

Infaunal communities of Baltic infralittoral coarse sediment

Summary

This habitat occurs in all the Baltic Sea sub-basins although some of the associated biotopes have a more limited distribution. It is a benthic habitat in the photic zone where the predominate substrate is coarse sediment. No macrovegetation or epibenthic macrofauna is present however infaunal bivalves/polychaetes/crustaceans/echinoderms or insects may dominate. The pressures and threats include eutrophication (increased N, P and organic matter), sedimentation and siltation caused by offshore and coastal constructions, and localised pollution. Direct damage may also result from activities that disturb the seabed such as demersal fisheries. Proposed conservation measures include establishing protected areas where damaging activities are restricted or prohibited and managing activities elsewhere.

Synthesis

There have been some declines in extent of this habitat, estimated to be more than 25% over the last 50 years in the case of the associated biotopes dominated by infaunal bivalves and polychaetes and at least 10% in a third associated biotope. Moderate to severe reductions of between 10-15% of the habitat is also believed to have occurred in a similar period. The lack of quantitative data on extent, quality and trends over time means that accurate calculations of EOO and AOO are not possible at the present time. This Red List assessment has therefore been based on expert opinion.

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 two relevant Baltic biotopes (AA.I3L10 and AA.I3L11) as Near Threatened (A1). A third biotope AA.I3N3 was assessed as Least Concern (A1). The remaining three AA.I3N, AA.I3O and AA.I3P were not evaluated. There is no additional data or information to update the assessment outcome past the HELCOM 2013 assessment. Given that there have been declines of more than 25% for much of this habitat, current expert opinion is therefore an assessment of 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 | Near Threatened | A1 |

Sub-habitat types that may require further examination

AA.I3L10 Baltic photic coarse sediment dominated by multiple infaunal bivalve species *Macoma calcaria*, *Mya truncata*, *Astarte* spp., *Spisula* spp.

AA.I2L11 Baltic photic coarse sediment dominated by multiple infaunal polychaetes species including *Ophelia* spp.

Habitat Type

Code and name

Infaunal communities of Baltic infralittoral coarse sediment

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 coarse sediment according to the HELCOM HUB classification. No macrovegetation or epibenthic macrofauna is present however infaunal bivalves/polychaetes/crustaceans/echinoderms or insects may dominate, comprising at least 50% of the biomass. It is encountered in areas of high energy associated with currents or wave action. Five associated biotopes have been identified but not all occur in all the sub-basins. For example 'Baltic photic coarse sediment characterised by infaunal bivalve species' (AA.I3L), has only been reported in the Baltic Proper, The Belt Sea and The Sound. Where the substrate is well sorted with medium to coarse sand, gravel or small shell fragments, often building small patches inside finer sediments, the large variety of interstitial space, may be inhabited by species of specialised fauna, such the polychaetes *Ophelia limacina*, *O. rathkei* and *Travisia forbesii*. In areas of poorly sorted substrate there may be a higher species diversity with none of the characteristic species clearly dominant but including bivalves such as *Macoma calcarea*, *Mya truncata*, *Astarte* spp., and *Spisula* spp.

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:

Depending on the particular associated biotope these include *Macoma calcarea*, *Mya truncata*, *Astarte* spp., *Spisula* spp. *Ophelia limacina*, *Travisia forbesii*, *Tanaissus* spp. and *Streptosyllis* spp. the sand digger shrimp (*Bathyporeia pilosa*), the echinoderms *Amphiura* spp, *Ophiura* spp.,

Brissopsis lyrifera, *Echinocardium* spp. and infaunal insect larvae (Chironomidae).

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:

Level 5 of the HELCOM HUB classification (2013):

AA.I3L Baltic photic coarse sediment characterized by infaunal bivalves, this habitat has two sub-habitats on HUB level 6; 'Baltic photic coarse sediment dominated by multiple infaunal bivalve species: *Macoma calcarea*, *Mya truncata*, *Astarte* spp., *Spisula* spp.' (AA.I3L10) and 'Baltic photic coarse sediment dominated by multiple infaunal polychaete species including *Ophelia* spp.' (AA.I3L11).

AA.I3M Baltic photic coarse sediment characterized by infaunal polychaetes

AA.I3N Baltic photic coarse sediment characterized by infaunal crustaceans

AA.I3O Baltic photic coarse sediment characterized by infaunal echinoderms

AA.I3P Baltic photic coarse sediment characterized by infaunal insect larvae

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

Unknown

Justification

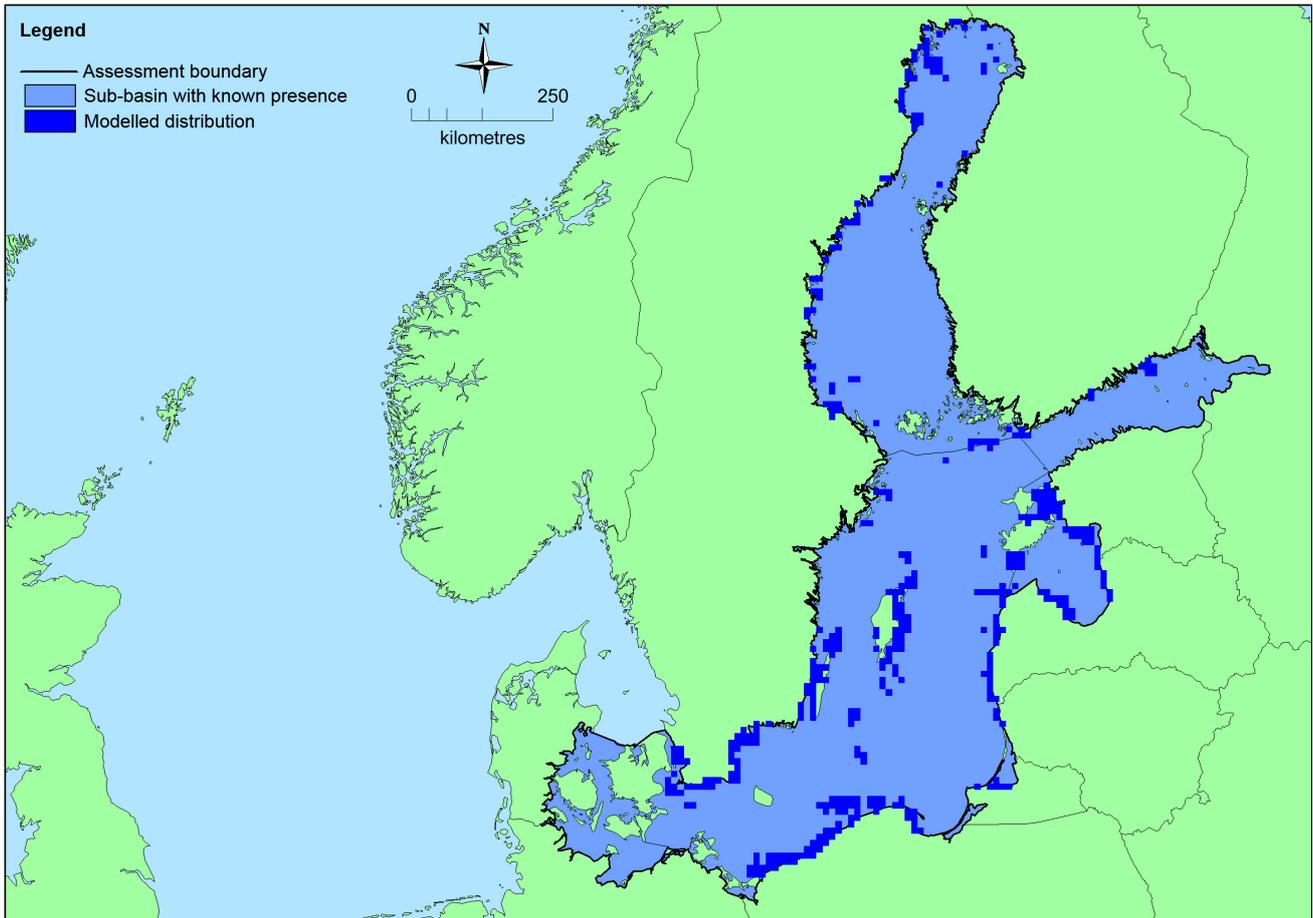
Geographic occurrence and trends

| 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 Gulf of Bothnia: Present Gulf of Finland: Present Gulf of Riga: Present The Sound: Present | Unknown Km ² | Decreasing | Decreasing |

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 | 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. |
| <i>EU 28+</i> | >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. Similar habitats do occur in other European Regional Seas.

Trends in quantity

This habitat occurs in all Baltic Sea sub-basins although some of the associated biotopes have a more limited distribution. For example, Baltic photic coarse sediment dominated by infauna, only occurs in Western most areas such as the Belt Sea and the Sound, and Baltic photic coarse sediment dominated by infaunal polychaetes *Ophelia* is only found in the southern parts of the Belt Sea and Baltic Proper. There have been some declines in extent of this habitat, estimated to be more than 25% in the case of two of the associated biotopes and at least 10% in a third associated biotope. There was insufficient data to determine trends in the three other associated biotopes and overall no historic quantitative data or estimates of future trends.

- Average current trend in quantity (extent)
 EU 28: Decreasing
 EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
 No
Justification

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

Trends in quality

The quality of this habitat has shown moderate to severe reductions (10-15%) in past 50 years. Further reduction of around 10% has been estimated for at least two of the three associated biotopes which were assessed by HELCOM (2013).

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

Eutrophication, construction including oil and gas exploration and exploitation, bottom trawling, mining and quarrying and contaminant pollution have been identified as pressures and threats. For example, biotopes dominated by infaunal bivalves are threatened by oxygen deficiency caused by eutrophication. Eutrophication can also lead to an increased growth rate in algae which in turn increases organic load which threatens this habitat. An additional threat is siltation which can be caused by various construction activities. Where the habitat is close to land, increased siltation may be traced back to changes in land use such as run-off from intensively farmed areas. Coarse sediments dominated by infaunal polychaetes are mainly threatened by bottom trawling, oil and gas exploration and dredging.

List of pressures and threats

Mining, extraction of materials and energy production

Mining and quarrying

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

Siltation rate changes, dumping, depositing of dredged deposits

Dumping, depositing of dredged deposits

Other siltation rate changes

Conservation and management

Restrictions or prohibition of bottom trawling and sediment extraction will protect this habitat along with activities that can improve oxygen conditions, for example by reducing the risk of eutrophication. A Baltic Sea wide biotope inventory and threat assessment would be a useful tool to guide conservation and management.

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 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 two associated biotopes (AA.I3L10 and AA.I3L11) as NT (A1) and one other (AA.I3N3) as LC (A1). The remaining three biotopes (AA.I3M, AA.I3O, AA.I3P) were not evaluated.

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 % | Unknown % | Unknown % | Unknown % |
| EU 28+ | >25 % | Unknown % | Unknown % | Unknown % |

There have been reductions in quantity of more than 25% for two of the three associated biotopes that were assessed by HELCOM (2013). Expert opinion is that there has been an overall reduction in quantity of this habitat by >25% in the last 50 years. This habitat has therefore been assessed as Near Threatened

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

This habitat is present in all the Baltic Sea sub-basins therefore EOO exceeds 50,000 km² however with no quantitative data on habitat extent or area, accurate calculation of EOO or AOO is not possible at the present time. Future trends have not been predicted. This habitat has therefore been assessed as Data Deficient under criterion 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 | <15 % | moderate to severe % | unknown % | unknown % | unknown % | unknown % |
| EU 28+ | <15 % | moderate to severe % | 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% |

The quality of this habitat is believed to have shown moderate to severe reductions (10-15% of extent) in past 50 years. Further reduction of around 10% has been estimated for at least two of the three associated biotopes which were assessed by HELCOM (2013). This does not exceed the threshold for threatened status on the basis of decline in quality. This habitat has therefore been assessed as Least Concern under 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 | DD | DD | DD | DD | DD | DD | LC | DD | DD | DD | DD | DD | DD | DD | DD | DD |
| EU28+ | NT | DD | DD | DD | DD | DD | DD | LC | 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)

Assessors

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Contributors

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Reviewers

T.A. Haynes.

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09/07/2015

Date of review

21/12/15

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