Emergent vegetation communities on Baltic infralittoral coarse sediment

Summary

The presence of this habitat type in the Baltic Sea is well known and it is present in sheltered areas in all the sub-basins. The characteristic species are reeds or sedges with dominance being determined by factors such as sediment type, exposure and nutrient levels. It may not be particularly common as reed and sedge habitats are more typical on softer sediments. The habitat can support a high biodiversity, for example by providing nesting areas for birds, and shelter and spawning grounds for fish, although reeds in particular can also out compete and shade other plant species (including sedges) decreasing local biodiversity.

The expansion of reed belts has been accelerated by anthropogenic eutrophication, postglacial land upheaval and the lack of grazing on coastal meadows and attached shallow water areas, while pollution associated with drainage from farming and forestry, and other sources (like traffic and industry) are threats and deterioration factors. Other pressures arise from shipping, and the construction or enlargement of harbours and marinas in sheltered areas. Changes in the water flow due to hydrotechnical constructions, such as dams, cascades and river bank control, may also have adverse effects downstream.

In some areas, there is an active programme of reed removal to encourage re-establishement of the sedge dominated biotopes. Improvements in water quality are also beneficial although it should be noted that whereas increased eutrophication leads to reed replacing sedges, a later decrease in eutrophication does not necessarily facilitate a process where sedges come back.

Synthesis

Increases in extent have been evident in this habitat in the last 50 years, though this is mainly due to the increase of reed (*Phragmites australis*) while at the same time sedges have decreased, most likely a response to eutrophication favouring the former. In the case of the sedge dominated biotopes some loss in density/biomass may be occuring but there are no monitoring data to confirm this.

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 AA.I1A1 and AA.I1A2 as Least Concern (A1). Expert opinion is that this habitat is either stable or has increased in extent over the last 50 years and therefore should be assessed as Least Concern 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
Least Concern	-	Least Concern	-

Sub-habitat types that may require further examination

AA.I1A2 Baltic photic coarse sediment dominated by sedges (Cyperaceae).

Habitat Type

Code and name

Emergent vegetation communities on 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. It is found across all salinity ranges in the Baltic and in areas where there is low to moderate exposure to wave action typically to depths of about 2 meters. The associated communities of sedges and/or reeds are more typically found in areas of soft sediment. Their presence on coarse sediment may indicate that siltation is already taking place and that the establishment of sedges and reeds will increase the rate of siltation, changing the substrate to finer sediments over time.

Two associated biotopes with different dominant plant species have been identified. The common reed (*Phragmites australis)* forms the charactersitic biotope in water depths of up to 2m and in moderately exposed conditions, where as sedges such as *Schoenoplectus* spp, *Bolbaschoenus maritimus* are generally in more sheltered and shallower waters. Nutrient levels play a part in affecting the balance between the two biotopes with reed dominated areas favoured by conditions of eutrophication.

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. The overall quality and continued occurrence of this habitat is, however, largely dependent on the presence of the emergent plant species which create the biogenic structural complexity on which the characteristic associated communities depend. The density and the maintenance of a viable population of these species is a key indicator of habitat quality, together

with thevisual evidence of presence or absence of physical damage. In the case of this habitat the situation is further complicated because the reed dominated biotope is favoured by the deterioration of the sedge dominated biotope under conditions of eutrophication.

Characteristic species:

Phragmites australis, Schoenoplectus spp, Bolbaschoenus maritimus may be in areas of coarse sediment but are likely to be embedded in the patches of finer sediment.

Classification

EUNIS:

The closest correspondence in EUNIS (2004) level 4 is A5.54 Angiosperm communities in 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:

1130 Estuaries

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.I1A–Baltic photic coarse sediment characterized by emergent vegetation This habitat has two sub-habitats on HUB level 6; ‘Baltic photic coarse sediment dominated by common reed (*Phragmites australis*)’ (AA.I1A1) ‘Baltic photic coarse sediment dominated by sedges (Cyperaceae)’ (AA.I1A2)

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

No

Justification

Sedges as a dominant emergent vegetation along seashores are typical and characteristic of the Baltic Sea. Reeds are one of the most commonly widespread plants on the globe, and are commonly found along shorelines in sheltered bays and estuaries in brackish water all over world including the Baltic. The combined habitat is not a typical characteristic for the Baltic.

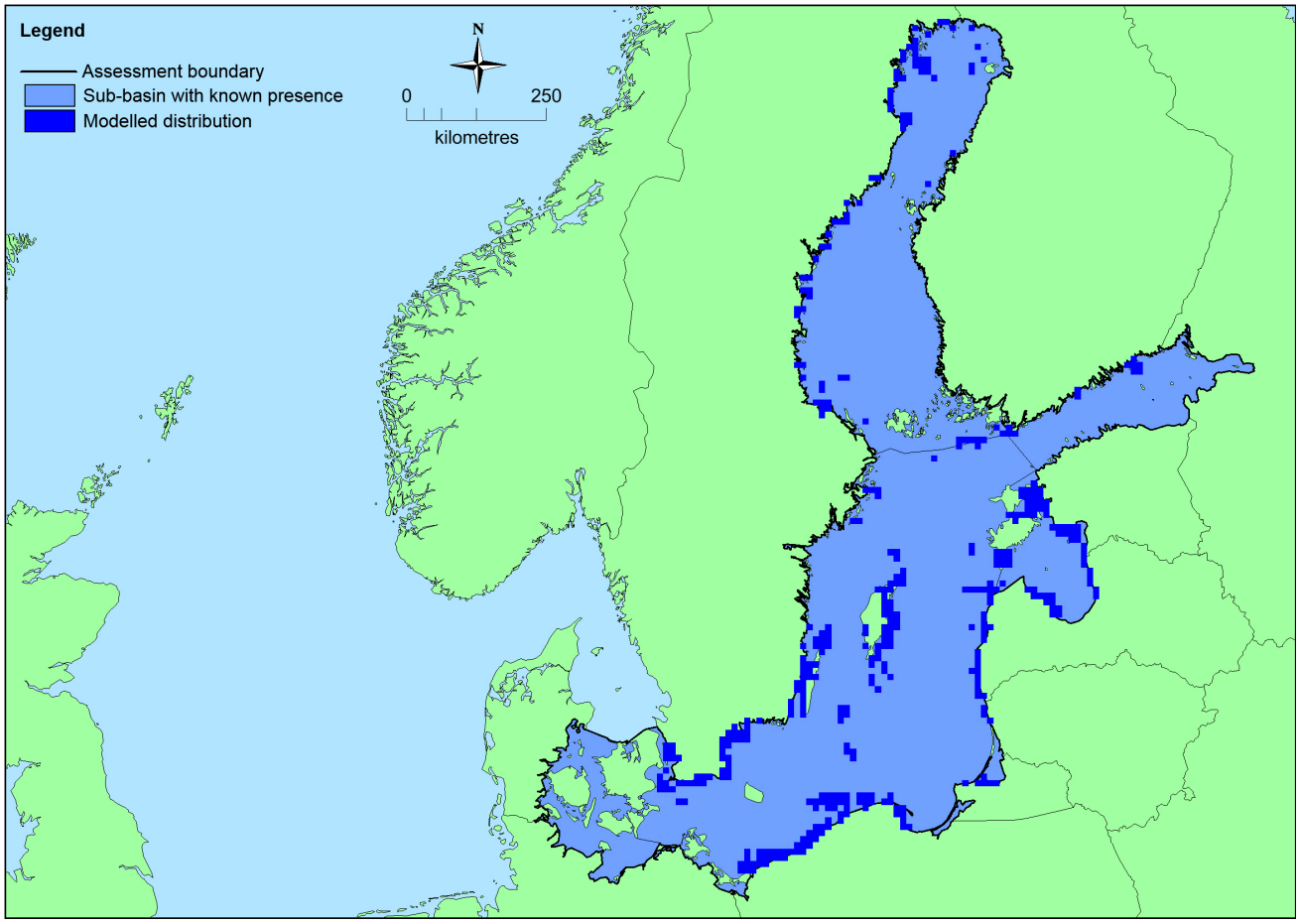
Geographic occurrence and trends

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 Gulf of Bothnia: Present Gulf of Finland: Present Gulf of Riga: Present The Sound: Present Belt Sea: Present	Unknown Km^2	Increasing	Stable

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.
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.

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

This habitat occurs in the EU28+ (Russia). The percentage hosted by EU28 is therefore less than 100% but there is insufficient information to establish the proportion.

Trends in quantity

This habitat is present in all sub-basins of the Baltic Sea and there are distribution maps for the characteristic species (e.g. *Phragmites*). It has increased in extent over the last 50 years due to anthropogenic eutrophication and changes in land use (less coastal pastures, less reed cutting). There also appears to have been a changing balance between the associated biotopes with sedge dominated communities declining and reed dominated communities increasing, most likely in response to eutrophication. There are no historical data on which to make an accurate trend assessment. No estimates have been made of possible future trends.

In Estonia, for example there was expansive reed growth from 1950s to end of 1970s whereas in the last few decades growth rates reduced or even ceased. This is believed to be associated with increased storminess resulting in increase of average sea level which has limited the suitable growth zones for the reed weakened by eutrophication.

- Average current trend in quantity (extent)
  EU 28: Increasing
  EU 28+: Increasing
- Does the habitat type have a small natural range following regression?

No

Justification

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

Trends in quality

In the case of the sedge dominated biotopes some loss in density/biomass may be occuring but there are no monitoring data to confirm this. The overall trend in quality of this habitat is considered stable.

- Average current trend in quality

  EU 28: Stable

  EU 28+: Stable

Pressures and threats

The expansion of reed belts has been accelerated by anthropogenic eutrophication, postglacial land upheaval and the lack of grazing on coastal meadows and attached shallow water areas, while pollution associated with drainage from farming and forestry, and other sources (like traffic and industry) are threats and deterioration factors. Other pressures arise from shipping, and the construction or enlargement of harbours and marinas in sheltered areas. Changes in the water flow due to hydro-technical constructions, such as dams, cascades and river bank control, may also have adverse effects downstream. Other threats can be caused by introduction of non-indigenous, invasive species, unsustainable fisheries and tourism as well as oil spills and construction of breakwaters.

In the future climate change is likely to be a threat. Distribution of reed beds is controlled by mean sea-level variation superimposed on a background of postglacial isostatic uplift. Reduced growth in the reed beds in Estonia over last decades has probably been caused by increased storminess resulting in increase of average sea level. This is believed to have limited the suitable growth zones for the reed weakened by eutrophication.

List of pressures and threats

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

Modification of water flow (tidal & marine currents)

Dykes, embankments, artificial beaches, general

Sea defense or coast protection works, tidal barrages

Climate change

Changes in abiotic conditions

Wave exposure changes

Sea-level changes

Changes in biotic conditions

Habitat shifting and alteration

Conservation and management

In some areas, there is an active programme of reed removal to encourage re-establishement of the sedge dominated biotopes. Improvements in water quality are also beneficial although it should be noted that whereas increased eutrophication leads to reed replacing sedges, a later decrease in eutrophication does not necessarily facilitate a process where sedges come back.

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality
Restoring/Improving the hydrological regime

Measures related to marine habitats

Other marine-related measures

Conservation status

Annex 1:

1130: MBAL U2

1160: MBAL U2

1650: MBAL U2

HELCOM (2013) assessments:

1130 CR C1

1150 EN, C1

1160 VU C1

1650 VU C1

HELCOM (2013) have assessed the associated biotope AA.I1A1 and AA.I1A2 as LC(A1)

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

Phragmites is a pioneer species and a strong competitor therefore there is considered to be a good capacity for recovery at least for the reed dominated biotope.

Effort required

10 years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	0 %	unknown %	unknown %	unknown %
EU 28+	0 %	unknown %	unknown %	unknown %

There have been different trends in the extent of this habitat depending on which of the associated biotopes is considered. Sedges have declined, quite significantly in some areas, possibly due to the expansion of, and competition with reed. The latter benefits from the nutrient enrichment associated with eutrophication. As a consequence sedges, former considered ecologically typical of sheltered areas in the Baltic are being replaced by another biotope due to a deterioration of the environment (i.e. eutrophication),

Overall this habitat is believed to have been stable or possibly increased in extent over the last 50 years. It has therefore been assessed as Least Concern under Criteria A for 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	Unknown	unknown	unknown	Unknown	Unknown	unknown	unknown
EU 28+	>50,000 Km^2	Unknown	Unknown	unknown	unknown	Unknown	Unknown	unknown	unknown

This habitat has a large natural range in the Baltic Sea with EOO >50,000 km^2 but it is possible that it is not particularly common as reed and sedge habitats are more typically found on softer sediments. Future trends have not been estimated. 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	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 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	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	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
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)

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Reviewers
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Date of assessment
07/07/2015

Date of review
16/01/2016

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