Interreg
Baltic Sea Region

Baltic Blue Growth

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

EU STRATEGY FOR THE BALTIC SEA REGION
FLAGSHIP

Operational Decision Support System (ODSS) for the Baltic Blue Mussel Farming - a platform enabling upload, analysis and sharing of information

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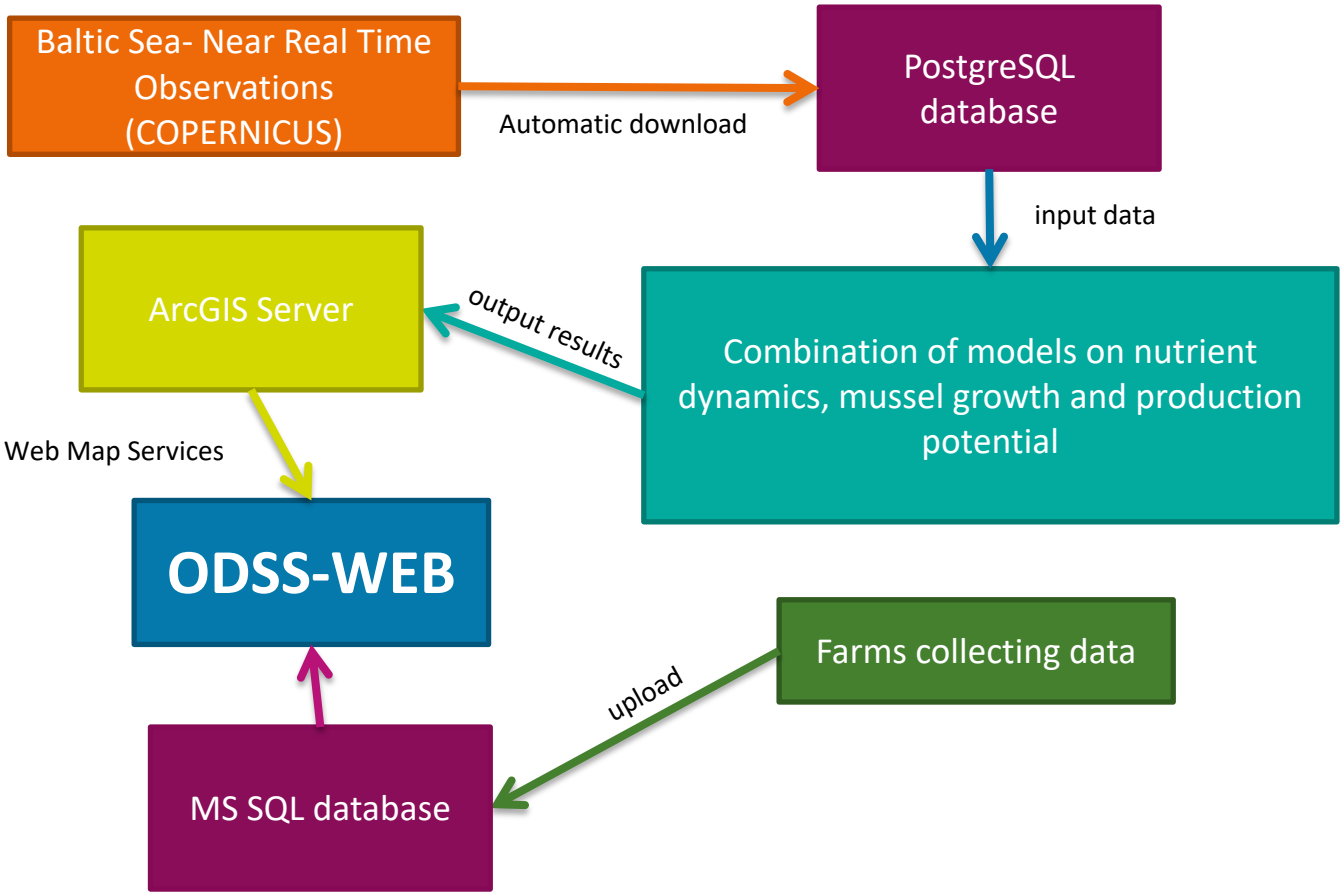
www.sea.ee/bbg-odss

Operational Decision Support System (ODSS)

- The ODSS enables different end-users to make effective decisions about mussel farming in the Baltic Sea.
- These decisions are driven by the best existing monitoring and modelling data.
- As such the ODSS raises the capacity of government and county level officials, internal and external stakeholders and the industry to achieve the environmental, economic and socio-economic objectives of the mussel farming.

ODSS data flow principal diagram



Cross-platforming

Web-application developed using ASP.NET MVC development framework for building dynamic websites with HTML, CSS, JavaScript and server scripting, that conform to the latest web standards and can be opened on almost all devices and browsers. Map application environment will be developed using ArcGIS API for JavaScript.

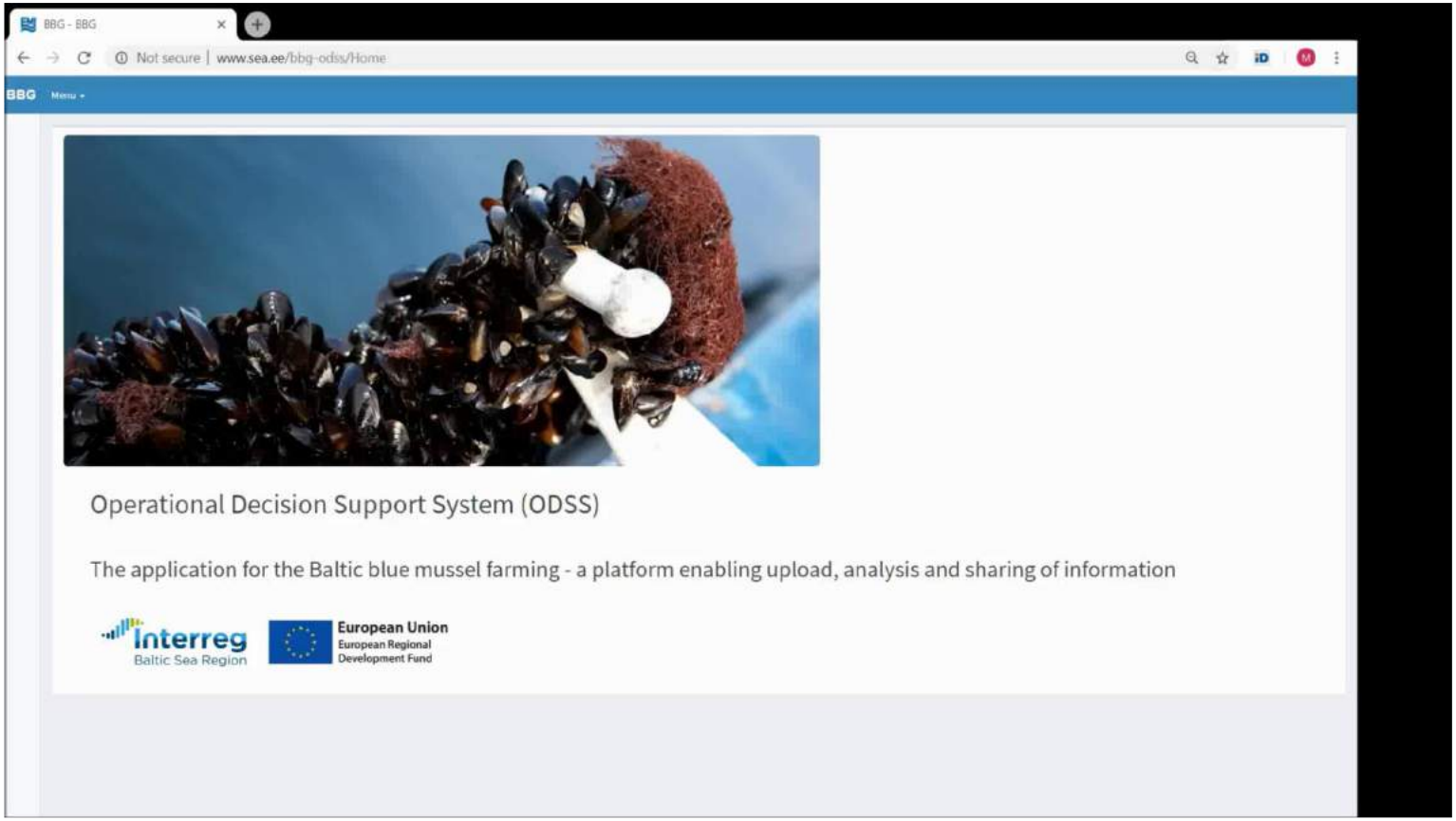
Sections of the ODSS

- Farms & Additional Info
- Environmental Impact Assessment
- Earlier Impact Evidence
- Continuous Oceanographic Recordings
- Plan your FARM

Farms & Additional Info

This section presents the current mussel farms in the Baltic Sea area as well as provides information on variables monitored in these farm areas. Results of the environmental monitoring are shown in the subsection Environmental Impact Assessment.

Farms & Additional Info



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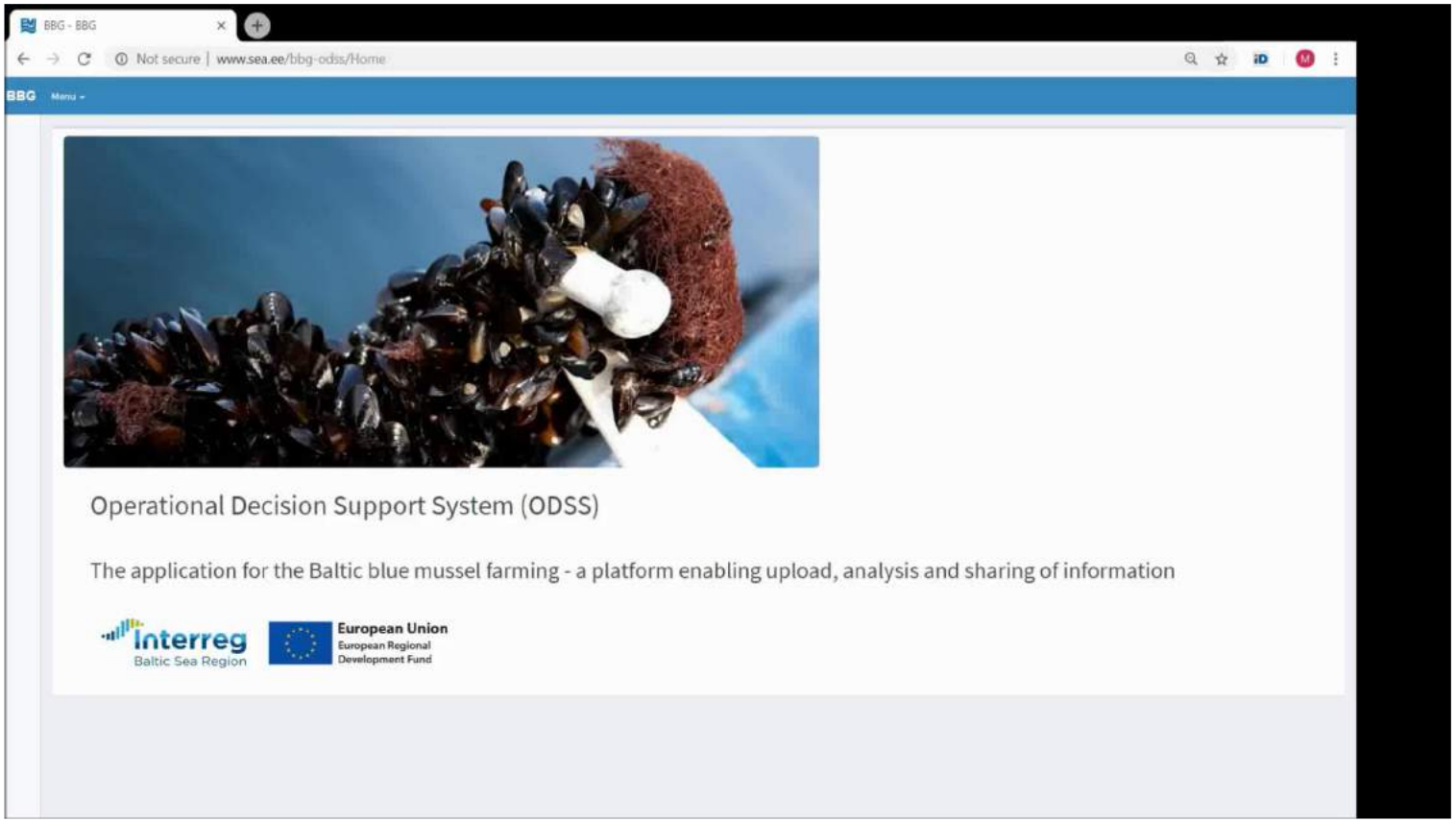
Environmental Impact Assessment

- This section summarizes the existing monitoring data in the Baltic Sea mussel farms and shows a presence of any significant effects either positive or negative due to mussel farming.
- A user can select farm and environmental variable(s) and then the engine calculates if these exists statistical difference in these variables between mussel farm and the respective reference area.
- The results are summarized in a form of downloadable figures and tables.

Environmental Impact Assessment



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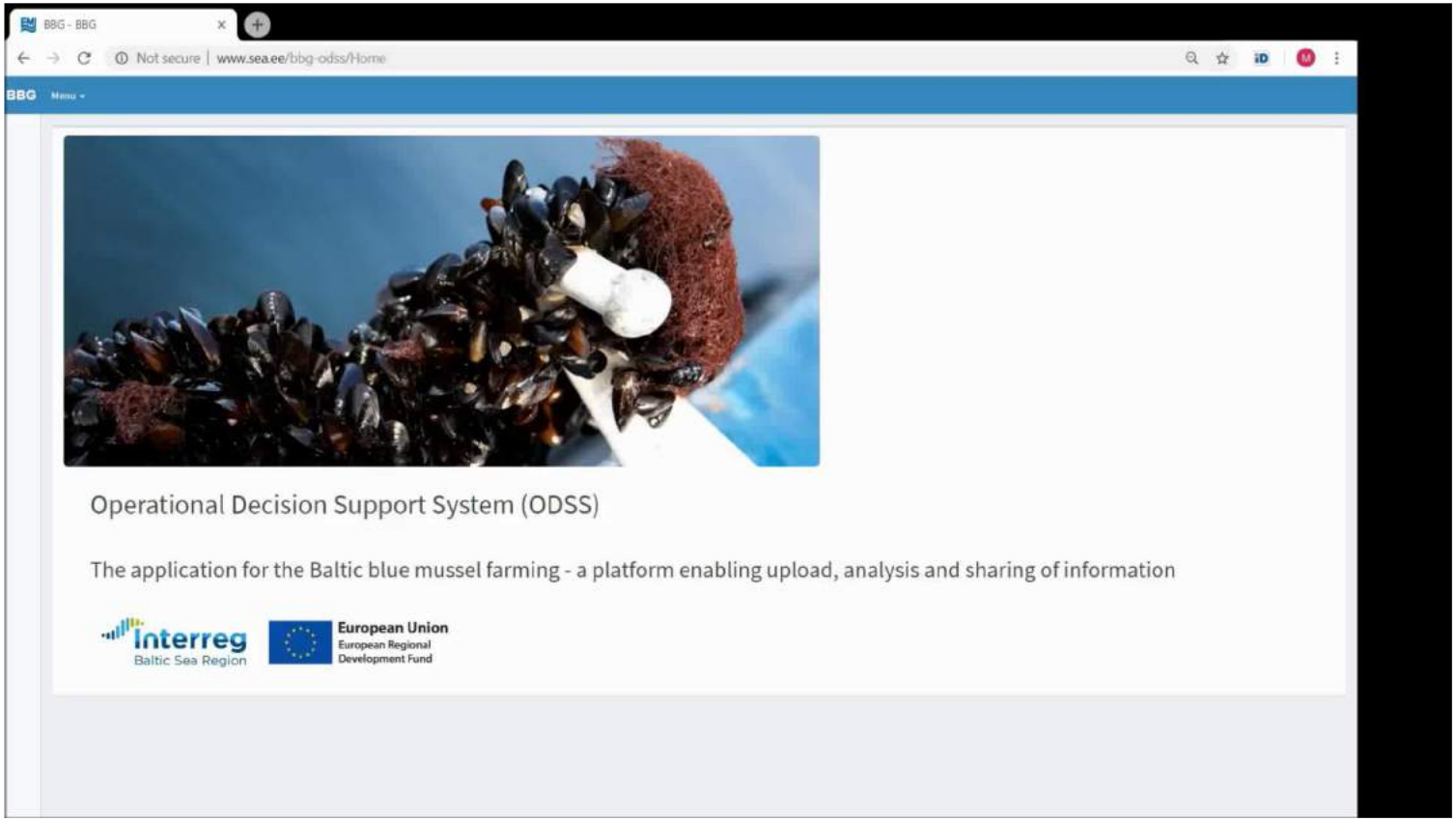
Earlier Impact Evidence

- This section revises the earlier impact evidence of mussel farming before the Interreg project Baltic Blue Growth.
- Similar to previous section, users can select farms and environmental variables and see if mussel farms are expected to have any negative and positive effects.

Earlier Impact Evidence



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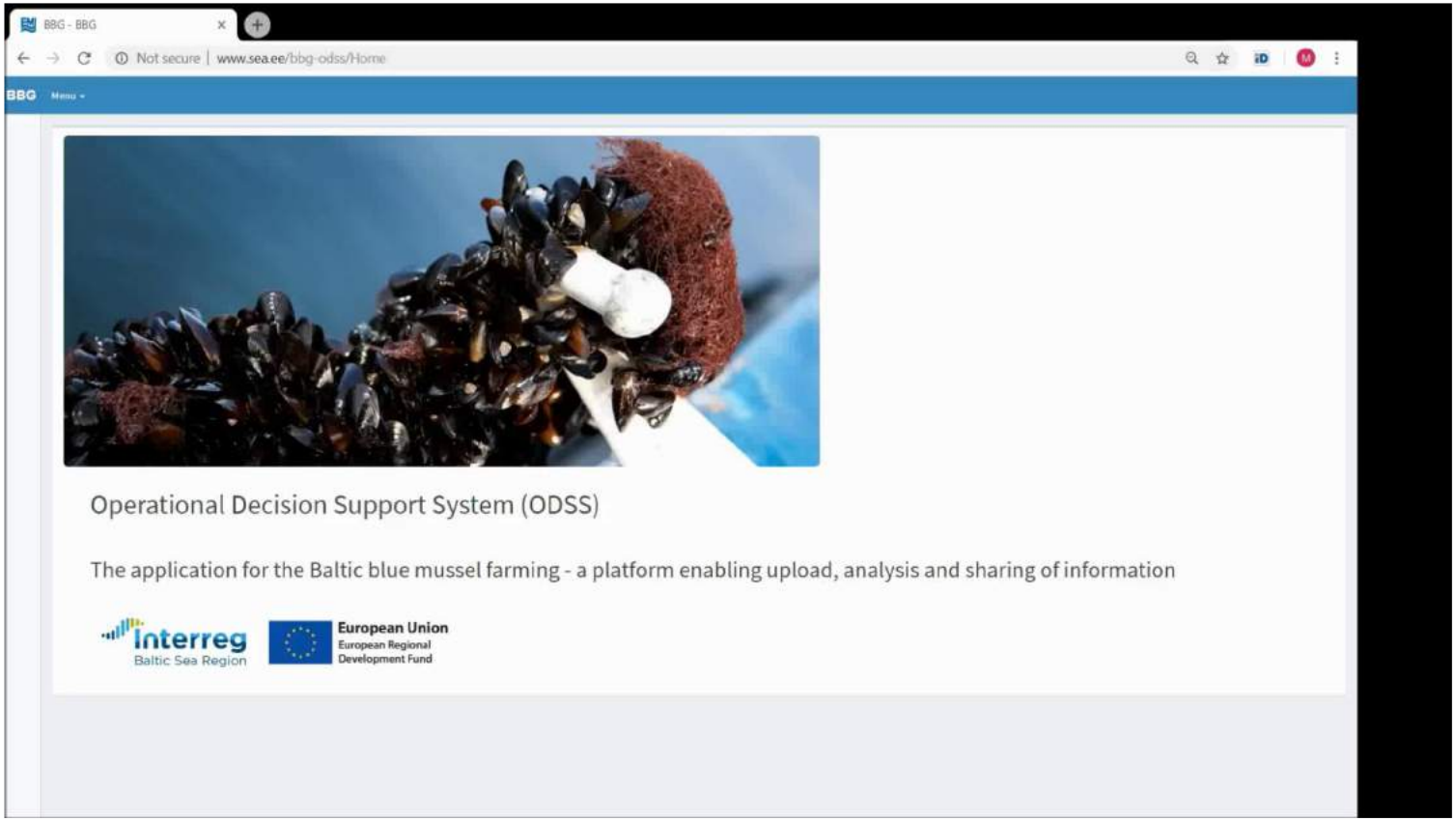
Continuous Oceanographic Recordings

- In order to optimize monitoring activities and collect high-frequency data on oxygen concentration at sediment-water interface underneath the Baltic Sea mussel farms, different types of oceanographic instruments were deployed.
- This section shows results of these oceanographic instrument measurements.
- The functionality of this section resembles earlier sections.

Continuous Oceanographic Recordings



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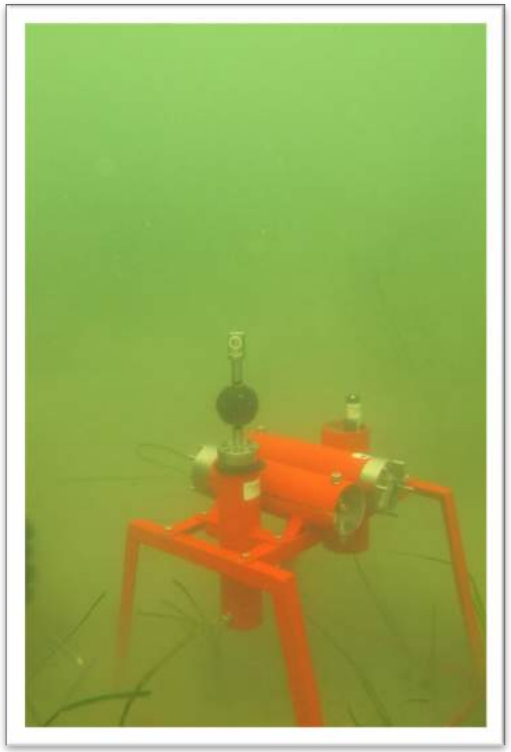
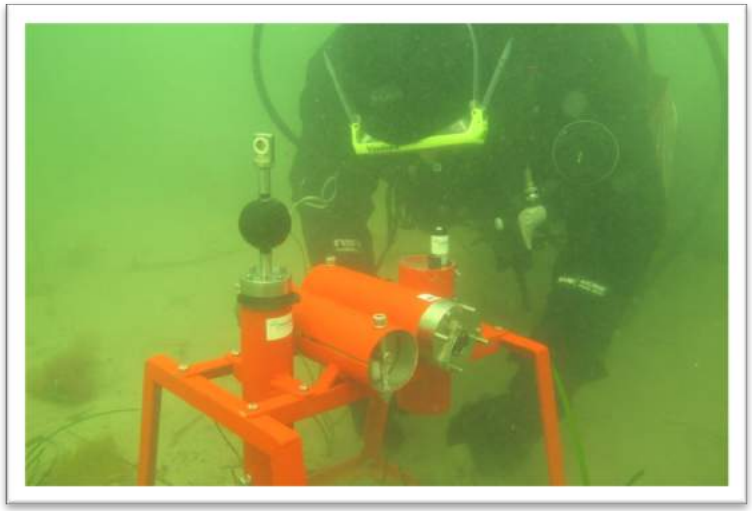
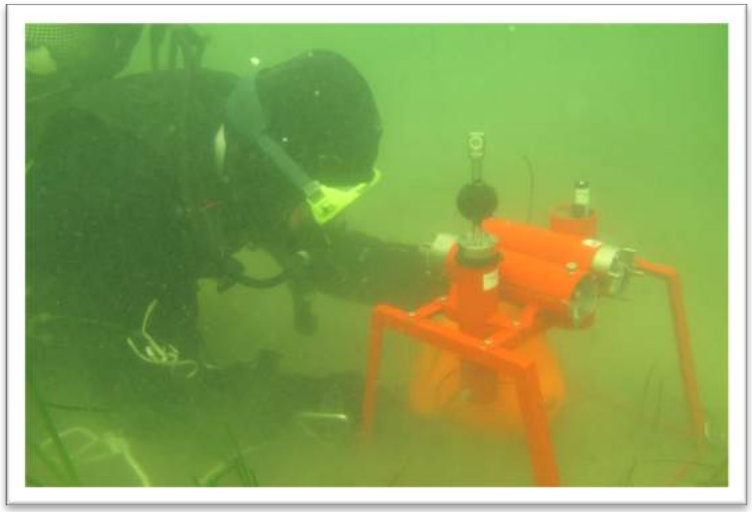
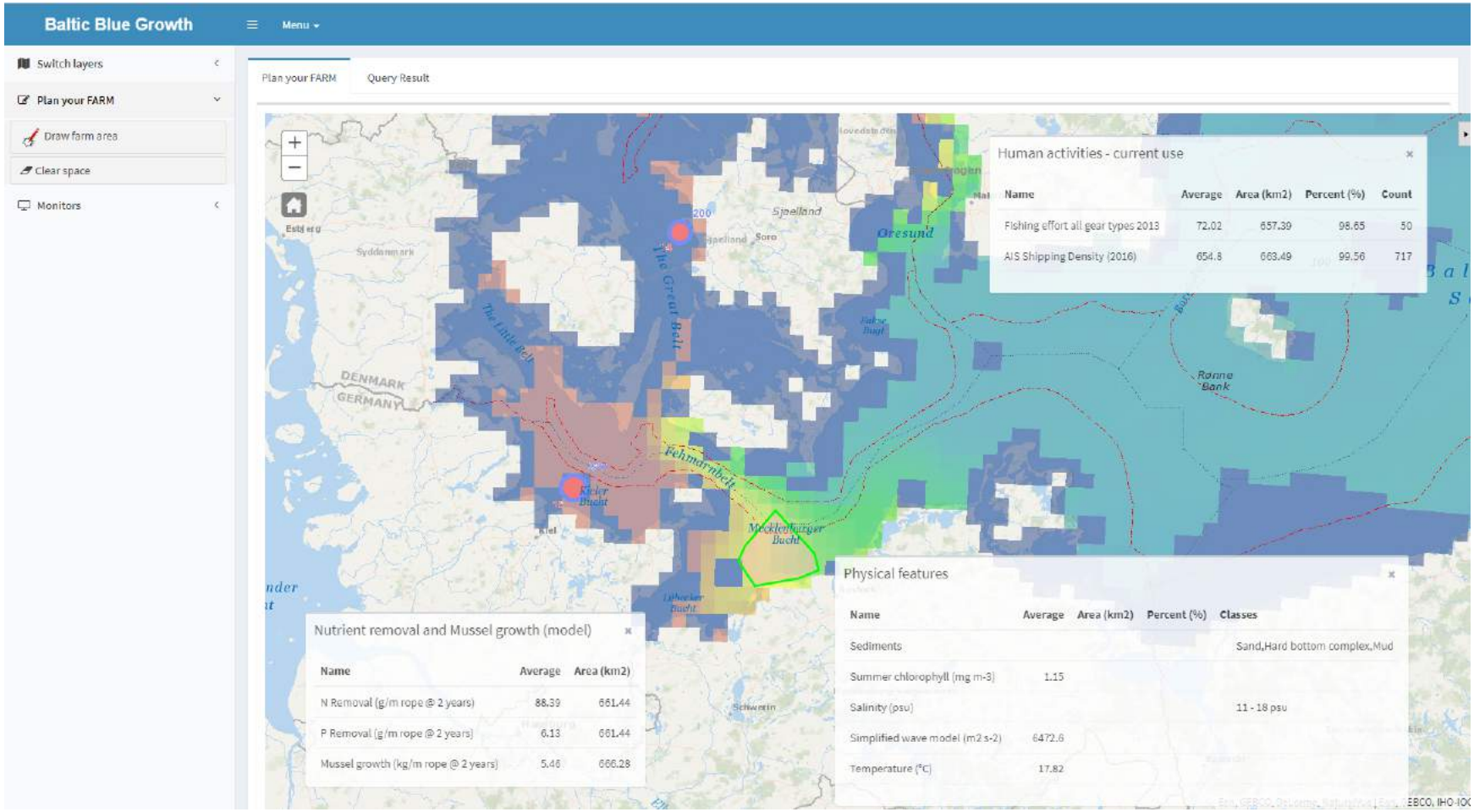
Deployment of oceanographic instruments to Musholm in May 2017







Plan your FARM



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Plan your FARM

- Plan your farm section compiles different datasets that are needed to reach effective decisions on mussel farming.
- The datasets span from original Baltic Blue Growth products to different online sources.
- Here the user can get a spatial overview on the physical environment of the Baltic Sea, intensity of different human uses or pressures and environmental protection.
- Most importantly, the engine produces maps of a pan Baltic potential of mussel growth and nutrient removal.

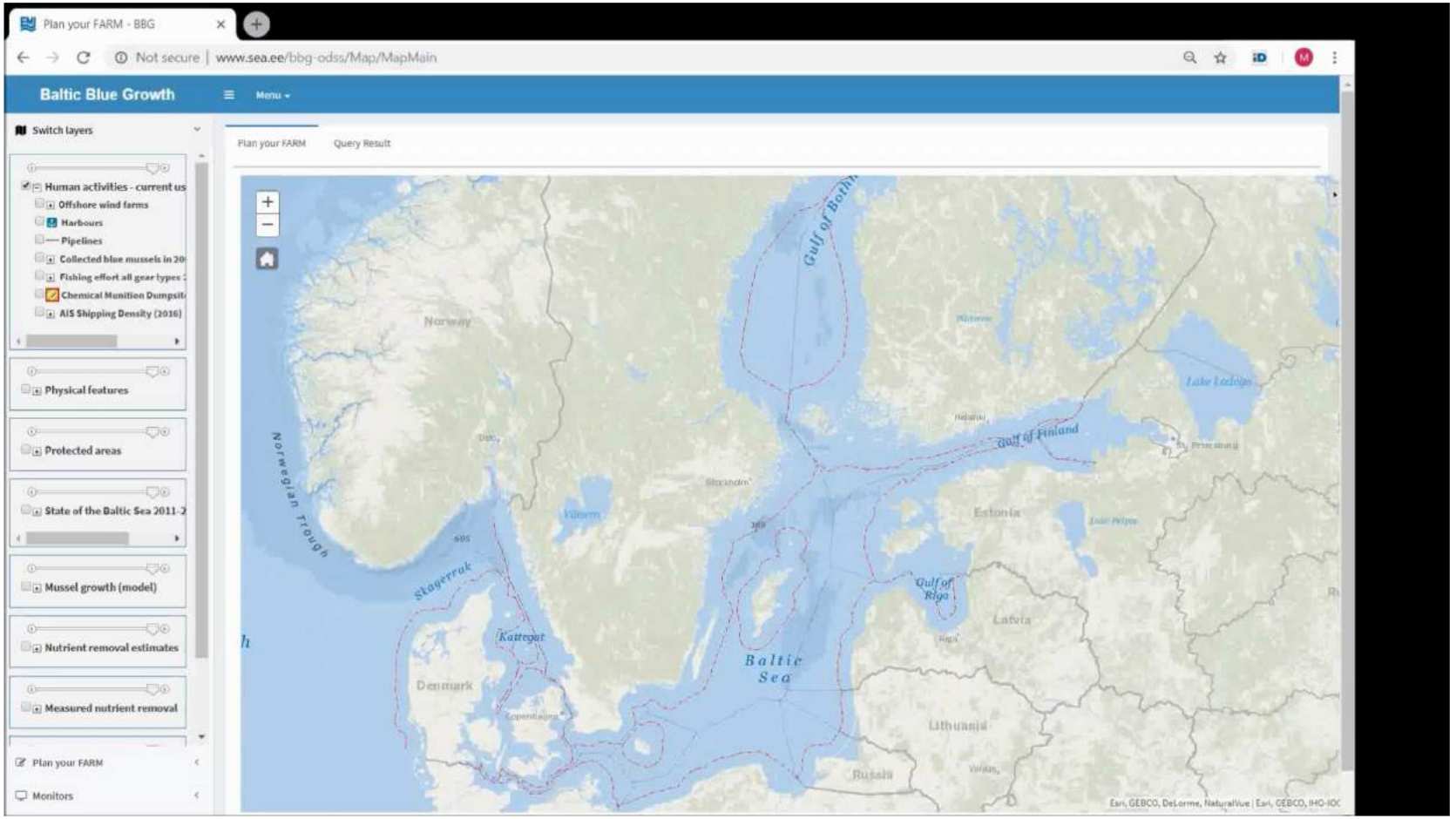
Plan your FARM

HELCOM Map Layers

Human activities - current use

- Offshore wind farms
- Harbours
- Pipelines
- Collected blue mussels in 2005 – 2015 (avg kg/year)
- Fishing effort all gear types 2013 (h)
- Chemical Munition Dumpsites
- AIS Shipping Density (2016)

Plan your FARM



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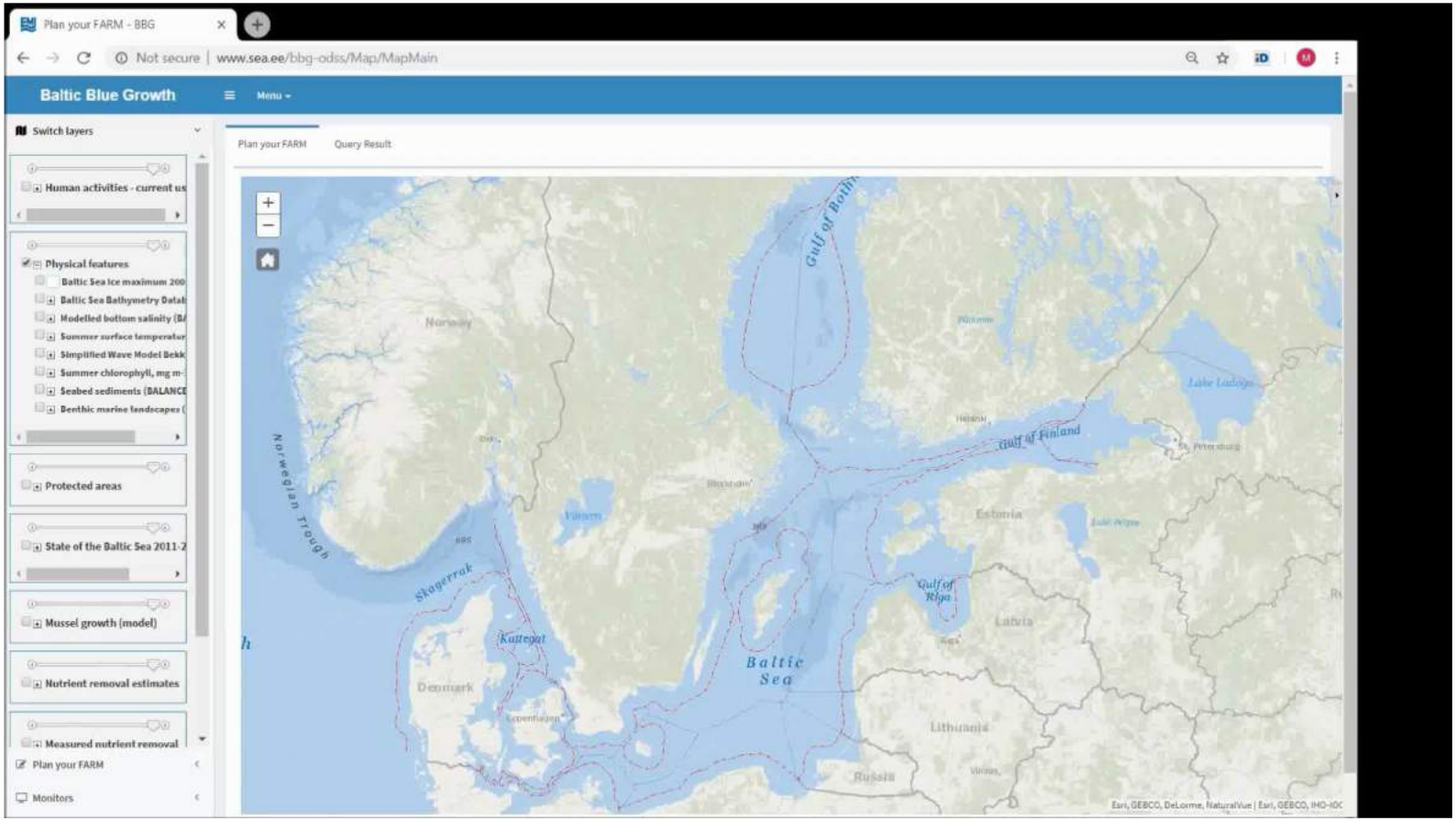
Plan your FARM

Map Layers

Physical features

- Baltic Sea Ice maximum 2005 to 2009 (Copernicus)
- Baltic Sea Bathymetry Database, m (IOW)
- Modelled bottom salinity (BALANCE)
- Summer surface temperature, °C (Copernicus)
- Simplified Wave Model Bekkby, m2 s-2 (AquaBiota)
- Summer chlorophyll, mg m-3 (Copernicus)
- Seabed sediments (BALANCE)
- Benthic marine landscapes (BALANCE)

Plan your FARM



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Plan your FARM

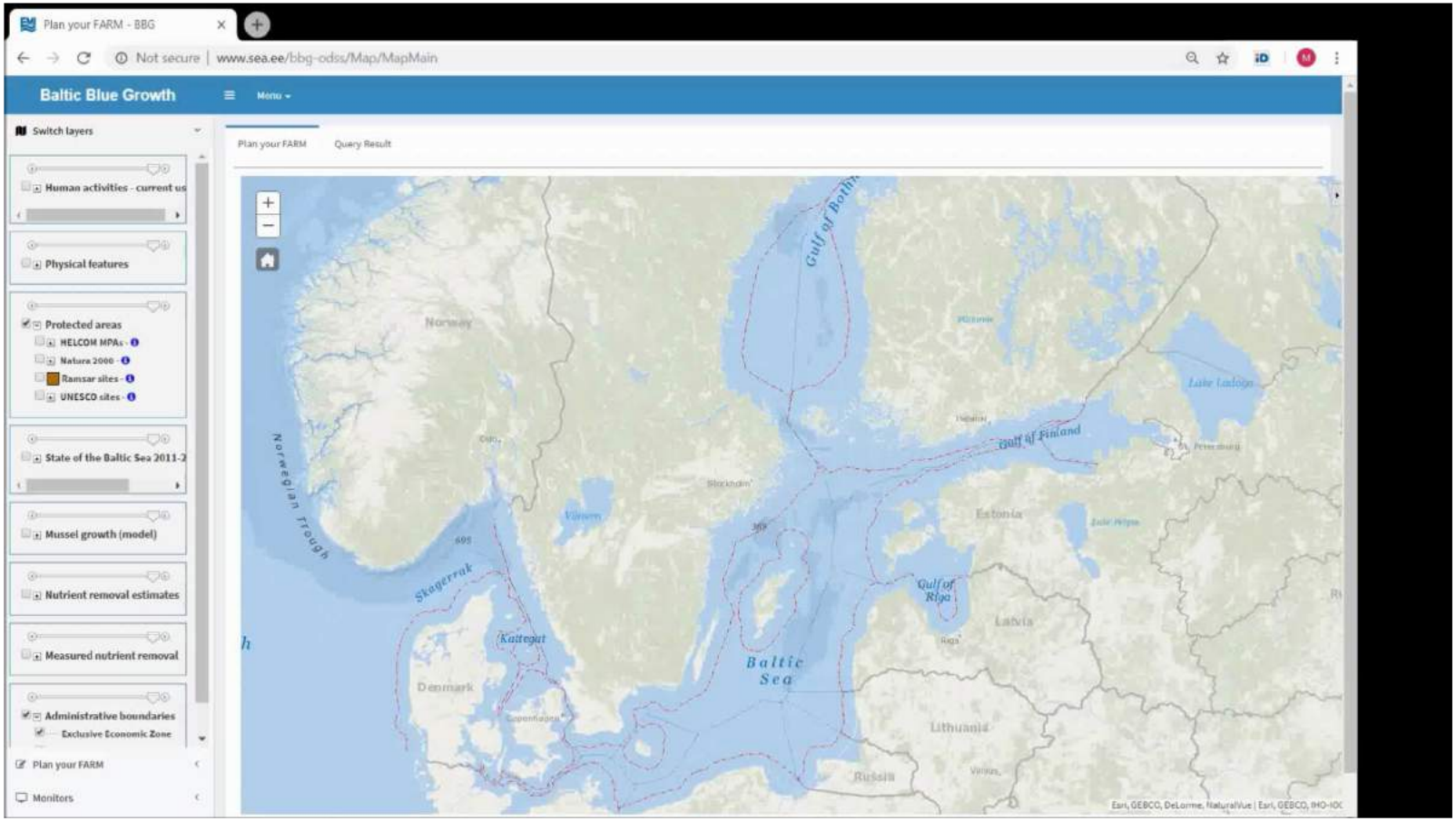
HELCOM Map Layers

Protected areas

- HELCOM MPAs
- Natura 2000
- Ramsar sites
- UNESCO sites

State of the Baltic Sea 2011-2016 (HOLAS II)

Plan your FARM



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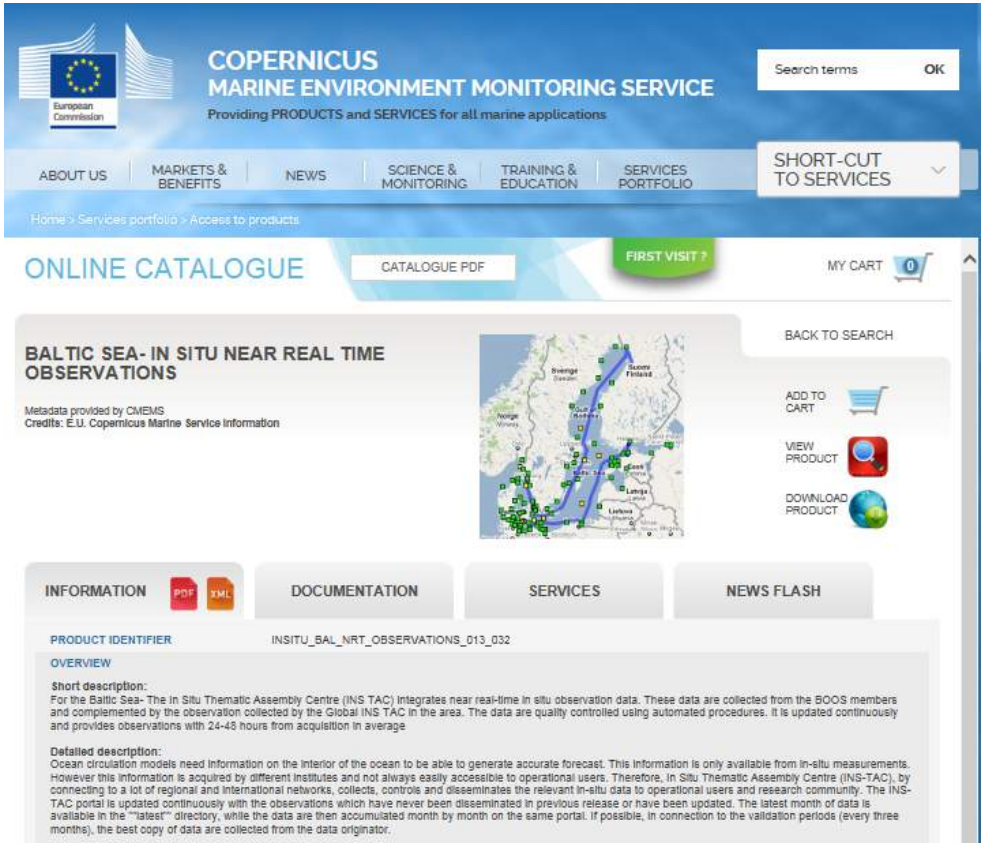
Baltic Sea- In Situ Near Real Time Observations

- About 800 stations collecting data
- Parameters: temperature, dissolved oxygen, light irradiance, salinity, concentration of chlorophyll a…
- Look for an updated data
- Automatic download of netCDF files
- Automatic export from netCDF to PostgreSQL database



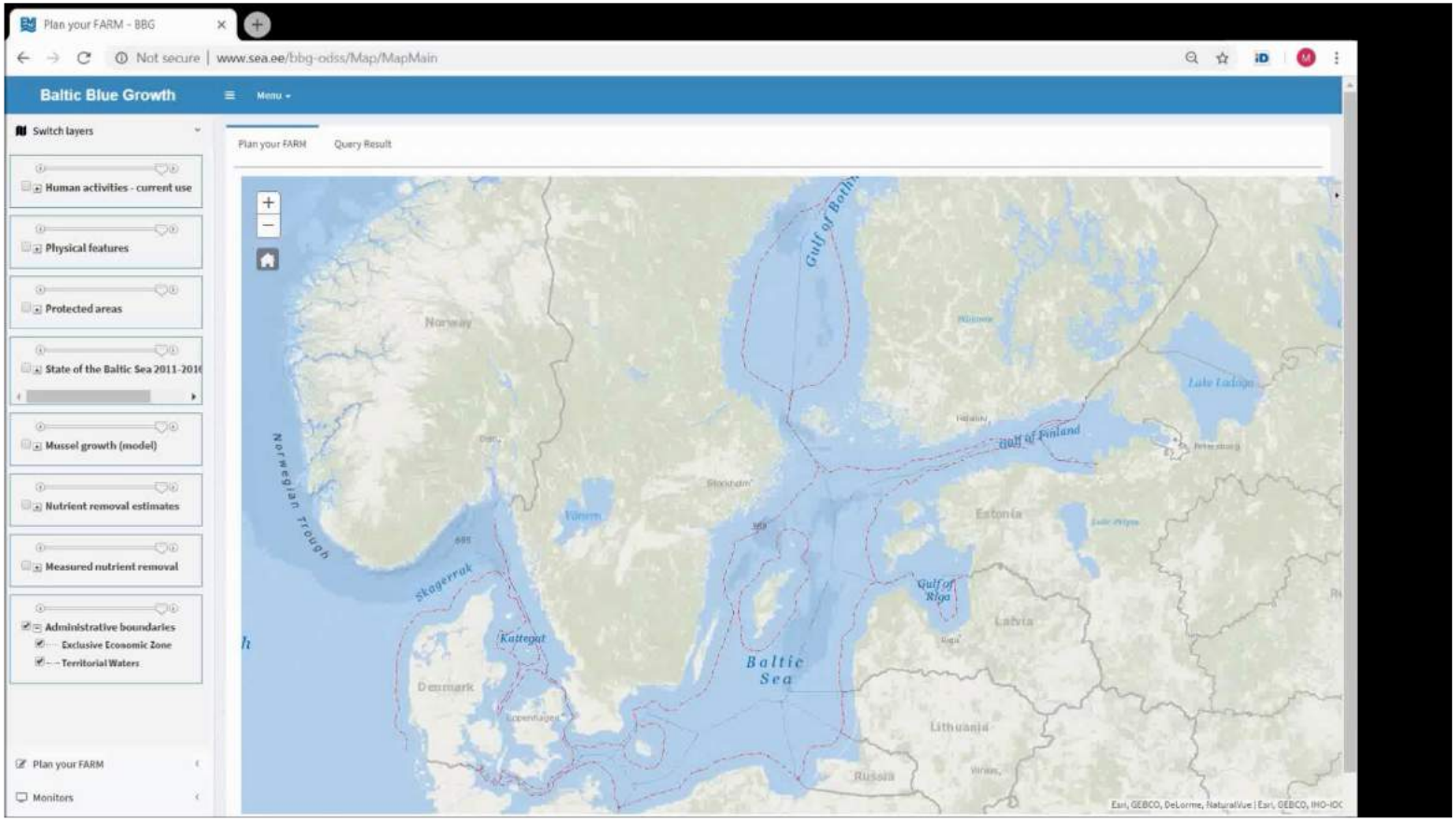
Plan your FARM

Map Layers

- Modelled mussel growth
- Modelled nutrient removal
- Measured nutrient removal

We employed all existing experimental measurements of mussel growth in the Baltic Sea to model the potential growth and yields across the key environmental gradients in the Baltic Sea area. Then, we combined these spatially-explicit empirically modelled growth rates with measured N and P concentrations in farmed mussels to analyze the potential for nutrient removal through mussel harvest.

Plan your FARM



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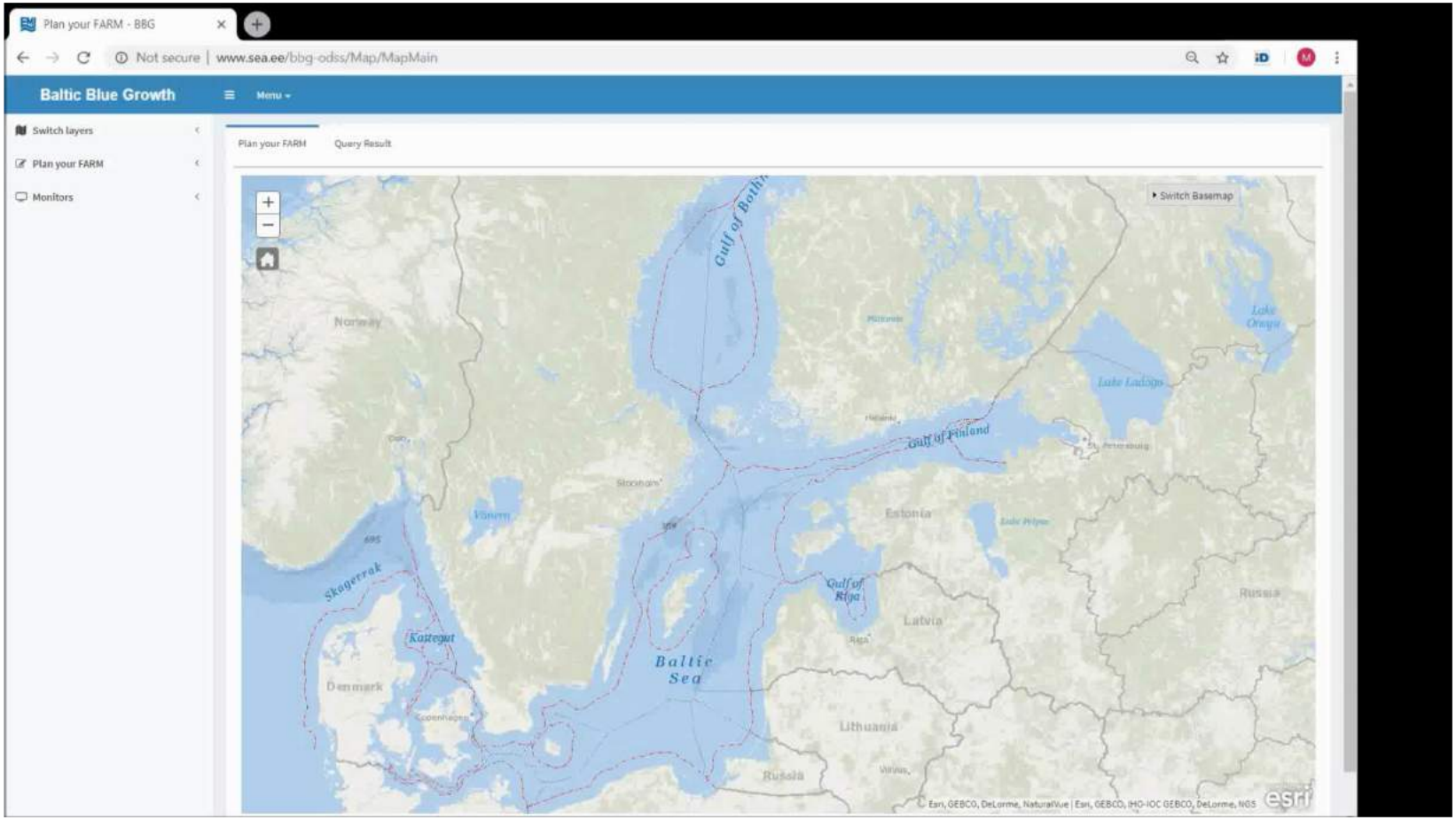
Plan your FARM

- „Plan your FARM“ – dynamic tool provides user to draw hypothetical farm area and get the respective environmental and mussel production data as tables.
- When drawing a hypothetical farm area in the map all this information is summarized in a user friendly way and the user can immediately get a synthesis of physical environment, existing human pressures, biomass yield and nutrient removal service provided by such a hypothetical mussel farm.

Plan your FARM



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Thank you for your attention!

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