BIOTOPE INFORMATION SHEET

English name: **Coastal lagoons**		Code in HELCOM HUB: **1150**	
Characteristic species: *Charales,* Cyperaceae*, Phragmites australis, Potamogeton* spp.*, Ruppia spp., Zannichellia palustris*			
Past and Current Threats (Habitat directive article 17): Eutrophication (H01.05), Contaminant pollution (H03), Construction (dredging J02.02.02), Fishing (F02)		Future Threats (Habitat directive article 17): Eutrophication (H01.05), Contaminant pollution (H03), Oil spills (oil spills in the sea H03.01), Construction (dredging J02.02.02), Fishing (F02)	
Red List Criteria: **C1**	Confidence of threat assessment: **M**	**HELCOM Red List Category:**	**EN Endangered**
Previous HELCOM Red List threat assessments			
BSEP 75 (HELCOM 1998): "2" Heavily endangered G – Lagoons including Bodden, barrier lagoons and fladas		BSEP 113 (HELCOM 2007): Regions where the biotope/habitat is under threat and/or in decline: All where they occur.	
Higher concern stated by:			

Habitat and Ecology

Lagoons are known to be biodiversity hotspots and important spawning and nursing grounds for several fish species. The benthic flora is often rich and may include threatened and/or declining plants such as stoneworts (Charales). The bottom of a lagoon can be completely covered in dense underwater vegetation meadows. The lagoon plant vegetation provides habitat for many aquatic invertebrates and these are suitable food for larger animals such as fish or birds. The lagoons are vital habitats for many migrating birds that utilize lagoons both as breeding grounds and as feeding and resting sites during the annual migration.

Baltic Sea lagoons are mostly bay-like features or coastal lakes that are more or less separated from the sea by sandbanks or land thresholds. They are commonly shallow, often with a varying salinity. The salinity of semi-isolated lagoons is usually similar to the surrounding sea area, while lagoons that are nearly- or completely isolated can exhibit a lower salinity due to runoff from the drainage area. The size range is undefined. Large coastal lagoons can cover an areas of some 100 km² or even more, while small lagoons e.g. fladas or gloes only cover a few tens of square meters to a few hectares.

The size of the biotope complex can vary by several orders of magnitude from some tens of square meters to several hectares. Several specific types of lagoons (Bodden, barrier lagoons and Fladas) exist in the Baltic Sea (HELCOM, 1998). In the northern Baltic Sea around the Quark land up-lift is ongoing and can be as much as 9 mm annually. On these coasts many of the smaller lagoons are a result of the up-lift and form a temporal continuum of biotopes characteristic for the Baltic Sea. The seafloor/mainland plain is slightly tilted towards the sea and in combination with land uplift and siltation, this results in a succession where shallow bays with a threshold at the entrances (so called juvenile flads) gradually change into more isolated shallow flads which in the following stage become completely landlocked gloes lakes.

Definition of the habitat according to the 'Interpretation manual of European Union Habitats' EUR27:

> Lagoons are expanses of shallow coastal salt water, of varying salinity and water volume, wholly or partially separated from the sea by sand bank s or shingle, or, less frequently, by rocks. Salinity may vary from brackish water to hypersalinity depending on rainfall, evaporation and through the addition of fresh seawater from storms, temporary flooding of the sea in winter or tidal exchange.

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Flads and gloes, considered a Baltic variety of lagoons, are small, usually shallow, more or less delimited water bodies still connected to the sea or cut off from the sea very recently by land upheaval. Characterised by well-developed reedbeds and luxuriant submerged vegetation and having several morphological and botanical development stages in the process whereby sea becomes land.

Salt basins and salt ponds may also be considered as lagoons, providing they had their origin on a transformed natural old lagoon or on a saltmarsh, and are characterised by a minor impact from exploitation.

Plants: *Callitriche* spp., *Chara canescens, C. baltica, C. connivens, Eleocharis parvula, Lamprothamnion papulosum, Potamogeton pectinatus, Ranunculus baudotii, Ruppia maritima,Tolypella nidifica*. In flads and gloes also *Chara* spp.(*Chara tomentosa), Lemna trisulca, Najasmarina, Phragmites australis, Potamogeton* ssp., *Stratiotes aloides, Typha* spp.

Animals: Cnidaria- *Edwardsia ivelli*; Polychaeta- *Armandia cirrhosa*; *Bryozoa- Victorella pavida*; *Rotifera - Brachionus* spp.; Molluscs- *Abra* spp., *Murex* spp.; Crustaceans- *Artemia* spp.; Fish- *Cyprinus* spp., *Mullus barbatus*; Amphibians- *Hyla arborea*

Saltmarshes form part of this complex.

Figure 1 Lagoon in northern Baltic Sea region, Krunnit, Finland (Photo: Pekka Lehtonen)

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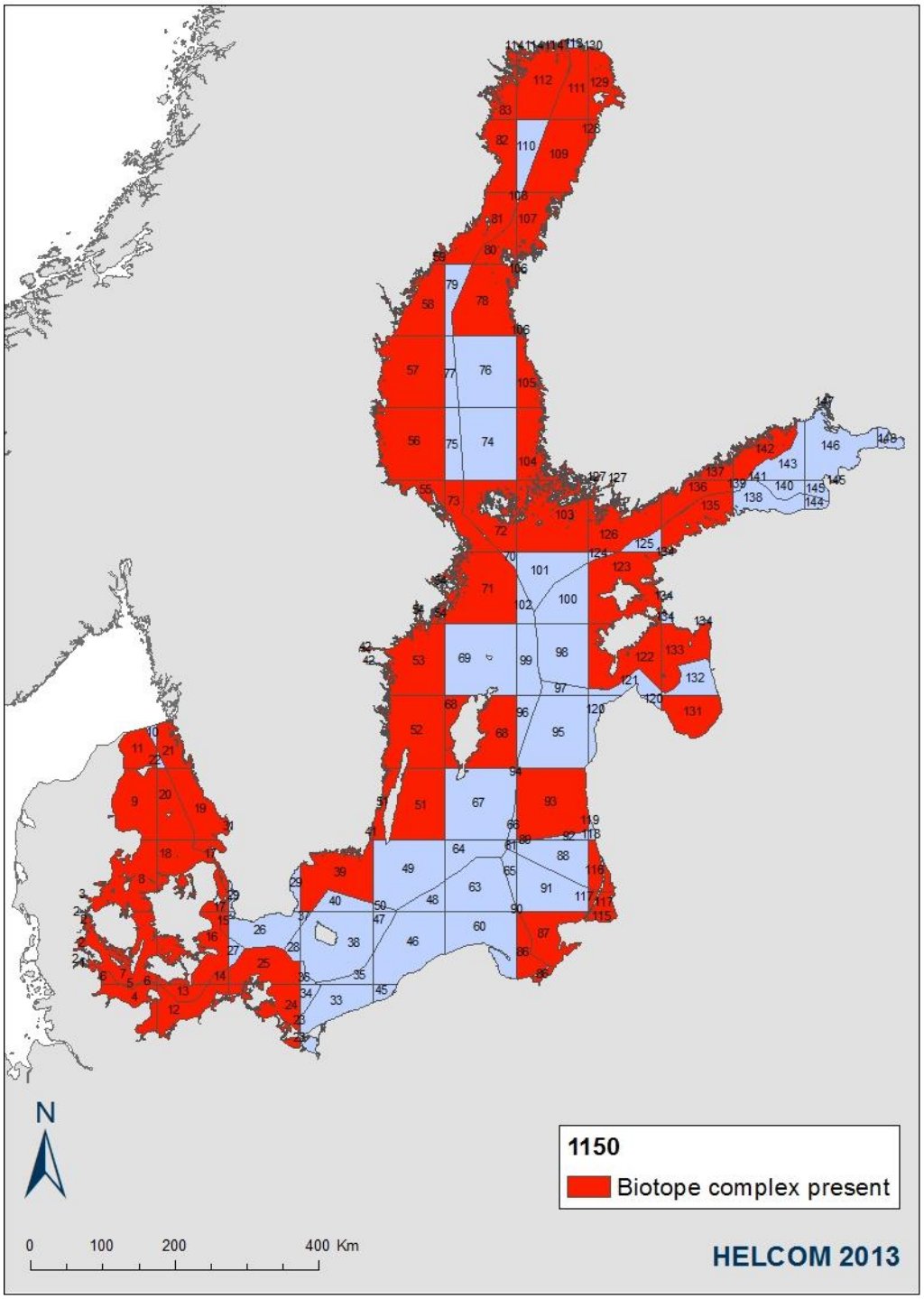
Distribution and status in the Baltic Sea region

Lagoons are a typical feature of the dynamic Baltic Sea coast and occurs or occurred in the past in all HELCOM sub-regions.



The distribution map indicates the area in the 100 x 100 km grid where biotope is known to occur (Naturvårdverket 2011, EUNIS Database, HELCOM 1998)

Description of Major threats

Eutrophication and pollution by drainage from agriculture and forestry areas as well as from other sources such as traffic and industry pose serious threats to the lagoon biotope complex. Many of the lagoons biotope forming species are sensitive to eutrophication.

The coastal lagoons are severely affected by various construction activities. Dredging, both small-scale and large-scale projects, affect the lagoons significantly both directly and indirectly. Removing the threshold at the entrance of a lagoon will affect the hydrodynamics of the lagoon on a long time scale. Indirectly dredging can also have an adverse effect on the biotope complex by increasing the turbidity of the water and by releasing nutrients from the sediment. Water turbidity and eutrophication is known to affect the biotope forming community and the natural succession of the biotope might be disrupted. Some of the characteristic biotope forming plants and algae are sensitive to turbidity. If dredging is carried out to enable boat traffic in a lagoon, then the resuspensation of sediments due to turbulence from the boats will continuously fuel the eutrophication process.

The lagoon shores are also used for building and other activities which can cause visual, acoustic or physical disturbance to wildlife. Unsustainable fishing methods pose a threat to larger lagoons.

Contaminant pollution threatens coastal lagoons. Run-off from urbanized areas in the catchment of the lagoon can introduce various hazardous substances. Coastal lagoons are also threatened by oil spills at sea. If the oil drifts to shore, the shallow lagoons with dense macrophyte meadows can be difficult to restore after an oil spill accident.

Assessment justification

C1

Human activities have affected the majority of lagoons and have in some cases caused severe or even irreparable damage. The assumedly severe decline in quality on more than half of the lagoon biotope complexes is mainly due to exploitation of the coastal areas. In these lagoons biota performing key roles has been greatly reduced and even disappeared completely in some locations and many lagoons suffer from chronic changes in nutrient cycling and water clarity.

The length of pristine shores of lagoons and the number of lagoons in a natural or near natural state is low and steadily decreasing due to the increased utilization of the coast for construction activities. In many regions in the northern Baltic Sea recreational building of vacation homes along the coast has had a negative impact on the lagoons. Especially in areas where the land up lift is significant and dredging is required for boat access, the anthropogenic impact on the biotope complex has been significant. The quality of lagoons in the southern and western Baltic Sea has deteriorated severely due to exploitation of the coastlines. Lagoons are directly impacted by human activities in the drainage area, and in the southern regions the population density along the coast is high leading to a gradual quality degradation.

Eutrophication of the coastal lagoons increases water turbidity and the siltation rate. Macrophyte meadows of various Charales and spiny naiad biotopes are characteristic. Macrophyte meadows have been severely impacted in several coastal lagoons, to the degree that the meadows have disappeared in some locations. Characteristic species such as *Zostera noltii* has disappeared completely form many lagoons in the southern Baltic Sea.

This biotope complex could possibly be assessed by the A-criterion as a decrease in quantity if for example, dredging of the sill of a flad would be considered as changing the flad to a shallow bay.

Currently there is insufficient data to assess the biotope complex by the A-criterion. The exact abundance or cover of threatened or declining lagoons is not known.

Recommendations for actions to conserve the biotope

One of the main solutions to stop and reverse degradation of lagoons is a general protection of this natural habitat type by law as already performed in some countries. Particularly still undisturbed and natural lagoon areas should become strictly protected. Moreover, programs and measures are needed to restore natural conditions in affected lagoon areas. This includes a drastic reduction of the eutrophication and pollution in the run off area.

Additional protective measures should be: introduction of ecologically sound fishing methods, preservation of natural dynamics (HELCOM Rec. 16/3), restrictions on building activities and any constructions (HELCOM Rec. 15/1), unregulated growth of tourism and harmful recreational activities.

Common names

Denmark: Kystlaguner, Estonia: - , Finland: Rannikon laguunit, Germany: Lagunen des Küstenraumes (Strandseen), Latvia: - , Lithuania: - , Poland: - , Russia: - , Sweden: Kustnära laguner

References

European Commission. (2007a). Guidelines for the establishment of the Natura 2000 network in the marine environment. Application of the Habitats and Birds Directives. Appendix 1: Marine Habitat types definitions. http://ec.europa.eu/environment/nature/natura2000/marine/docs/appendix_1_habitat.pdf

European Commission (2007b). Guidelines for the establishment of the Natura 2000 network in the marine environment. Application of the Habitats and Birds Directives. (EU interpretation manual) Available at: http://ec.europa.eu/environment/nature/natura2000/marine/docs/marine_guidelines.pdf (viewed 4 June 2013)

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. HELCOM-Baltic Sea Environment Proceedings 75, Helsinki Commission. 115 pp.

Naturvårdsverket (2011) Vägledning för svenska naturtyper i habitatdirektivets bilaga 1, Blottade sand- och lerbottnar. Available at: http://www.naturvardsverket.se/upload/stod-i-miljoarbetet/vagledning/natura-2000/naturtyper/kust-och-hav/vl_1150_Laguner.pdf (Viewed 19.7.2013).

EUNIS Database. http://eunis.eea.europa.eu/habitats.jsp (Viewed 19.7.2013).