

## BIOTOPE INFORMATION SHEET

|   |   |   |                          |
|---|---|---|--------------------------|
| English name:<br><b>Baltic Sea aphotic pelagic below halocline oxic</b>   |   | Code in HELCOM HUB:<br><b>AE.O5</b>   |                          |
| Characteristic species:   |   |   |                          |
| Past and Current Threats (Habitat directive article 17):<br><br>Eutrophication (H01.05), Contaminant pollution (H03), Climate change (reduced water mass exchange M01.05) |   | Future Threats (Habitat directive article 17):<br><br>Eutrophication (H01.05), Contaminant pollution (H03), Climate change (reduced water mass exchange M01.05) |                          |
| Red List Criteria:<br><b>A3</b>   | Confidence of threat assessment: <b>L</b> | <b>HELCOM Red List Category:</b>  | <b>EN<br/>Endangered</b> |
| Previous HELCOM Red List threat assessments   |   |   |                          |
| BSEP 75 (HELCOM 1998):<br>"2" Heavily endangered<br>1.1.2 Offshore (deep) waters below the halocline  |   | BSEP 113 (HELCOM 2007):<br>Offshore (deep) waters below the halocline under threat and/or in decline everywhere where they occur.                               |                          |
| Greater concern stated by:  |   |   |                          |

### Habitat and Ecology

This pelagic habitat occurs below the permanent halocline which is a characteristic feature of the Baltic Proper. The permanent halocline is usually encountered at depths of 60–80 m. Below the halocline the salinity is typically >12 psu and due to the depth of the permanent halocline this biotope is generally only found in the aphotic zone. This implies that the biotope is mainly populated by a community of marine zooplankton. The copepod *Oicopleura dioica* which has been found in high abundances just below the halocline and down to depths where the oxygen concentration is 1 mL/L<sup>-1</sup> is a typical example of a species utilizing the higher salinity water below the halocline in the Bornholm Basin (Schulz & Hirche 2007). Copepods in the biotope are believed to feed on organic matter, ciliates and heterotrophic flagellates that can be found in the water layer (Schulz & Hirche 2007).

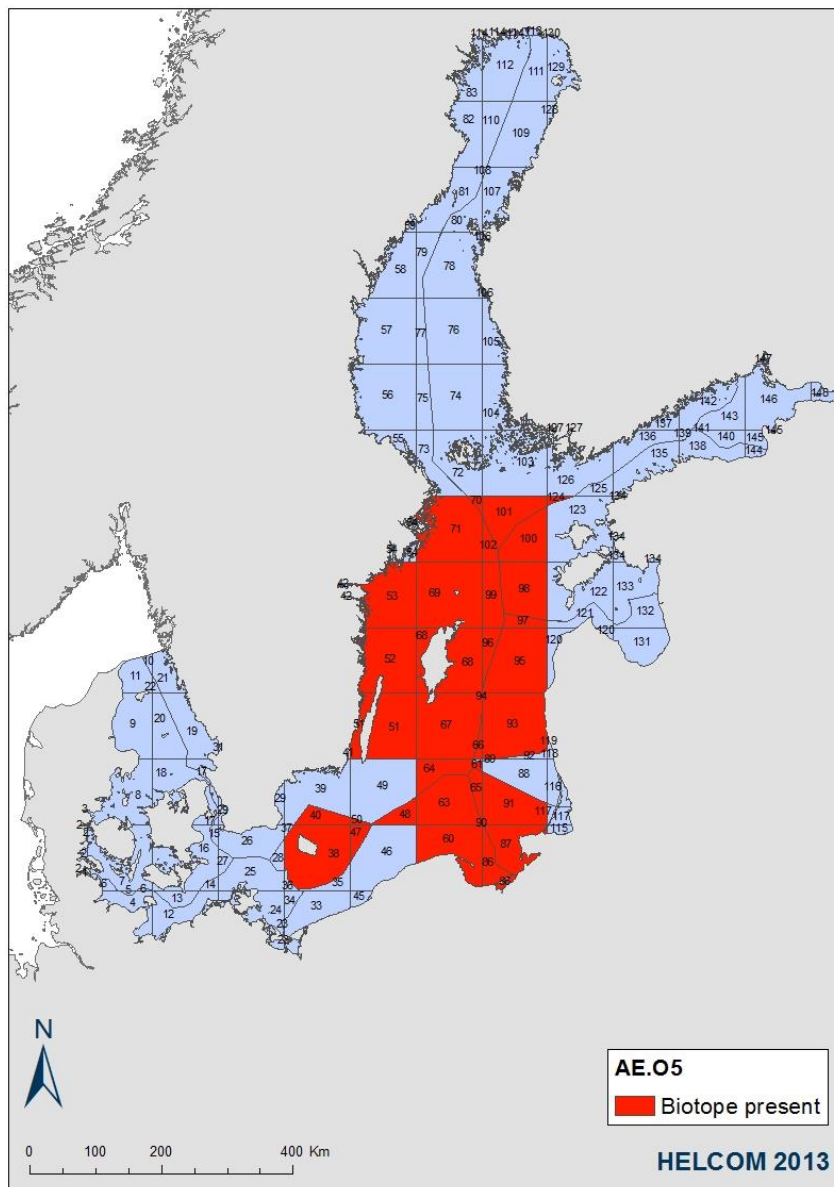
In the areas around the Danish sounds a semi-permanent halocline can sometimes be found, however this halocline is not considered to be a stable habitat forming feature.

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### Distribution and status in the Baltic Sea region

The volume of the oxic watermass below the permanent halocline varies. The habitat occurs as a layer of water in the Baltic Proper at a depth usually below 60–80 meters where the permanent halocline is usually found. Due to the variable influx of saltwater from the Atlantic through the Danish sounds and the river run-off that provides the Baltic Sea with fresh water, the depth of the halocline can vary. At times the halocline and the oxic water below reaches into the Gulf of Finland. The thickness of the oxic watermass below the halocline varies mainly due to the spread of the anoxic waterlayer below. The anoxic waterlayer spreads and thickens due to eutrophication, decreasing both the vertical and horizontal distribution of the oxic watermass.

The distribution map indicates the area in the 100 x 100 km grid where biotope is known to occur. The habitat only makes up a section of the pelagic water mass in the area indicated by the map. The map is created based on the bathymetric data of the Baltic Proper. According to the depth contours, the grid indicated on the map include areas deeper than 60-80m.



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### Description of Major threats

The most severe threat for this habitat is the expansion of the deep anoxic water mass due to eutrophication. Eutrophication leads to an increased sedimentation of organic matter in the deep parts of the Baltic Proper. Microbial decomposition of the matter requires oxygen and when the amount of organic matter is large this may lead to oxygen depletion. The habitat is delineated based on the occurrence of oxygen, so the spread of anoxia directly affects the quantity of the habitat. Other chemical pollutants may further degrade the quality of the habitat. The stratification of the Baltic Sea and the shallow Danish straits restricting the water exchange with the Atlantic ocean

### Assessment justification

A3

The oxygenic watermass below the halocline is estimated to have declined by more than 70% during the past 100 years for which there is measured data available on the depth of the halocline and the depth of the anoxic zone (Figure 1.).

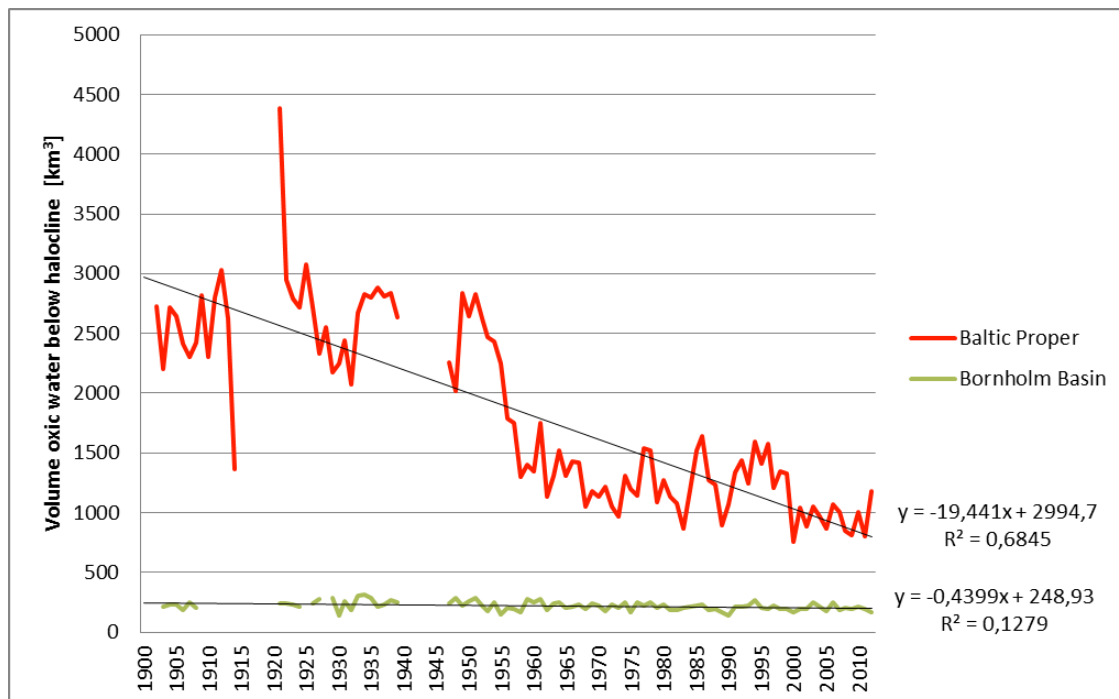


Figure 1. The oxic water volume below the halocline has been calculated as a five year average based on data previously published in the TARGREV report (HELCOM 2013).

The spread of the anoxic watermass in the deep parts of the Baltic Sea has been intensively studied. If the data is analysed for the past 50 years the decline does not indicate a very high threat category, however periodically the depth of the anoxic watermass has been recorded encountered at similar depths as the permanent halocline.

### Recommendations for actions to conserve the biotope

All actions that reduce the eutrophication level of the Baltic Sea will support persistence and possible spread of oxic water below the permanent halocline. Actions that reduce eutrophication include agricultural measures that reduce nutrient run-off and efficient waste water treatment plants.

### Common names

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### References

- HELCOM (1998). Red List of Marine and Coastal Biotopes and Biotope Complexes of the Baltic Sea, Belt Sea and Kattegat - Including a comprehensive description and classification system for all Baltic Marine and Coastal Biotopes. Baltic Sea Environment Proceedings No. 75. Helsinki Commission, Helsinki. 115 pp. Available at: <http://www.helcom.fi/stc/files/Publications/Proceedings/bsep75.pdf> (viewed 28 May 2013)
- HELCOM (2013) Approaches and methods for eutrophication target setting in the Baltic Sea region. Baltic Sea Environmental Proceedings No.133.
- Schulz, J., Hirche, H-J. (2007) Living below the halocline: strategies of deep-living species in the highly stratified brackish Bornholm Basin (central Baltic Basin). *Journal of Plankton Research* 29(10):881-894