

BIOTOPE INFORMATION SHEET

English name: Baltic photic or aphotic rock and boulders or mixed substrate dominated by erect moss animals (<i>Flustra foliacea</i>)		Code in HELCOM HUB: AA.A1H2, AB.A1H2, AA.M1H2, AB.M1H2	
Characteristic species: <i>Flustra foliacea</i>			
Past and Current Threats (Habitat directive article 17): Fishing (bottom trawling F02.02.01), Construction (other siltation rate changes J02.11.02, offshore construction D03.03)		Future Threats (Habitat directive article 17): Eutrophication (H01.05), Construction (other siltation rate changes J02.11.02, offshore construction D03.03)	
Red List Criteria: A1	Confidence of threat assessment: L	HELCOM Red List Category:	NT Near Threatened
Previous HELCOM Red List threat assessments			
BSEP 75 (HELCOM 1998): "3" Endangered 2.1.2.1 Solid rock bottoms of the aphotic zone 2.1.2.2.1 Sublittoral level solid rock bottoms with little or no macrophyte vegetation of the photic zone 2.1.2.2.3 Sublittoral solid rock reefs of the photic zone with or without macrophyte vegetation 2.2.1 Stony bottoms of the aphotic zone		BSEP 113 (HELCOM 2007): Maerl beds under threat and/or in decline in Kattegat	
Greater concern stated by:			

Habitat and Ecology

The biotope is formed by erect growing moss animals (Bryozoa) of which brown-leaved hornwrack (*Flustra foliacea*) constitutes at least 50% in volume or biomass. *Flustra foliacea* occurs on stony sublittoral bottoms and favours areas with bottom currents (Ryland & Hayward 1977) as the bryozoans feed on plankton, detritus and dissolved organic material (Tyler-Walters & Ballerstedt 2007).

Accompanying epibenthic species are other erect growing moss animals like *Eucratea loricata* or crust-shaped bryozoans but also sponges, sea squirts or hydrozoans. Erect and laminar bryozoans form calcified substrata that is attractive to many other marine organisms, e.g. barnacles, hydroids and other bryozoans. Erect bryozoans increase the complexity and diversity of their habitat (Bitschofsky et al. 2011), giving shelter to small invertebrates and fishes. Beside other attached species the bushy colonies



* Aphotic boulder covered by various erect growing moss animals with *Flustra foliacea* as the dominant species (Photo: Karin Fürhaupter) (left), *Flustra foliacea* on sieve (Photo Alexander Darr) (right)

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form also shelter for small mobile amphipods or scale worms. Nudibranchs, pynogonids and sea urchins (e.g. *Psammechinus miliaris*) are known to feed on *Flustra foliaceae* (Ryland & Hayward 1977). Therefore they can be regarded as habitat-forming species.

Flustra foliacea can commonly be found between vegetation in the photic zone, but becomes dominant in the aphotic zone with strong currents usually down to 20 – 25 m. The biotope exists only scarcely in the photic zone, where the *Flustra foliacea* colonies mainly cover the negative surfaces of boulders, whereas the macroalgae are dominating on top of the hard substrate. In the aphotic zone the bryozoan can form denser 'meadows' and also live on mixed gravel like substrates. The biotope does not exhibit a distinct lower depth limit in the Baltic Sea, the availability of suitable hard substrates can limit the biotope at greater depths.

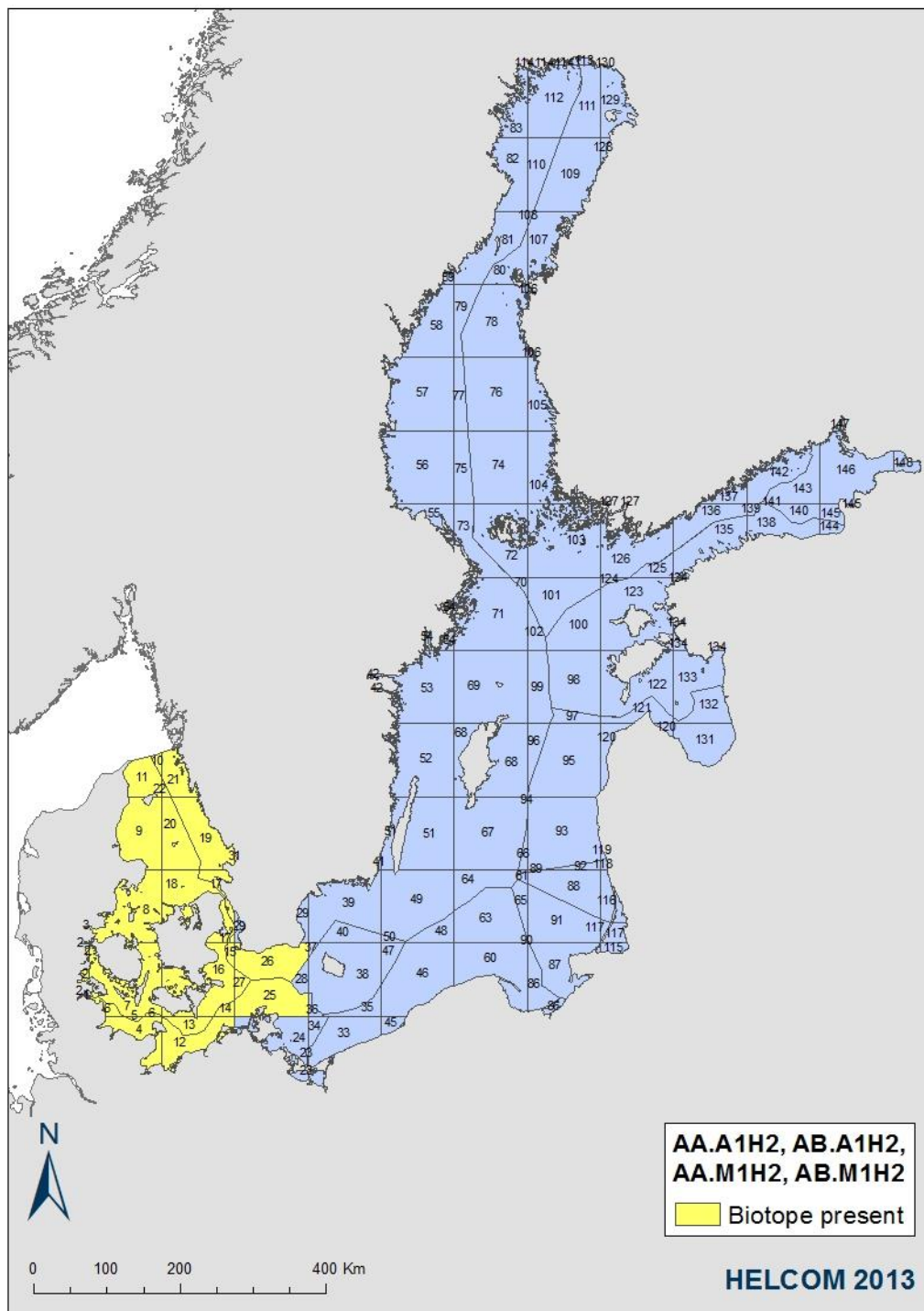
The *Flustra foliacea* colonies are bushy and up to 20 cm high. The fronds are flat, several centimetres broad, branched and have rounded lobes (Ryland & Hayward 1977). Because of its branched flat fronds, the species is often mistaken for a seaweed (Picton & Morrow 2010), especially in videos records without adequate illumination the growth form resembles that of perennial foliose red algae such as *Phyllophora* spp. potentially leading to a biotope misidentification.

Flustra foliacea is a cold-water species (Ryland & Hayward 1977). Compared to the fan-shaped and broad growing specimens of the North Sea, the species tend to reduce branching, width of their fronds and height in brackish waters. *Flustra foliacea* prefers high salinity waters, but can also occasionally be found in areas with salinity as low as 15 psu (Stresemann et al. 1992).

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Distribution and status in the Baltic Sea region

The *Flustra foliacea* dominated biotope commonly occurs from Kattegat to the Mecklenburg Bight and Arkona Basin (Kadetrinne). The spatial restriction to the Western Baltic Sea is due to the salinity requirements of the dominant species *Flustra foliacea*. The more to the west or north-west this biotope occurs the higher the salinities, and in consequence the higher the diversity of inhabiting invertebrate and fish communities. The distribution map indicates the area in the 100 x 100 km grid where biotope is known to occur, the occurrence of the biotope in the photic zone is restricted to the negative surfaces of for example boulders.



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Description of major threats

Due to the scarceness of hard substrates in many areas there the biotope could potentially exist, the extent of occurrence is not very large and currently only little information about the biotope is available. The scarcity of rocks and boulders in the coastal areas around Germany and Denmark is due to historical stone fishing where stones and boulders were extracted from the seabed.

Eutrophication is a major threat to the biotope. The growth rate of annual macrophyte algae is known to increase due to higher nutrient concentrations in the water, which might restrict the available substrate for the biotope. The increased siltation rate due to eutrophication, further reduces the availability of hard substrates for the biotope especially impeding the settlement of larvae. A higher particle concentration in the water may also impede the filter feeding efficiency of the adult *Flustra foliacea*. Oxygen depletion due to eutrophication is seen as a smaller threat. Likewise the biotope may be affected negatively by physical disturbance by bottom trawling, offshore construction work and exploitation of soil resources, in the same way as several other hard bottom biotopes.

Assessment justification

A1

The biotope is assumed to be rather rare and to be restricted to small patches where it occurs. It is assumed to have been reduced in distribution mainly due to increased siltation and habitat lost. In the southern regions of the Baltic Sea where the biotope occurs, hard bottoms are scarce and historically stone fishing has reduced the available substrata for the biotope.

Recommendations for actions to conserve the biotope

The distribution of the biotope and the type of environmental conditions it requires is currently somewhat unclear. Detailed biotope mapping activities are needed in the region where the biotope occurs. The biotope may easily be overlooked or falsely identified as a macrophyte biotope if the mapping activities are not carried out in enough details.

All actions reducing the eutrophication level of the Baltic Sea will benefit the biotope. These activities include measures to reduce the diffuse run-off from agriculture on land to reduction of nutrient run-off from point sources by constructing waste water treatment plants.

All actions to reduce physical disturbance of photic and aphotic stony bottoms in the Baltic Sea are important for the conservation of the epibenthic biotopes dominated by *Flustra foliacea*. Appointing areas where the biotope is known to occur as protected sites, where bottom trawling, offshore construction work and exploitation of soil resources is prohibited, would constitute an effective conservation measure.

Common names

hornwrack

References

- Bitschofsky F., Forster S., Scholz J. 2011. Introduction in: 'Regional and temporal changes in epizoobiontic bryozoan-communities of *Flustra foliacea* (Linnaeus, 1758) and implications for North Sea ecology'. *Estuarine, Coastal and Shelf Science* 91(3): 423–433.
- Picton, B.E., Morrow, C.C., (2010). *Encyclopedia of Marine Life of Britain and Ireland* Available at: <http://www.habitas.org.uk/marinelifelife/species.asp?item=Y6940> (viewed 3 June 2013).
- Ryland J.S., Hayward P.J. (1977). *British anascan bryozoans. Synopses of the British Fauna (New Series), No. 10.* Academic Press, London.

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- Stresemann E., Hannemann H.-J., Klausnitzer B. Senglaub K. 1992. Exkursionsfauna von Deutschland. Band 1, Wirbellose (ohne Insekten). Volk und Wissen Verlag gmbH Berlin.
- Tyler-Walters H., Ballerstedt S. 2007. Flustra foliacea. Hornwrack. Marine Life Information Network: Biology and Sensitivity Key Information Sub-programme [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 08/07/2013]. Available at: <http://www.marlin.ac.uk/generalbiology.php?speciesID=3342>