of an expected continuing decline in abiotic environmental quality and because it only appears to be present in very few locations this habitat fulfills criteria B1a(ii) and B3, and it has therefore been assessed as Endangered under criterion B.

It is important to note some shortcomings with the EOO and AOO calculations. The data used to calculate EOO and AOO was based on HELCOM mapping in 100 x 100 cells of only one of the two associated biotopes. The full extent and area covered by the habitat could therefore be greater. Equally relevant is that fact that HELCOM information has been converted to 10 x 10 km cells to derive AOO. As the habitat may not occur in all the cells mapped this figure could be an over estimate. The confidence of this assessment has therefore been given as low.

### 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%

This habitat has a restricted distribution in the Baltic Sea, currently only reported within the German EEZ. Experts considered there to have been some decline in quality of this habitat over the last 50 years but 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

This habitat has a restricted distribution in the Baltic Sea, currently only reported within the German EEZ. 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	EN	DD	EN	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	EN	DD	EN	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
Endangered	B1a(ii), B3	Endangered	B1a(ii), B3

### 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

T.A.Haynes.

### Date of assessment

09/07/2015

### Date of review

21/12/15

## References

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HELCOM, 2013. *Red List of Baltic Sea underwater biotopes, habitats and biotope complexes*. Avellan, L. (Ed). Helsinki, Finland.

HELCOM, 2013. Biotope Information Sheet. Available at:  
<http://helcom.fi/Red%20List%20of%20biotopes%20habitats%20and%20biotope%20complexes/HELCOM%20Red%20List%20AA.E3Y,%20AB.E3Y.pdf> (Accessed: 16/07/2015).