



Document title	Update on benthic ecosystem component spatial data sets
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Background

For the purposes of developing the second HELCOM holistic assessment of the Baltic Sea ecosystem health (HOLAS II) several spatial data sets have been compiled. The spatial data sets have been developed through the HELCOM TAPAS project based on data calls issued to the countries from the HELCOM Secretariat and from other sources.

The development of the assessment of pressures and impacts using Baltic Sea Impact Index (BSII) requires linking human activities and pressures to ecosystem components based on the sensitivity of the component. The ecosystem component layers to focus on in the HOLAS II BSII assessment were prepared based on the outcome of State and Conservation 3-2015 (para 6J-4-6J-7), in communication with the TAPAS project.

The key components of the Baltic Sea Pressure Index (BSII) are

1. information on the spatial distribution of key ecosystem components,
2. spatial information on the pressures to be considered, and
3. sensitivity scores to estimate the sensitivity of different ecosystem components to each of the pressures.

This document gives:

- an update on the process to collate spatial data sets on benthic ecosystem components for use in HOLAS II (table 1), in particular in the Baltic Sea Impact Index as developed further within the TAPAS project,
- an example of a thematic fact sheet for ecosystem layers,
- basic information on the benthic ecosystem layers (Annex 1)

Action required

The workshop is invited to take note of the information and use it as appropriate.

Benthic ecosystem component layers for the BSII

Status of the benthic ecosystem component layers

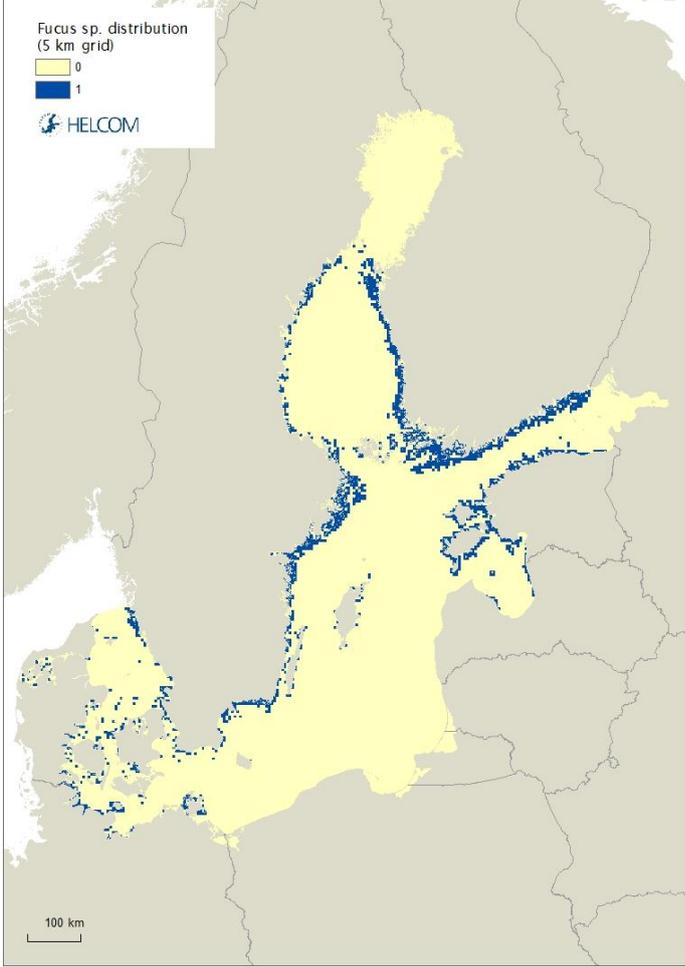
Table 1 gives an overview of the current status of the benthic ecosystem component data layers. More detailed descriptions of the data and the methods applied in the production of the layer can be found in Annex 1.

Table 1. The status of the benthic ecosystem component layers in September 2016.

Ecosystem component	Data	Status (x = ready)	Planned schedule
Broad-scale seabed habitats			
Infralittoral hard bottom	EMODnet seabed habitats (EUSeaMap II project)		New release in September 2016
Infralittoral sand	EMODnet seabed habitats		September 2016
Infralittoral mud	EMODnet seabed habitats		September 2016
Circalittoral hard bottom	EMODnet seabed habitats		September 2016
Circalittoral sand	EMODnet seabed habitats		September 2016
Circalittoral mud	EMODnet seabed habitats		September 2016
Habitat forming species			
Furcellaria sp.	HELCOM data call	x	
Zostera marina	HELCOM data call	x	
Charophytes	HELCOM data call	x	
Mytilus edulis	HELCOM data call	x	
Fucus sp.	HELCOM data call	x	
Natura 2000 habitats			
Sandbanks (1110)	HELCOM data call	x	
Estuaries (1130)	HELCOM data call	x	
Mudflats and sandflats (1140)	HELCOM data call	x	
Coastal lagoons (1150)	HELCOM data call	x	
Large shallow inlets and bays (1160)	HELCOM data call	x	
Reefs (1170)	HELCOM data call	x	
Submarine structures made by leaking gas (1180)	HELCOM data call	x	
Baltic Esker Islands (UW parts, 1610)	HELCOM data call	x	
Boreal Baltic islets and small islands (UW parts, 1620)	HELCOM data call	x	

Thematic fact sheets on ecosystem components

The data layers on ecosystem components and the underlying data will be represented in thematic fact sheets. The fact sheets will be published online. An example of an ecosystem component fact sheet is presented below.

<p>Distribution of <i>Fucus</i> sp.</p>	
	<p>Distribution of <i>Fucus</i> sp. based on data submission by HELCOM contracting parties. Mainly pointwise occurrences of <i>Fucus</i> were submitted, originally gathered in national mapping and monitoring campaigns, or for scientific research purposes. From Estonian waters, a predictive model was used (200m resolution), that was converted to presence/absence using minimized difference threshold (MDT) criteria. All data (<i>Fucus</i> points and the raster presenting predicted presence of <i>Fucus</i>) were generalized to 5km x 5km grid cells.</p>
<p>Data sources: Denmark: Point data from national monitoring (dive and video, points and transects), data from 2007-2015. Data is available through Miljøportalen Estonia: Modelled distribution of <i>Fucus vesiculosus</i> and <i>Fucus radicans</i> based on observations from national monitoring (dive and drop video), 2005-2014. Finland: Point data gathered during the national marine mapping programme VELMU (2004-2015). Germany: Point data originally gathered for monitoring and research purposes (video, photos, dive, wading, snorkeling), data from 2010-2015. Latvia: Point data of from national monitoring (dive and drop video) campaigns during 2006-2013. Lithuania: No reported occurrences of <i>Fucus</i>. Poland: No reported occurrences of <i>Fucus</i>. Russia: No reported occurrences of <i>Fucus</i>. Sweden: Point data from national monitoring and mapping surveys (1995 -2015) extracted from SMHI SHARK database.</p>	
<p>Attribute information:</p>	

<p>Spatial coverage: Entire Baltic Sea.</p>
<p>Spatial resolution: The original data mainly as point data, but the observations have been generalized to 5x5 km grid cells.</p>
<p>Time period and temporal resolution: Varies between countries (see data sources)</p>
<p>Data access: HELCOM data and map service</p>
<p>Limitations of use: Data can be used freely given that the source is cited.</p>
<p>Responsible institution: HELCOM (www.helcom.fi).</p>

Annex 1.

This annex gives more detailed descriptions of the benthic ecosystem component data layers.

Broad-scale seabed habitats

Broad-scale habitats are level 3 habitats according to HELCOM underwater biotope and habitat classification system (HUB) (or level 2 habitats according to EUNIS classification system). The broad-scale habitats are used as proxies for the biological communities that are found in these environments. The spatial data on broad-scale seabed habitats will be obtained directly from the EUSeaMap II -project. A new updated version will be released in September 2016 (not released yet on the 26th of September).

1. Infralittoral hard bottom
 - *Cladophora spp.*, *Ceramium spp.*, *Laminaria sp.*, *Fucus sp.*, *Furcellaria lumbricalis*, *Polysiphonia fucoides*, *Aegagrophila linnaei*, *Fontinalis sp.* Ascidiaceae, *Electra crustulenta*, *Flustra foliacea*, Balanidae, *Mytilus spp.*, *Modiolus modiolus*
2. Infralittoral sand
 - *Phragmites australis*, *Zostera marina*, *Potamogeton perfoliatus*, *Stuckenia pectinata*, *Tolypella nidifica*, *Chara aspera*, *Hediste diversicolor*, *Bathyporeia pilosa*, *Arenicola marina*, *Macoma balthica*, *Mya arenaria*.
3. Infralittoral mud
 - *Phragmites australis*, *Stuckenia pectinata*, *Potamogeton perfoliatus*, *Najas marina*, *Chara tomentosa*, *Hediste diversicolor*, *Gammarus spp.*
4. Circalittoral hard bottom
 - *Mytilus spp.*, *Cordylophora caspia*, Hydrozoa, *Amphibalanus improvisus*, Bryozoa, Porifera, Hydrozoa
5. Circalittoral sand
 - *Mya arenaria*, *Macoma baltica*, *Arctica islandica*, *Pygospio elegans*, *Marenzelleria spp.*, *Hediste diversicolor*, *Monoporeia affinis*, Chironomidae
6. Circalittoral mud
 - *Macoma balthica*, *Saduria entomon*, *Marenzelleria spp.*, *Monoporeia affinis*

Habitat forming species

The maps of habitat forming species are based on data submission by countries, as a result of data call on species and biotopes.

The following habitats forming species are considered:

7. *Furcellaria lumbricalis*
8. *Zostera marina*
9. Charophytes
10. *Mytilus edulis*
11. *Fucus sp.*

The data was mainly submitted as point data on species observations. Only Finland and Estonia submitted results of predictive models on species presence, Finland submitted also point data. The Estonian predictive model (200m resolution) was converted to presence/absence using minimized difference threshold (MDT)

criteria. All data (species point observations and the raster presenting predicted presence of species for Estonian waters) were generalized to 5km x 5km grid cells.

Natura 2000 habitats

Natura 2000 habitats are habitats listed in the Annex 1 of the Habitats Directive, and named as habitat types, whose conservation requires the designation of special areas of conservation (SACs). Full descriptions of the habitats can be found at the following link: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/Int_Manual_EU28.pdf.

The maps of Natura 2000 habitats are based data submission by countries, as a result of data call on species and biotopes. Most of the submitted data (polygons) on Natura 2000 habitats are based on modelling, GIS analysis and/or aerial photos. Data coverage, accuracy and the methods in obtaining the data vary.

12. Sandbanks which are slightly covered by sea water at all time (1110)
 - Sandbanks are areas elevated from their surroundings that consist mainly of sand, but where cobbles and boulders can occur. Occur usually in < 20m depth. Characteristic plant species include *Zostera* sp., *Potamogeton* spp., *Ruppia* spp., *Tolypella nidifica*, *Zannichellia* spp., charophytes.
13. Estuaries (1130)
 - Estuaries are coastal inlets that are strongly influenced by freshwater. Characteristic species include e.g. *Carex* spp., *Myriophyllum* spp., *Phragmites australis*, *Potamogeton* spp., *Scirpus* spp.).
14. Mudflats and sandflats not covered by seawater at low tide (1140)
 - This habitat contains sands and muds not covered by sea water at low tide, often devoid of vascular plants, usually coated by blue algae and diatoms. These habitats host diverse intertidal communities of invertebrates. They are of particular importance as feeding grounds for wildfowl and waders.
15. Coastal lagoons (1150)
 - Lagoons are expanses of shallow coastal waters, entirely or partially separated from the sea by sandbanks, shingle, or rocks. Salinity may vary from brackish water to hypersaline depending on rainfall, evaporation and addition of fresh seawater from storms, temporary flooding, or tidal exchange. Characteristic species include e.g. *Callitriche* spp., *Chara* sp., *Eleocharis parvula*, *Lamprothamnion papulosum*, *Ranunculus baudotii*, *Ruppia maritima*, *Tolypella nidifica*. In flads and gloes also *Lemna trisulca*, *Najas marina*, *Phragmites australis*, *Potamogeton* spp., *Stratiotes aloides*, *Typha* spp.
16. Large shallow inlets and bays (1160)
 - These habitats are large, shallow indentations of the coast, sheltered from wave action and where, in contrast to estuaries, the influence of freshwater is generally limited. Characteristic species include e.g. *Zostera* spp., *Ruppia maritima*, *Potamogeton* spp.
17. Reefs (1170)
 - Reefs are hard compact substrata on solid and soft bottoms, which arise from the seafloor in the sublittoral and littoral zone. They may be either biogenic or geogenic. Characteristic species include red, brown and green algae, and bivalves (e.g. *Modiolus modiolus*, *Mytilus* sp., *Dreissena polymorpha*).
18. Submarine structures made by leaking gas (1180)
 - These habitats are also known as “bubbling reefs”. These formations support a zonation of diverse benthic communities consisting of algae and/or invertebrate specialists of hard marine substrates different to that of the surrounding habitat.

19. Baltic Esker Islands (UW parts, 1610)

- These habitats are glaciofluvial islands consisting mainly of relatively well sorted sand, gravel or less commonly of till. Also their underwater parts are included in the habitat. Characteristic species include e.g. *Potamogeton sp.*, *Myriophyllum sibiricum*, *Ceramium tenuicorne*, *Chorda filum*, *Chara aspera*, *Cladophora glomerata*, *Fucus vesiculosus*, *Pilayella littoralis*

20. Boreal Baltic islets and small islands (UW parts, 1620)

- Groups of skerries, islets or single small islands, mainly in the outer archipelago or offshore areas. They are important nesting sites for birds and resting sites for seals. The surrounding sublittoral vegetation is also included. The species composition is often very similar to reefs (1170).