

Means of verification: Documentation and URLs of the services available to HaDEA.

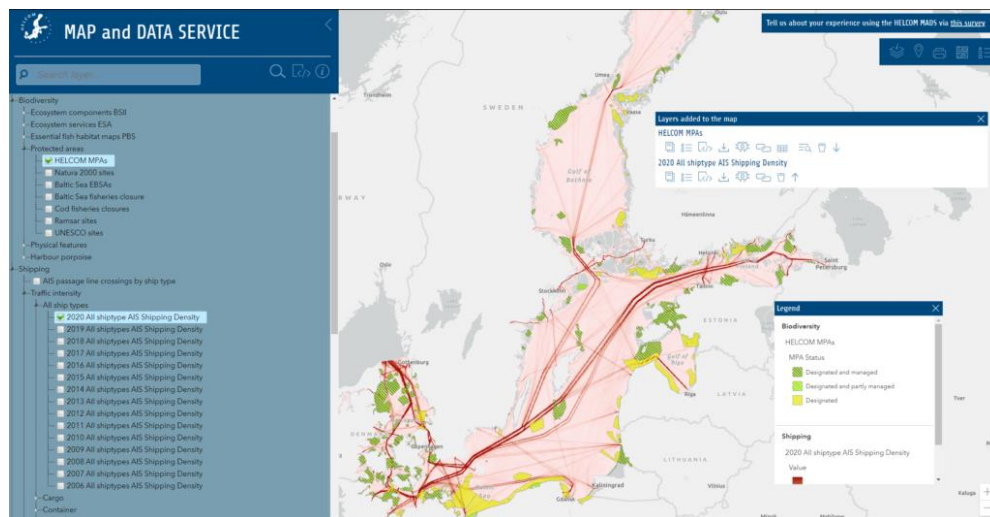
1. HELCOM Map and Data Service
2. HELCOM Metadata Catalogue
3. ICES Oceanographic Portal

1. HELCOM Map and Data Service

URL: <https://maps.helcom.fi/>

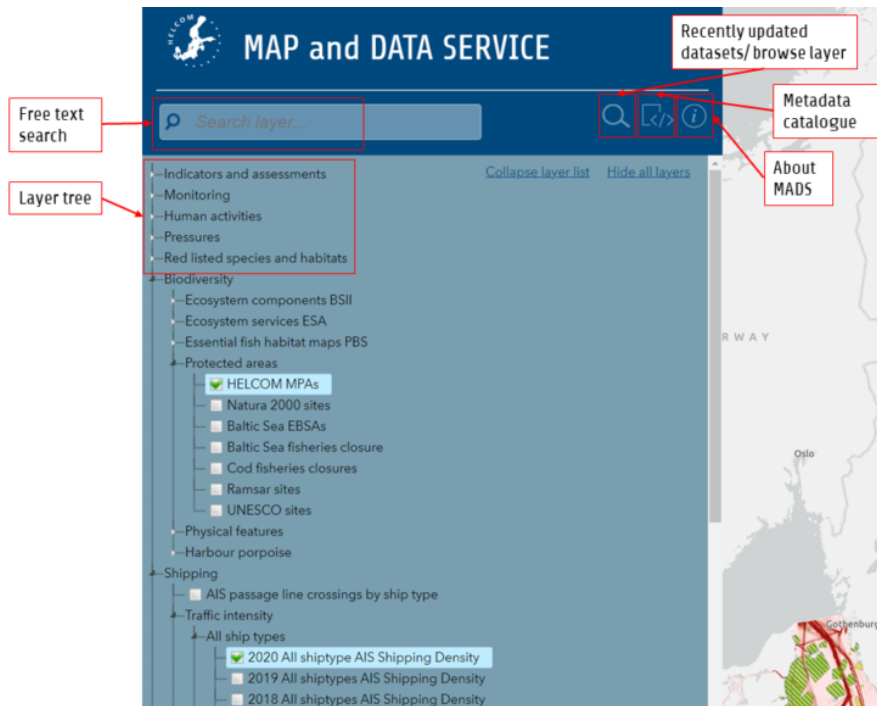
The updated HELCOM Map and Data Service (MADS) was [launched on 24 April 2023](#). The MADS has undergone a significant refresh of its user interface and visualization functionalities. Improvements include a modern and responsive user interface along with new widgets such as query layers and export map.

HELCOM MADS is a Javascript web map application. The application front end was developed using [ArcGIS Maps SDK for JavaScript](#) programming libraries. Spatial datasets for the application are provided by ArcGIS REST map services and processed using ArcGIS geoprocessing services developed in Python. Datasets descriptions are retrieved from the HELCOM Metadata Catalogue using [GeoNetwork API](#).



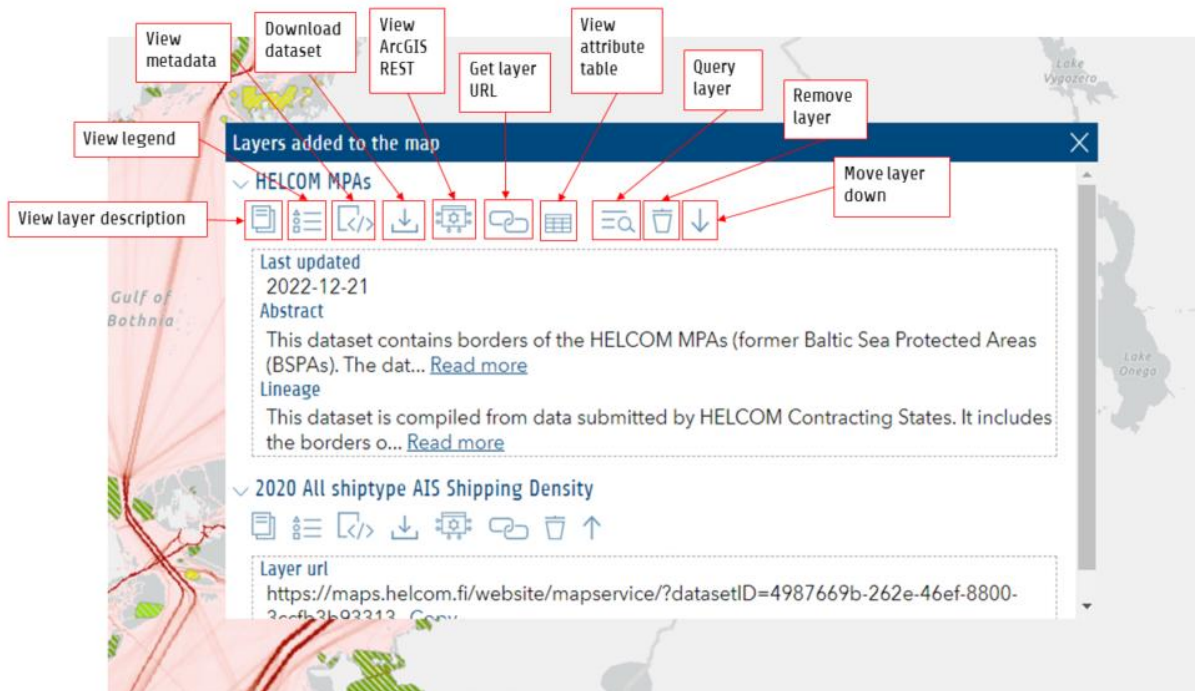
Screenshot of new HELCOM MADS showing improved data layering and viewing functionality.

As with the previous MADS website, datasets are grouped under eight different 'services' that can be accessed using the free text search tool or by browsing the services layer tree (shown in the screenshot below). Multiple data layers can be added to the map explorer for conducting unique queries and analyses. Data is also available in vector and raster formats and accessible as a service (ArcGIS REST, OGC WMS, WFS). Each dataset is linked to the INSPIRE compliant [HELCOM Metadata Catalogue](#) where the data can be downloaded.



Screenshot showing the free text search bar and services layer tree navigation tool.

Following the selection of one or multiple datasets, the data is displayed on the map explorer. The 'map layers info' box allows the further exploration of data through the selection of widgets, as shown in the screenshot below. In addition, up to 12 background maps can be selected to obtain the most relevant visualization for the user's needs. Maps generated by users can then be printed or exported in various file formats.



Screenshot showing the 'map layers info' box with widgets.

Ideas for improvements were collected via the user survey at the start of the project in April 2021. These ideas were consolidated into the [Key Findings report](#) from the survey. The [survey](#) was opened again in May 2023 to collect feedback on the new HELCOM MADS website and also to inform the [project KPIs](#).

The source code for the MADS is available on the [HELCOM GitHub account](#).

2. HELCOM Metadata Catalogue

URL: <https://metadata.helcom.fi/>

The HELCOM Metadata Catalogue was updated in November 2021. The update benefits from a revamped user interface along with the latest stable GeoNetwork version 3.12. The GeoNetwork is a catalogue application designed to manage spatially referenced resources that provides powerful metadata editing and search functions.

Each metadata record has a unique identifier that is used to relate metadata records with datasets stored in the HELCOM MADS. The MADS contains all geospatial data relevant for HELCOM work from status assessments to shipping density maps, totaling up to more than 1,000 maps. As highlighted in the section above, the MADS contains various functionalities for viewing datasets, for example, identify features and attribute table functionalities. In each metadata records there are links to the related data layers in MADS, as well as links to the downloadable resources.

The Metadata Catalogue provides an easy-to-use web interface to search geospatial data across multiple catalogues. The search provides full-text search as well as faceted search on keywords, resource types, organizations, scale, etc. Users can easily refine the search and quickly get to the records of interest. GeoSpatial layers, but also services, maps or even non-geographic datasets can be described in the catalogue.

The HELCOM GeoNetwork implementation has been configured to be INSPIRE compatible in terms of metadata on datasets and contains a tool to validate metadata records against the INSPIRE validator. The INSPIRE validator and thesauri were used during development to ensure all metadata records are INSPIRE compliant.

The HELCOM Metadata Catalogue has been harvested by the 'data.europa.eu' platform since May 2022 (see [blog post](#) on BDF website). The Metadata Quality Assurance (MQA) tool available on the European Data Portal has evaluated the quality of metadata available from the HELCOM Metadata Catalogue and awards it a 'sufficient' rating. Further information on the MQA tool and other harvested catalogues is available in the milestone 15 report.

Browse by INSPIRE themes Topics

The image shows a grid of 24 INSPIRE themes and topics. Each theme is represented by a colored bar with an icon and a count of resources. The themes include Atmospheric conditions (4), Administrative units (2), Environmental monitoring (115), Geology (3), Habitats and biotopes (160), Land cover (1), Oceanographic geographical features (133), Protected sites (3), Statistical units (98), Agricultural and aquaculture (11), Bio-geographical regions (71), Elevation (3), Geographical grid systems (1), Geographical names (1), Human health and safety (8), Land use (3), Population distribution (1), Species distribution (200), Transport networks (144), Area management/restriction (2), Buildings (1), Energy resources (1), Geographical names (1), Hydrography (10), Meteorological geographical features (5), Production and industrial facilities (10), Sea regions (131), and Utility and governmental services (13).

Browse resources

The 'Browse resources' sidebar shows a list of resource types with counts: Dataset (995), Service (24), service-OGC-WMS (8), service-ArcGIS REST map (8), and service-Web application / d... (8).

Datasets available on the HELCOM Metadata Catalogue can be browsed by INSIPRE themes or topics

The screenshot shows the Helcom metadata catalogue interface. The top navigation bar includes 'Helcom metadata catalogue', a search box, and options for 'Sign in' and 'English'. Below the navigation bar is a search input field with a search icon and a clear button. The main content area displays a list of records. On the left, there is a 'Filter' sidebar with sections for 'TYPE OF RESOURCES', 'AVAILABLE ACTIONS', 'TOPICS', and 'INSPIRE THEMES'. The main content area shows two record cards. The first card is for 'Hexabromocyclododecane (HBCDD)' and the second is for 'Total phosphorus 2018'. Each card includes a compass icon, a description of the indicator, and a 'MAP' button. The footer of the interface includes 'Powered by GeoNetwork 3.12.1.0' and social media links.

View of records in 'Oceanographic geographical features' theme where metadata can be searched and made available for download

3. ICES Oceanographic Data Portal

URL: <https://ocean.ices.dk>

Update of the ICES oceanographic database, data submission format, and procedure have been completed as described under activity 2 of the BDF project.

The database holds oceanographic data from 1877 to present and is a repository of monitoring data for the two regional sea conventions HELCOM and OSPAR in addition to the European Topic Centre on Inland, Coastal and Marine waters (ETC/ICM) as well as a repository for oceanographic data collected during ICES coordinated fisheries surveys.

The core parameters held in the ICES oceanographic database are available for download through the ICES Data Portal at <https://data.ices.dk>:

- Temperature
- Salinity
- Oxygen
- Phosphate, Total Phosphorus
- Silicate
- Nitrate, Nitrite, Ammonium, Total Nitrogen
- Hydrogen Sulphide
- pH, Alkalinity
- Chlorophyll a
- Secchi depths

The upgrade of the ICES Oceanographic data format and portal involved conformity to internationally recognised vocabularies and standards, with interoperability and data exchange with other national and international systems in mind. The upgrade of data management submission procedure included data ingestion, quality control, visualisation and comparison with existing data both within the ICES oceanographic database and external data submitted to the SeaDataNet maintained Cruise Summary Report (CSR) system at <https://csr.seadatanet.org> which is a repository of metadata of the objectives and data collected during individual cruises.

Based on user feedback the ICES Oceanography Data Portal will continue to be improved beyond the BDF project.