

Sparse epibenthic community of Baltic upper circalittoral muddy sediment

Summary

The habitat is characterised by colonies of the seapens *Virgularia mirabilis* and *Pennatula phosphorea* established in areas of soft sediment. It only occurs in the deep parts of The Sound in the highest salinity waters of the Baltic. Current information suggests that it may cover a maximum area of around 1900 km² but this is likely to be an over estimate. The main anthropogenic threats to this habitat are bottom trawling and oxygen depletion caused by eutrophication. The seapens, which characterise this habitat, are very vulnerable to being damaged by trawls because of their body size and height above the sediment whilst slow recovery of seapens, can result in changes in the associated communities in areas of soft sediment, shifting to favour an abundance of small invertebrates. This habitat is also sensitive and vulnerable to dredging and the disposal of dredge spoil which may remove, smother and/or bury epibenthic species. Restrictions on bottom trawling in areas where it occurs (The Sound trenches) both within and outside Marine Protected Areas, is the most significant action that would benefit this habitat. Improvements in water quality (N, P and organic matter levels) reducing the risk of anoxic events in the bottom waters of the Sound, and preventing dredging and disposal of dredge spoils in areas where this habitat occurs are further valuable conservation and management measures.

Synthesis

This habitat occurs in a spatially limited area of the southern Baltic Sea. It has been heavily disturbed by intensive trawling with more than half the area it occupies considered to have been destroyed in the last 50 years. A continuing decline in spatial extent, abiotic and biotic quality is considered likely. Furthermore, because the places where it occurs are not widely separated (all in a small area of The Sound) it can also be considered to be present in very few locations. This means that a single threat (e.g. eutrophication or intensive trawling) may affect all the places where it occurs. For this reason it is also capable of becoming critically endangered or collapsed within a very short time period.

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 this habitat as Endangered on the basis of a decline in quantity over the last 50 years. Its restricted distribution, clustered location, and likely continuing decline in quantity and quality means that for the current assessment expert opinion is that this habitat should be considered to be Endangered for the EU 28. It is not present and has therefore not been assessed for EU 28+.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	A1,B1,B2,B3	Endangered	A1,B1,B2,B3

Sub-habitat types that may require further examination

None.

Habitat Type

Code and name

Sparse epibenthic community of Baltic upper circalittoral muddy sediment



Underwater video images of seapens (*Virgularia mirabilis*) living scattered on soft substrates near the Island of Ven (© J.Näslund).

Habitat description

This Baltic Sea benthic habitat occurs in the aphotic zone where there is at least 90% coverage of muddy sediment according to the HELCOM HUB classification. Sessile/semi-sessile epibenthic fauna is present but covers less than 10% of the seabed. One associated biotope has been identified: 'Baltic aphotic muddy sediment dominated by seapens' (AB.H2T1). This is characterized by conspicuous populations of seapens that usually live scattered over the sea floor but usually cover less than 10% of the muddy surface. It occurs typically from 15 to 200 meters depth in low to moderate energy exposure classes in the highest salinity regions of the Baltic (up to 23 psu in The Sound). These deep water communities are crucially important to the function of the ecosystem. They provide food and shelter for many other species, including commercially important fish.

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 fauna are suggested quality parameters including the presence of seapens which are both characteristic of this habitat and vulnerable to the most significant pressures.

Characteristic species:

In the Baltic Sea the most common seapens associated with this habitat are *Virgularia mirabilis* and *Pennatula phosphorea*. *Virgularia mirabilis* is found in sheltered areas where the seabed comprises soft sediments such as fine, muddy sand or mud in depths below 10 meters. It lives partly embedded in the sediment and can form colonies up to 60 cm tall. *Pennatula phosphorea* forms erect colonies up to 40 cm

tall.

Classification

EUNIS:

The closest correspondence in EUNIS (2004) level 4 is A5.41 Sublittoral mud 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:

1160 Large shallow inlets and bays

1130 Estuaries

1650 Boreal Baltic narrow inlets

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral mud

EUSEaMap:

Shallow muds

IUCN:

9.6 Subtidal Muddy

Other:

Level 5 of the HELCOM HUB classification (2013):

AB.H2T Baltic aphotic muddy sediment characterized by sparse epibenthic macrocommunity.

This habitat has one biotope on HUB level 6; 'Baltic aphotic muddy sediment dominated by sea pens' (AB.H2T1).

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

Unknown

Justification

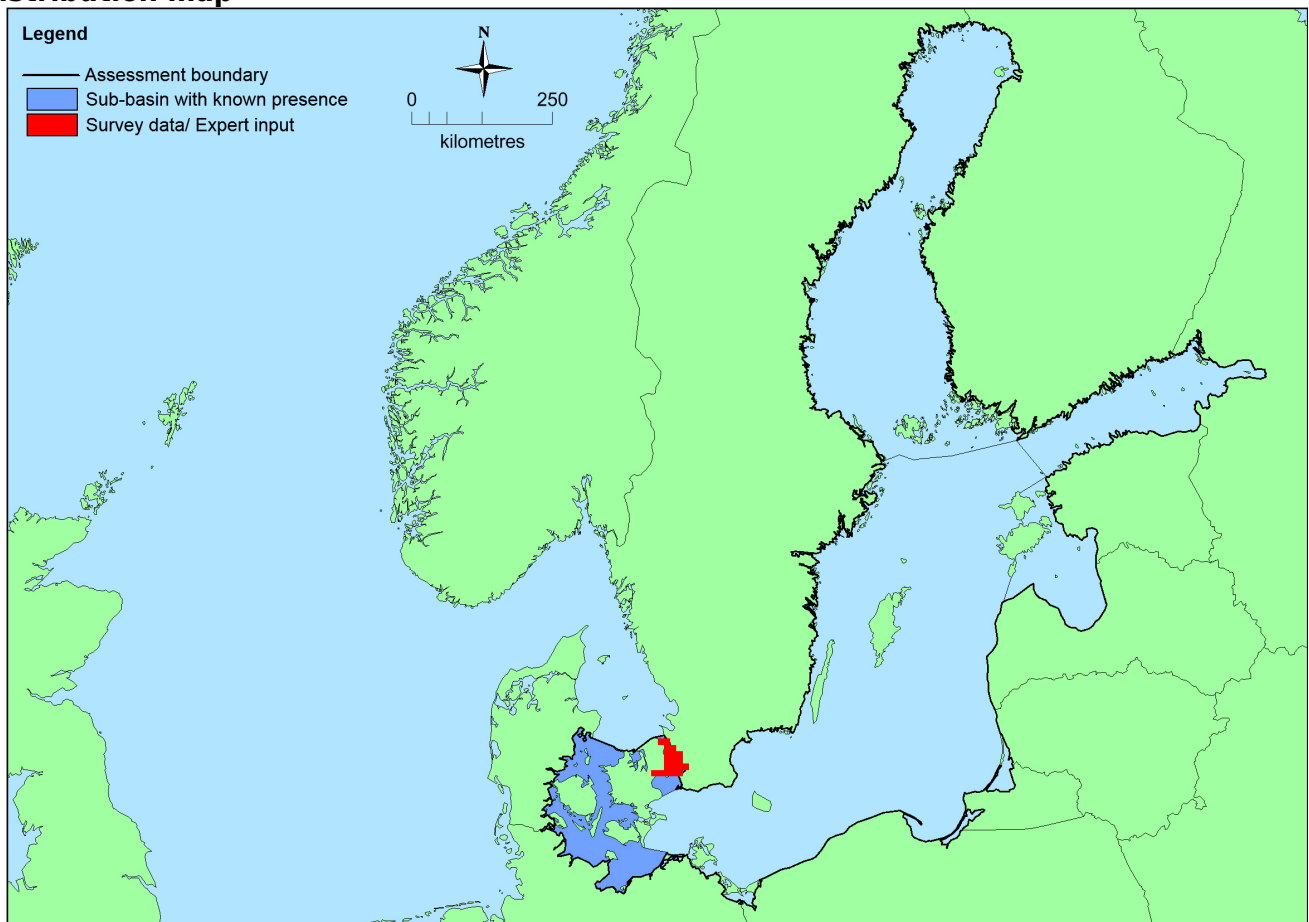
Geographic occurrence and trends

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>	Belt Sea: Present The Sound: Present	max 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>	2,800 Km ²	19	max 1900 Km ²	Based on presence in 100 x 100km grid squares therefore maximum potential EOO and AOO
<i>EU 28+</i>	2,800 Km ²	19	max 1900 Km ²	Based on presence in 100 x 100km grid squares therefore maximum potential EOO and AOO

Distribution map



This map is based on HELCOM mapping of the presence of this habitat in 100 x 100 km cells that were converted to 10 x 10 km cells. The calculated EOO and AOO values therefore represent a maximum based on current information as the habitat may not occur in all these 10 x 10 km cells.

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

This habitat type does not occur in the Russian Baltic Sea area therefore 100% is hosted by EU 28. A similar habitat occurs in the North East Atlantic Regional Sea.

Trends in quantity

This habitat only occurs in the Western Baltic Sea, in The Sound. The data used to calculate EOO and AOO was based on HELCOM mapping in 100 x 100 km cells is therefore a maximum. Expert opinion is that although the soft sediment substrate remains, the loss of the associated seapen communities means there has been an estimated decline in extent of between 50-80% over the past 50 years. No historic data are available and there have been no 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?

Yes

Justification

This habitat has undergone a significant decline during the past 50 years and has an maximum estimated EOO of 2,800 km². The decline is considered to be the result of activities which disturb the seabed and damage the associated seapen communities. In some locations the presence of trawl tracks in the soft sediment indicates where this has occurred.

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

Yes

Justification

Because of its salinity and depth requirements, this habitat is only found in the deeper parts of The Sound at the entrance to the Baltic.

Trends in quality

The damage and loss of the seapen communities associated with this habitat is indicative of a decline in quality however there is insufficient information to quantify the trend.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

The main anthropogenic threats to this habitat are bottom trawling and oxygen depletion caused by eutrophication. Towed demersal fishing gear disturbs the seabed and both damages and removes benthic fauna. The seapens, which characterise this habitat, are very vulnerable to being damaged by trawls because of their body size and height above the sediment. This habitat is also sensitive and vulnerable to other activities which disturb the seabed, such as dredging and the disposal of dredge spoil which may remove, smother and/or bury epibenthic species. The slow recovery of seapens can result in changes in the associated communities in areas of soft sediment, shifting to favour an abundance of small invertebrates.

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
Siltation rate changes, dumping, depositing of dredged deposits
Dumping, depositing of dredged deposits
Other siltation rate changes

Conservation and management

Restrictions on bottom trawling in areas where this habitat occurs (The Sound trenches) is the most significant action that would benefit this habitat. This may be introduced both within and outside the boundaries of Marine Protected Areas and would prevent the loss of this habitat from the Baltic. Improvements in water quality (N, P and organic matter levels) reducing the risk of anoxic events in the bottom waters of the Sound, and preventing dredging and disposal of dredge spoils in areas where this habitat occurs are further valuable conservation management measures.

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

Other resource use measures

Conservation status

Annex 1:

1110: MBAL U1

1130: MBAL U2

1160: MBAL U2

1650: MBAL U2

HELCOM (2013) Red List assessments:

1110 VU C1

1130 CR C1

1160 VU C1

1650 VU C1

HELCOM (2013) assessed this habitat AB.H2T1 as EN (A1).

Sea-pen and burrowing megafauna communities are on the OSPAR list of threatened habitats for OSPAR

Region II which includes the Kattegat.

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

Time between damaging activity, the type of damage activity and the predominant species influences recovery. Recovery times following dredging of similar habitats in the North Sea were significantly shorter for short-lived species (<1-3 years), free-living and tube-dwelling species and for scavenging or opportunistic species, than for medium live species (3-10 years), burrow-dwelling species and suspension feeders. In trawled areas, recovery times were significantly shorter for free-living species, species covered by an exoskeleton or a hard tunic and species that produce pelagic or benthic eggs than for epiphytic/zoic species, species that grow attached to the substratum and have an erect or stalked body form and species that reproduce asexually. Differences in the recoverability of different species groups following fishing may result in changes in community composition and ecosystem functioning over the long term. Recovery times following oxygen depletion and pollution has been investigated in several studies of the Gullmarsfjord, Sweden showing recovery times of between 2-8 years.

Effort required

10 years	20 years
Naturally	Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	50-80 %	unknown %	unknown %	unknown %
EU 28+	50-80 %	unknown %	unknown %	unknown %

Expert opinion is that, although the soft sediment substrate may still be present, the loss of the characteristic species amounts to an estimated decline in extent of this habitat of between 50-80% over the last 50 years. This habitat has therefore been assessed as Endangered under Criteria 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	2800 Km ²	Yes	Yes	<5	19	Yes	Yes	<5	Yes
EU 28+	2800 Km ²	Yes	Yes	<5	19	Yes	Yes	<5	Yes

This habitat occurs in a spatially limited area of the southern Baltic Sea. It has been heavily disturbed by intensive trawling with more than half the area it occupies considered to have been destroyed in the last 50 years. Although the AOO is 19, because these are not widely separated it can also be considered to be present in very few locations. This means that a single threat (e.g. eutrophication or trawling) may affect all the places where it occurs. For this reason it is also capable of becoming critically endangered or collapsed within a very short time period. This habitat has therefore been assessed as Endangered under Criteria B for both the EU 28 and EU 28+.

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 %

The damage and loss of the seapen communities associated with this habitat is indicative of a decline in quality however there is insufficient information to quantify the trend. 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	EN	DD	DD	DD	EN	EN	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	EN	DD	DD	DD	EN	EN	VU	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	A1,B1,B2,B3	Endangered	A1,B1,B2,B3

Confidence in the assessment

Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

Assessors

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Contributors

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Habitats 2014 and 2015.

Reviewers

G. Saunders.

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Date of review

07/01/2016

References

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