TRANSFERRING KNOWLEDGE ON ECOSYSTEMS AND THEIR BENEFITS IN THE BALTIC SEA REGION

A Geospatial toolkit to support decision making

BONUS MARES - Policy Brief 3 • 2020

The Geospatial toolkit

Ecosystem services create a foundation for socio-economic benefits that people derive from functioning ecosystems. Ecosystems provide supporting, provisioning, and regulating services at the same time bringing recreational, cultural and aesthetic values to humans.

In the current global ecological crisis, there is an ever-increasing need to value, highlight and better communicate, how ecosystems support human well-being. It is also important to identify management practices and policies which can help us reach the Sustainable Development Goals (SDGs).

To respond to the challenges, a web-based geospatial (GIS) toolkit for decision support was created in the BONUS MARES project.

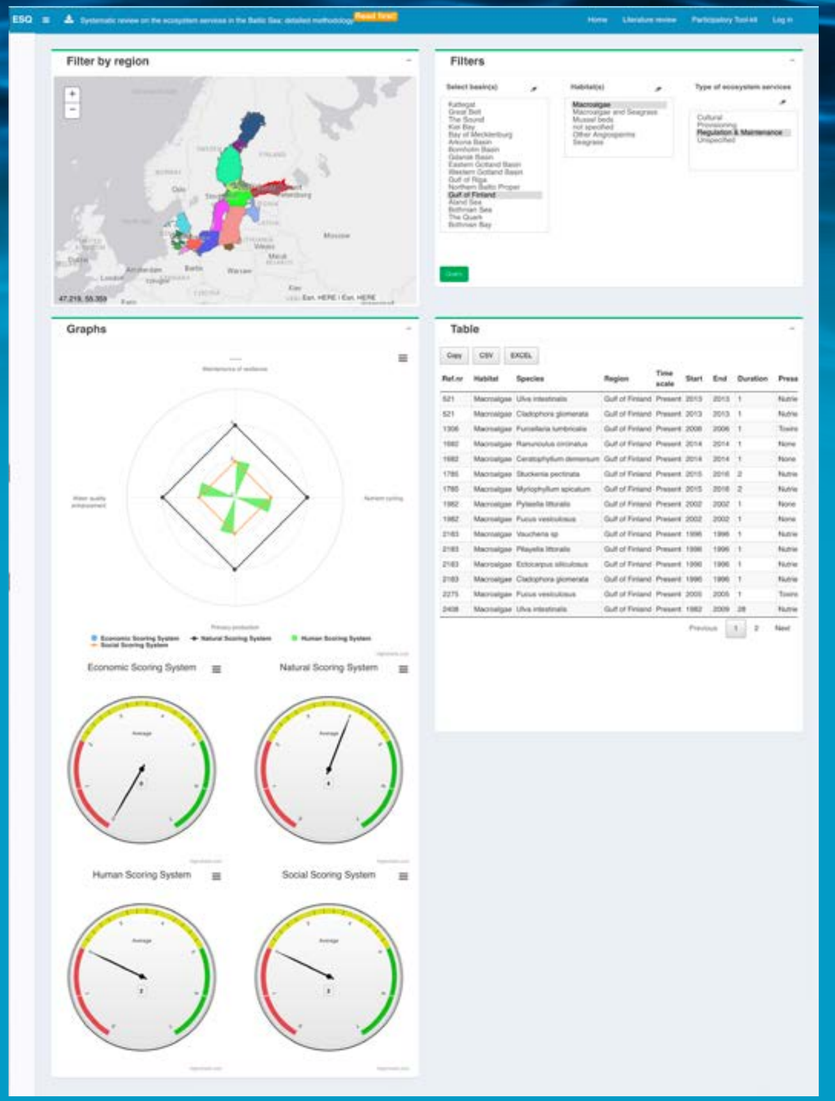
The toolkit can be used for

1) a meta-evaluation for the observation and monitoring of ecosystem services in the Baltic Sea region
2) analysis of the strength of science policy interaction.

The decision support toolkit enables geospatial representation of the knowledge on habitats and ecosystem services and communicates this information to decision-makers and the society at large. As such the toolkit can be considered as a starting point for a continuous, long-term process, collecting data from different parts of the Baltic Sea. It provides a basis for aggregating scientific knowledge on the services that specific ecosystems provide. This data that can be further detailed and connected to the locations of the habitats.

In this way, the toolkit forms an extensive and Baltic Sea-wide dataset, based on academic knowledge, that can be used and further developed for decision making. For dissemination and communication, an online web-platform was built to visualise

1) the spatial heterogeneity of the knowledge of ecosystem services
2) the impacts of human activities on these services, including climate change.



Specific characteristics – the participatory interface

In addition to scientific literature, the portal facilitates collecting and quantifying information from non-academic sources and stakeholders. This allows developing a better methodological basis (e.g. combination of different methods, economic and non-economic) on the integrated assessment and valuation of ecosystem services. This development is done along natural, economic, human, and social dimensions, referring to the approach of the Five Capitals – Model for Sustainability[1]. The Geospatial toolkit supports the evaluation of integrated methodological approaches, which in turn supports decision-making by combining ecological knowledge with economic aspects.

The toolkit consists or several elements:

1) dynamically linked databases
2) an analysis engine
3) a portal for the systematic geo-spatial representation and synthesis of the interactions that exist between different ecosystem services and human systems.

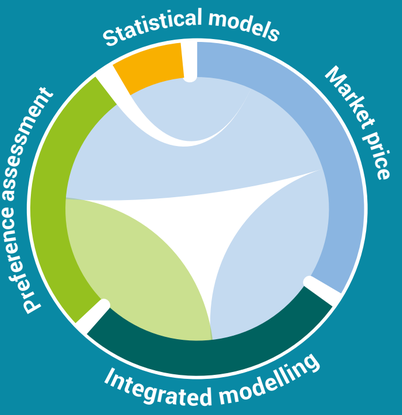
It also communicates the impacts of possible future scenarios on ecosystem services and suggests best practices for their assessment.

Through the participatory interface, information from experts can also be collected. Users are invited to insert knowledge on ecosystem services and related valuation methods. For each entry, the portal assesses the total amount and quality of information delivered for each capital dimension by specific combination of methods. The results are summarised in a synthetic figure. In this way, the end-users receive information about the strength of linkages between different methodologies when assessing their performance related to reaching the SDGs.

1 https://www.forumforthefuture.org/the-five-capitals
Maack & Davidsdottir (2015); Five capital impact assessment: Appraisal framework based on theory of sustainable well-being.

FIGURE 1. The geospatial toolkit visualizing the current level of knowledge on evaluation methods in the field of natural sciences for the user's selection of parameters. Similar information is available for the economic, human and social dimensions.

FIGURE 2. The dependency wheel in the portal assessing the strength of linkages among different methods. Higher linkages suggest better synergies among methods to deliver information on various ecosystem services.



How does the geospatial toolkit work?

1ST SECTION summarises the results from a scientific literature analysis on three key habitats – macroalgae, mussel beds, and seagrasses (See BONUS MARES Policy Brief 1/2020). It presents the level of economic, natural, human, and social knowledge associated with the selected three habitats and the ecosystem services they provide at regional level. This synthesis enables linking the existing assessment of ecosystem services to economic research and policy making on environmental management and further, suggests potential approaches for future research.

2ND SECTION contains a participatory dynamic framework for collecting expert knowledge on ecosystem service valuation methods. The intention is to increase the reliability and qualitative level of evaluations (both ecological, biophysical and economic) by stimulating contributions that combine different methods. Therefore, even in the absence of current linkages, methods can be proposed and then recalled in the future, when they may be combined with other methods for specific purposes.

To find out about the existing scientific information on ecosystem services, three filters can be chosen:

1) the geographic region(s) of interest in the Baltic Sea based on the HELCOM division
2) habitat(s)
3) the type of ecosystem service

When querying the results, the portal will display results about the current state of knowledge of the user-selected ecosystem services/habitats/regions as well as knowledge transfer of ecosystem services through the four dimensions. The user can also easily view, access, and download raw data associated with predefined filtering criteria.

Access the toolkit:

The Systematic Literature Review
The Participatory Interface

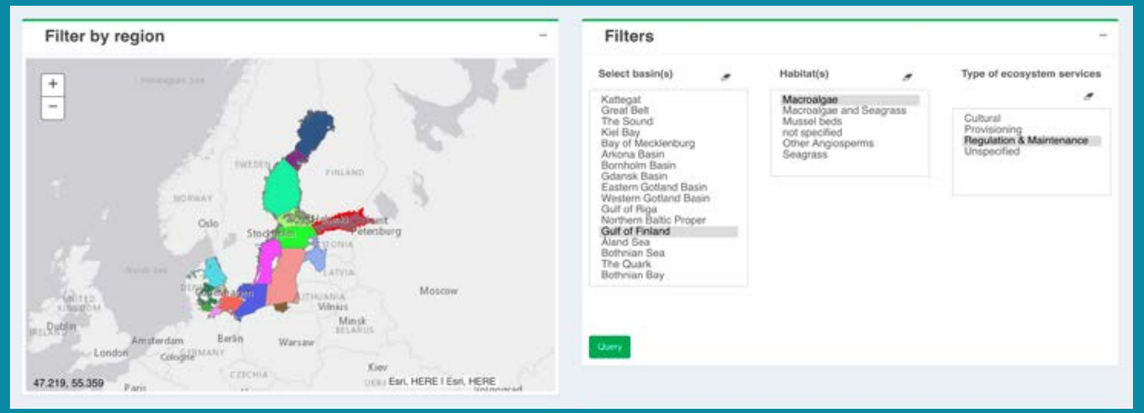


FIGURE 3. Main page of the geoportal with filters by the Gulf of Finland, Macroalgae and Regulating & Maintenance ecosystem services.

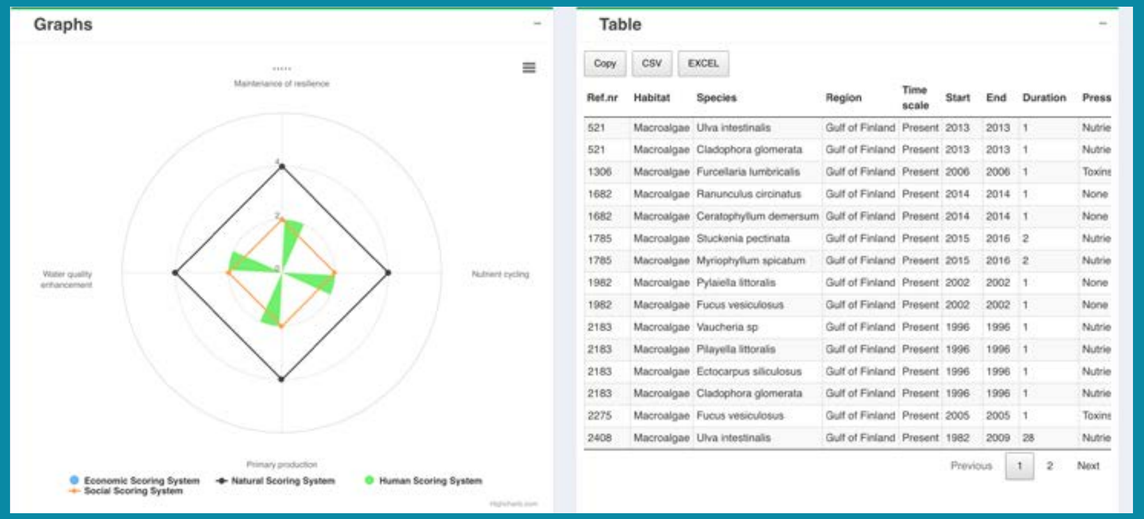


FIGURE 4. The result page of the geoportal. The amount of knowledge through four value dimensions (left) and associated raw data used in the analysis (right).

Recommendations to:

SCIENCE COMMUNITY: Start utilizing the geospatial toolkit for sharing and widening your knowledge on Baltic Sea ecosystem services and / or their valuation methods. Based on your user-experience, provide feedback for improvements of the toolkit.

POLICY AND DECISION MAKERS: Challenge researchers to present their knowledge in an understandable manner. Using the existing decision support tools helps you access synthesized information for evidence-based decision making.

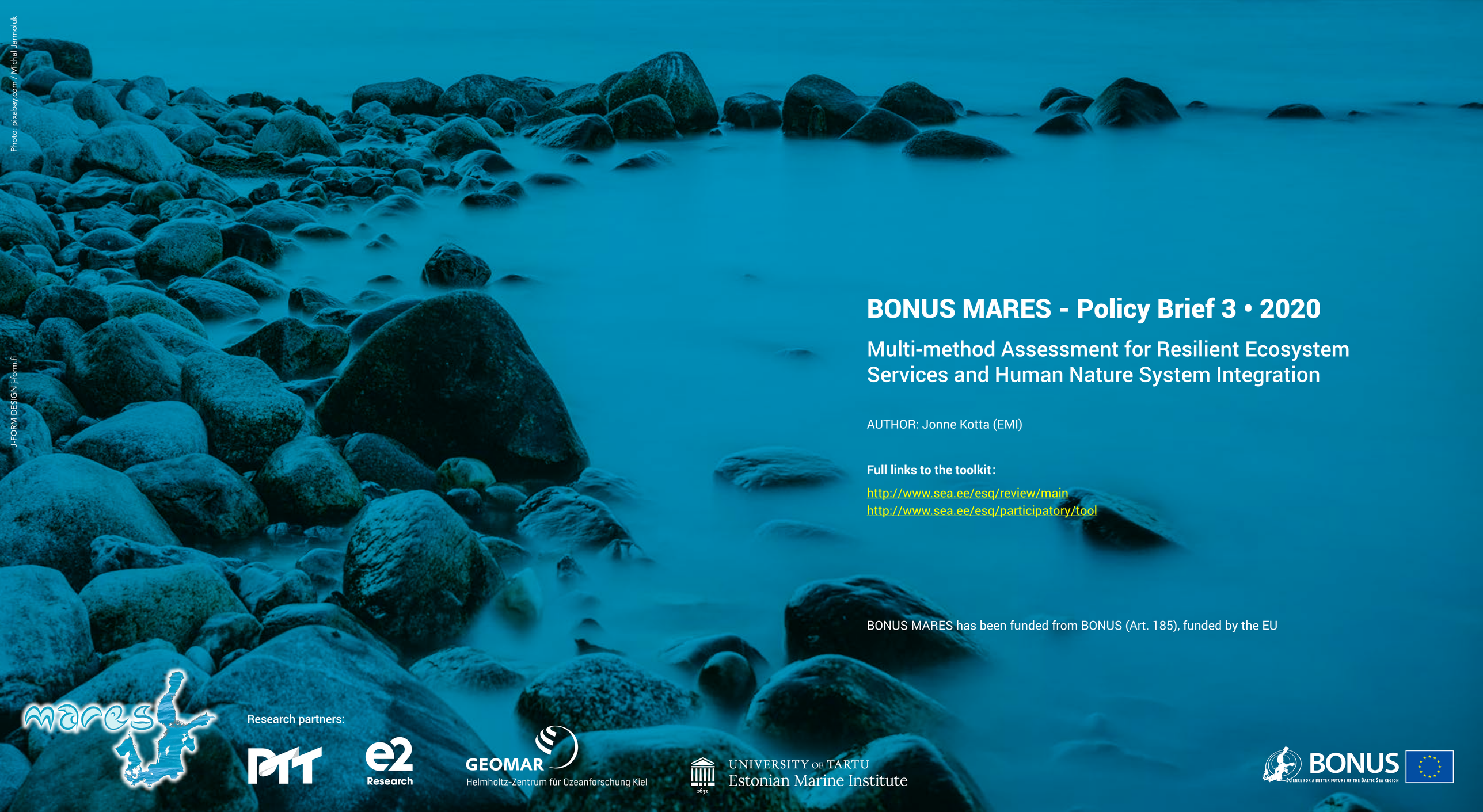


Photo: pixabay.com / Michal Jarmoluk

J-FORM DESIGN j-form.fi

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Multi-method Assessment for Resilient Ecosystem Services and Human Nature System Integration

AUTHOR: Jonne Kotta (EMI)

Full links to the toolkit:

http://www.sea.ee/esq/review/main
http://www.sea.ee/esq/participatory/tool

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BONUS SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION