Theme 1: Biodiversity

This is a deliverable from the BalticBOOST project that was coordinated by HELCOM and co-financed by the European Union in 2015-2016 as part of the programme DG ENV/MSFD Action Plans/2016.

WP 3.3 Deliverable 1: System for displaying decentralized spatial data and catalogue of human activities datasets

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1. Introduction

According to INSPIRE principles, spatial data related to the environment should be hosted at source and exposed to use by standard web services (OGC WMS, WFS). This work package explored the options of utilizing this approach by developing a tool to HELCOM Map and Data service which can harvest any OGC WMS interface and display the data in the map viewer and overlay it with centralized datasets hosted and collected by HELCOM. In addition for operational and tested tool for displaying the data, national data providers should make data holdings available by making the relevant datasets accessible using standard interfaces.
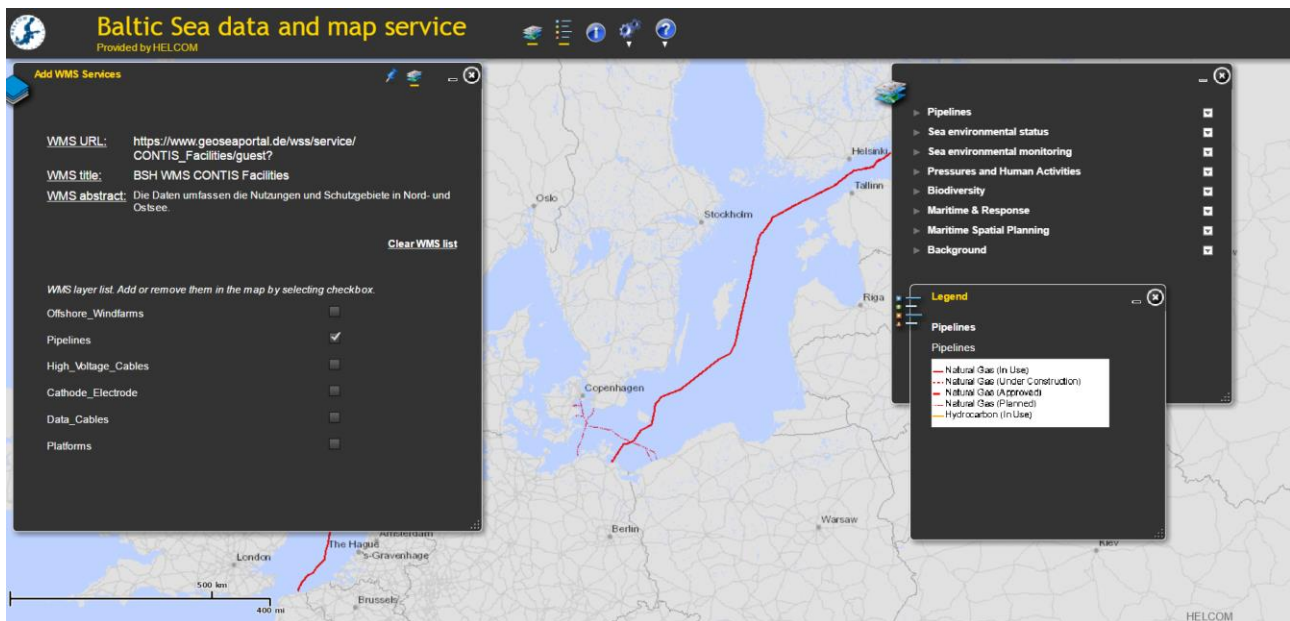
This work package also outlined a fact sheet for documenting information related to dataset on human activities and pressures.

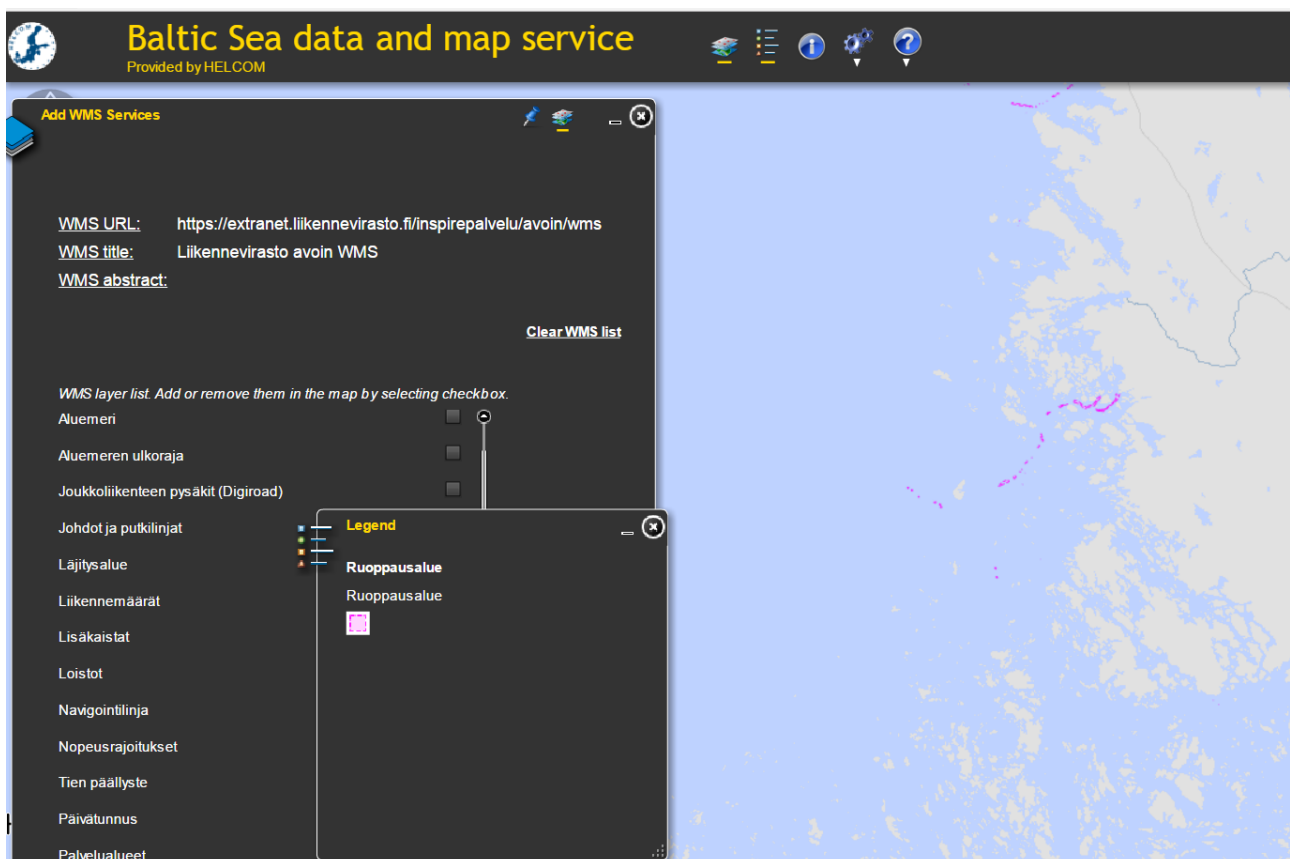## 2. System for displaying decentralized spatial data

The current version HELCOM Map and Data service, published in 2013, is based on ArcGIS viewer for Flex 3.6, which can by default display data from ArcGIS rest interface, which is the technology used for exposing centralized datasets collected by HELCOM and accessible via HELCOM Map and Data service as viewable and downloadable map layers.

The Flex API (Application Programming Interface) can be extended to also function with dynamic layers from OGC WMS interfaces. This was carried out under WP 3.3 by creating a custom widget to the HELCOM Map and Data service. The deliverable is electronic and available from http://maps.helcom.fi/website/mapservice/index.html. The functionality developed in WP3.3 can be accessed from the top menu "Utilities" → "Add WMS Service" (Figures 1-2).

It should be noted that the current version of HELCOM Map and Data service will be updated in mid-2017 with a version based on Javascript and the developed "Add WMS service" functionality will be migrated to the new version.

Figure 1. HELCOM Map and Data service "Add WMS service" functionality developed in WP3.3, displaying dataset "Pipelines" hosted by BSH CONTIS.

Figure 2. WMS dataset "Ruoppausalueet" (Dredging sites) hosted by Finnish Transport Agency (FTA).

During piloting the system it became evident that most of the data required for assessing impacts of human activities and pressures on seabed habitats will not be available via WFS services. This would be a prerequisite for extraction of data. Many Contracting Parties have functional interfaces in place, however the relevant datasets for pressures affecting seabed habitats was in some cases not fully included in the list of accessible datasets. The data however does exist nationally, but due to implementation schedule of INSPIRE directive those services are not yet in place or that datasets might not fall under specific INSPIRE Annex I-III themes thus including those to interfaces would be based on data provider organisations initiative and not by obligation. Therefore, HELCOM proceeded in requesting the datasets in traditional file submission via specific data calls for the purpose of the ensuring data to the upcoming 'State of the Baltic Sea' report (HOLAS II). Future projects should look into making sure that national data providers have interfaces in place and compare the available dataset against data requirements stemming from assessment purposes.

Piloting the system also revealed many practical and technical issues which should be agreed between organisation displaying the dataset and the original data provider providing the interfaces and was not on the scope of this work package. These are e.g. enabling legend requests when publishing WMS service, harmonizing legend styles between themes and also documenting the WMS interface in English language.
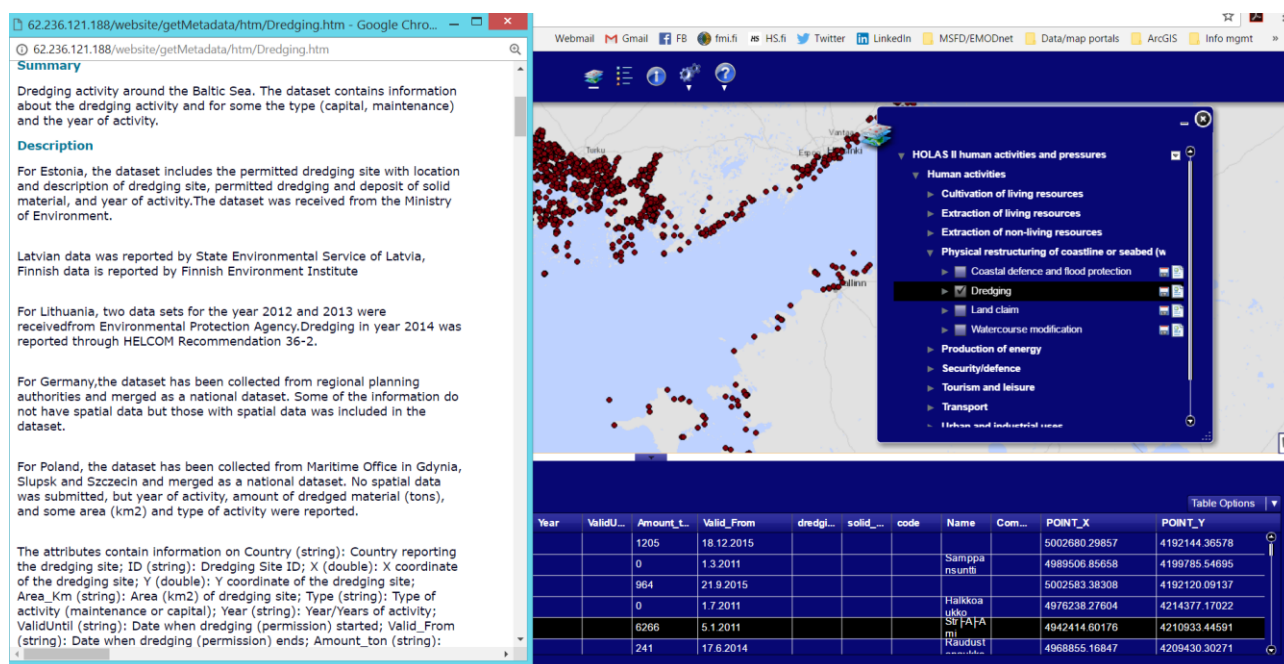
3. Catalogue of human activities datasets

3.1 Cataloguing dataset to workspace for review

Catalogue of human activities datasets was compiled to HELCOM Meeting portal as a Sharepoint workspace containing list of human activities used for BSPII/ BSII and also containing human activities relevant for pressures to the seabed habitats as defined in WP 3.1.

The deliverable is electronic and currently available at https://portal.helcom.fi/workspaces/HOLASII-DATA1-116/default.aspx (restricted access for the time being).

The workspace contains following features:

-   Timeline for review of data on human activities and pressures gathered through the HELCOM,
-   Dataview containing human activities datasets and link to metadata (Figure 3)
-   Dataset review list to be filled by experts of each HELCOM Contracting Party (Figure 4)

Figure 3. Dataview containing metadata of each spatial dataset.

Figure 4. Data review list containing links to data, metadata and review status.

Currently (December 2016-January 2017) the workspace is used by HELCOM Contracting Parties for their national review and quality assurance of human activities datasets. During the review process the datasets are not fully finalized as corrections may be required, thus the workspace is for the time being restricted and access given only to nominated members carrying out the national data review process. When the review process has been finalized and BSPI/BSII index calculations completed for HOLAS II, the catalogue and all datasets will be published using the HELCOM Map and Data service and metadata catalogue, which is currently under development.

3.2 Pressures/human activities data fact sheet template

The requirements of metadata of spatial dataset is described in ISO 19115 standard and INSPIRE directive. However, as all those generic elements of spatial dataset (abstract, sources, data use constraints, lineage etc.) are included, the abstract description should contain method description and documentation of what pressure dataset contains in order to provide sufficient documentation on datasets used for environmental assessments. For this purpose, a fact sheet on pressures was developed (Annex I), extending the standard metadata with domain specific information, in particular the human activities datasets used for pressure aggregation.

Fact sheets will be published together with the human activities datasets after data verifications process related to HOLAS II.

3.3 Linking human activities to pressure types

The spatial data sets of human activities will be used to produce spatial representations of the pressure types listed in the MSFD Annex III (revised) and agreed by the core team of the HELCOM HOLAS II project (i.e., the HELCOM steering group for the second holistic assessment). In order to produce the pressure layers, a framework needs to be established where activities and pressures are linked to each other. This framework was made on the basis of previous projects in Europe and HELCOM. In BalticBOOST the focus was on activities and pressures affecting benthic habitats.

Deliverable 1 of the work package 3.1 describes the methods how the framework was built and presents the resulting matrix.

Annex 1. Example pressure fact sheet (draft)

Physical disturbance or damage to seabed (temporary or reversible effects)	
	Dataset combines all human activity that causes physical disturbance to seabed. This pressure dataset is derived from several human activities. For vector datasets a buffer was created to represent the area of physical disturbance. The used buffer per relevant dataset are indicated in brackets. The following human activities were combined into the physical disturbance layer (URL link to INSPIRE metadata of human activities map layer); - Furcellaria harvesting - Dredging (1 km buffer) - Bathing sites and beaches (1 km) - Shipping density - Wind farms (under construction, 300 m) - Cables (under construction, 100 m) - Fishing intensity (surface area ratio, gears touching sea bed surface) - Coastal defence and flood protection (500 m) - Finfish mariculture (300 m) - Shellfish mariculture (300 m) - Deposit of dredged material (1.5 km) - Scallop and blue mussel dredging - Recreational boating and sports - Extraction of sand and gravel (400 m) These datasets were first processed separately covering the whole Baltic Sea and then summed together to 1x1 km grid. No watercourse modification or pipelines under construction during 2011-2015. These activities causes physical disturbance but did not occur during the assessment period. Harbours and marinas and leisure harbours were left out from the physical disturbance pressure to avoid double counting due to their representation in the shipping density and recreational boating and sports datasets.

Data source: See separate metadata link on human activities listed in the description.
Data quality: To be filled in
Attribute information:
Spatial coverage: Entire Baltic Sea. Fishing intensity data missing from RU.
Spatial resolution: Original data as vector (see metadata), shipping density and recreational boating and sports as 1 x 1 km grid, fishing intensity as 0,05 x 0,05 c-square degree grid. Finally converted to 1 km x 1 km grid.
Time period and temporal resolution: 1.1.2011–31.12.2015, annual data
Data access: HELCOM data and map service.
Limitations of use: Data can be used freely given that the source is cited.
Responsible institution: HELCOM (www.helcom.fi).