BIOTOPE INFORMATION SHEET

English name: **Baltic photic or aphotic shell gravel dominated by vase tunicate (*Ciona intestinalis*)**		Code in HELCOM HUB: **AA.E1F1, AB.E1F1**	
Characteristic species: *Ciona intestinalis*			
Past and Current Threats (Habitat directive article 17): Climate change (ocean acidification M01.04), Eutrophication (H01.05), Contaminant pollution (H03), Fishing (bottom trawling F02.02.01), Construction (D03, oil and gas exploration and exploitation C02), Mining and quarrying (sand and gravel extraction C01.01, oil and gas exploration and exploitation C02)		Future Threats (Habitat directive article 17): Climate change (ocean acidification M01.04), Eutrophication (H01.05), Contaminant pollution (H03), Fishing (bottom trawling F02.02.01), Construction (D03, oil and gas exploration and exploitation C02), Mining and quarrying (sand and gravel extraction C01.01, oil and gas exploration and exploitation C02), Random threat factors (–)	
Red List Criteria: **B1a(ii)**	Confidence of threat assessment: **L**	**HELCOM Red List Category:**	**VU Vulnerable**
Previous HELCOM Red List threat assessments			
BSEP 75 (HELCOM 1998): "?" No data available 2.6.1. Shell gravel bottoms of the aphotic zone 2.6.2 Sublittoral shell gravel bottoms of the photic zone		BSEP 113 (HELCOM 2007): Shell gravel bottoms Under threat and/or in decline in: All where they occur	
Greater concern stated by:			

Habitat and Ecology

The biotope 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, in this case of the vase tunicate (*Ciona intestinalis*). In offshore areas shell gravel bottoms are often exposed to currents and they are mainly found permanently at the same location, whereas in inner waters they can also shift dynamically from one location to another (HELCOM Website).

In these habitats coverage of epibenthic chordates is at least 10% of the sea floor, of which vase tunicate (*Ciona intestinalis*) constitutes at least 50% of the biomass. The tunicates might be overgrown by *Ectocarpus* spp. or *Desmarestia* spp. during summer in the photic zone.

C. intestinalis is an epibenthic filter feeder. It has no specific substrate preferences, but it has been reported to occur abundantly especially on rocky substrates. The filter feeding of *C. intentinalis* populations can greatly impact on phytoplankton abundance, making it as a key species in habitats where it occurs abundantly (Petersen & Riisgård 1992). In Scandinavia, the most of *C. intestinalis* populations are locally distributed in frords and inlets (Petersen & Svane 2002). As an euryhaline marine species, the distribution of *C. intentinalis* is limited by salinity in the Baltic Sea, where the outermost distribution limit lies at the Danish Straits and the Darss Sill. The minimum salinity is 11 psu (Dybern, 1967). Depth is usually 2–25 m.

Ciona intestinalis can grow to nearly 30 cm height, but most often it does not grow higher than 15 cm. In the Baltic Sea the species is largely annual. After the larvae have settled on a suitable substrate, the vase tunicate grows to a height of 4–5 cm during two summer months (Moen & Svensen 2008).

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Ciona intestinalis on shellgravel (Photo: Alexander Darr)

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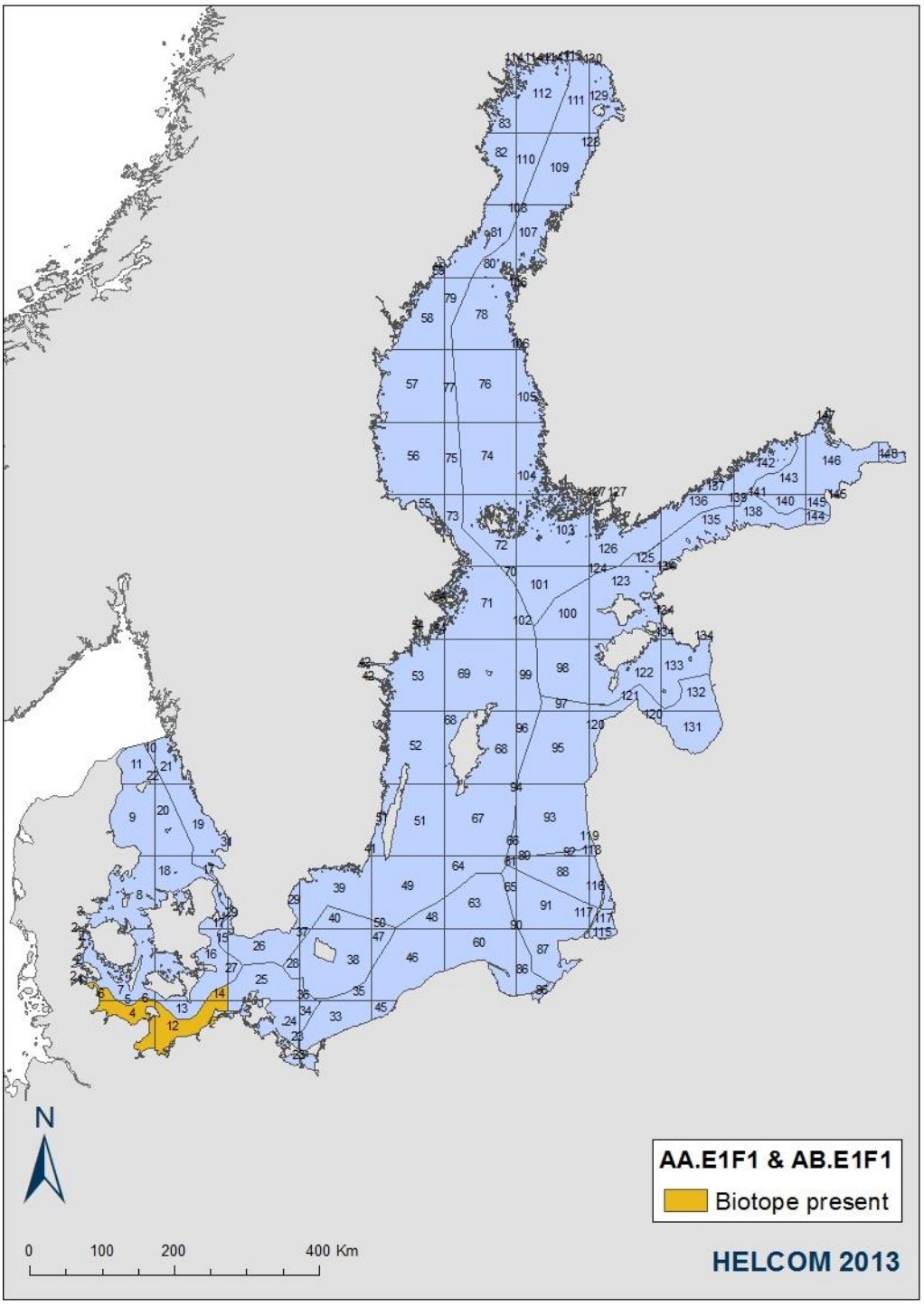
Distribution and status in the Baltic Sea region

The biotope is known from German waters in the Baltic Sea, but may also occur in other areas in the southwestern Baltic Sea where the vase tunicate (*Ciona intestinalis*) occurs. The distribution map indicates the area in the 100 x 100 km grid where biotope is known to occur. The biotope may potentially occur in other areas with high salinity on shell gravel covered bottoms, but is currently not known from other locations.



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Description of Major threats

Eutrophication causing oxygen depletion and increased siltation is the main threat of the biotope. Bottom trawling also threaten the physical integrity of the biotope.

The predicted increase in atmospheric CO_2 causing ocean acidification can be seen as a potential future threat of the biotope, as the precise effect of the acidification is currently not known. Ocean acidification may affect the shell gravel substrate severely. The natural degradation process of the calcium-carbonate shells may accelerate if the water becomes more acidic. Therefore the occurrence of the biotope may become more restricted in the future.

Pollution from various sources introducing hazardous substances to the Baltic Sea as well as construction activities such as offshore installations and sand or gravel extraction, pose additional threats to the biotope. However these effects are assumed to be smaller than that posed by eutrophication.

Assessment justification

B1a(ii)

The biotope is assumed to be rather rare and restricted to small patches where it can occur. It is assumed to have been reduced in distribution mainly due to increased siltation and bottom trawling.

Recommendations for actions to conserve the biotope

Mapping the biotope to better understand its distribution needs to be carried out to conserve it. The area where the biotope occurs should be protected and bottom trawling should not be allowed. Further eutrophication should be reduced to improve the oxygen conditions of the biotope and also reduce the overgrowth of annual brown algae on the vase tunicates.

Common names

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References

Dybern, B. (1967). The distribution and salinity tolerance of *Ciona intestinalis* (L.) F. *typica* with special reference to the waters around Southern Scandinavia. Ophelia 4(2): 207–226. DOI: 10.1080/00785326.1967.10409621

(HELCOM Website) http://www.helcom.fi/environment2/biodiv/endangered/Biotopes/en_GB/Shell_gravel_bottoms/

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Moen, E., Svensen, E. (2009) Djurliv i havet, Nordeuropeisk marin fauna. Nordstedst. 768 pp.

Petersen, J., Svane, I. (2002). Larval dispersal in the ascidian Ciona intestinalis (L.). Evidence for a closed population. Journal of Experimental Marine Biology and Ecology 186: 89–102.

Petersen, J., Riisgård, H.U. (1992) Filtration capacity of the ascidian *Ciona intestinalis* and its grazing impact in a shallow fjord. Marine Ecology Progress Series 88: 9–17.