HELCOM-VASAB Maritime Spatial Planning Working Group
18th Meeting
Hamburg, Germany, 27-28 March 2019

Document title	Outcome of the Green Infrastructure workshop, organized by Pan Baltic Scope project and HELCOM (regional expert workshop on essential fish habitats)
Code	5-4
Category	INF
Agenda Item	5 – Ecosystem-based approach in MSP
Submission date	14.3.2019
Submitted by	Latvia

Background

The Pan Baltic Scope project's workshop on Green Infrastructure was organized by the Pan Baltic Scope project and HELCOM together with the Regional expert workshop on essential fish habitats (in accordance with the decision of HOD 54-2018) and was held with the in Riga, Latvia, at the premises of the Latvian Ministry of Environmental Protection and Regional Development (MoEPRD), on 12-13 December 2018.

The aims of the Green Infrastructure workshop were:

- to receive feedback on the applied approach and first results in mapping areas of high ecological value;
- to discuss possibilities for improvement of the data sets used for mapping areas of high ecological value;
- to receive feedback on proposed approach for assessment of ecosystem services for Green Infrastructure mapping
- to agree on the next tasks, deadlines and outputs within the Pan Baltic Scope project.

The Workshop is a milestone in the "Indicative timetable for cooperation on Green infrastructure/Blue corridors in MSP" summarizing related ongoing processes relating to the implementation of the ecosystem-based approach in MSP, green infrastructure and connectivity of MPAs (document 5-3).

The results of this workshop will allow to improve final version of Green Infrastructure concept for supporting maritime spatial planning in the Baltic Sea region. Green Infrastructure concept to be finalised in March 2019 and will be publically available as the Pan Baltic Scope output in the end of 2019. Green Infrastructure concept will include the results from the Regional expert workshop on essential fish habitats and comments and agreements from the HELCOM State and Conservation 10-2019.

The Notes and preliminary results of the Green Infrastructure workshop, organized by the Pan Baltic Scope project is set out in the annex to this document.

Action requested

The Meeting is invited to take note of the HELCOM Pan Baltic Scope Green Infrastructure WS 2018 Outcome and utilize the information to plan further work on the Green Infrastructure concept.

Pan Baltic Scope

Co-funded by the European Maritime and Fisheries Fund of the European Union

Notes from the Green Infrastructure workshop

12-13 December 2018, Riga, Latvia

Aims of the meeting:

- To receive feedback on the applied approach and first results in mapping areas of high ecological value;
- To discuss possibilities for improvement of the data sets used for mapping areas of high ecological value;
- To receive feedback on proposed approach for assessment of ecosystem services for GI mapping
- To agree on the next tasks, deadlines and outputs

12th December: Mapping areas of high ecological value

Applied method & first results: For mapping on the areas of high ecological value, first the different features of the marine ecosystem (i.e. HELCOM HOLAS II ecosystem components) were assessed against the selected criteria (e.g. biodiversity, rarity, productivity, etc.). A matrix was developed, where the value (in binary scale: 0/1) was assigned to each ecosystem component to indicate its relevance for the each of the selected criterium (see Annex 1a.).

In order to obtain the maps of the high ecological value, the assessment results from matrix were fed into slightly modified code of the HELCOM tool for cumulative impact assessment (i.e. by using the ecological value criteria instead of pressures). Using the data sets of the HELCOM HOLAS II ecosystem components, first the single criteria maps for each of four groups of ecosystem components (habitats, birds, fish, mammals) were obtained. Further the maps of single criteria were aggregated in the combined ecological value maps of the four groups of the ecological components (see Annex 2: figure 1). Finally, the overall aggregated ecological value map was developed by combining the aggregated maps of the four groups of ecosystem components (see Annex 2: figure 2). The preliminary results of the mapping are not fully satisfactory, mainly due to limitations in mammals' data (it includes only data set on ringed seal, which report the entire north-eastern part of the Baltic Sea as important for the species, thus creating also artificial border line in the overall map of ecological value). Also, the data sets on areas important for birds and fish currently are too general.

During the meeting other alternative examples for mapping of ecologically valuable areas were also presented and discussed, including Green Map in Sweden, Latvian approach to mapping ecologically valuable areas, Finish example for applying EBSA[1] criteria at national level for identification of areas of high ecological value and German approach in developing map of Nationwide Green Infrastructure Concept.

[1] Ecologically or Biologically Significant Marine Areas, defined within the framework of the UN Convention on Biological Diversity (CBD)

Feedback on applied approach

- The overall PBS approach for mapping of GI was accepted as suitable for the purpose of the project. Participants of the meeting agreed that the most important is to demonstrate how the concept can be applied, despite the limitations in data sets. The input data on ecosystem components can be replaced when better data sets will be available.
- However, questions were raised about the scoring values (1/0) in the matrix for assessment of ecological value (e.g. why all components are assessed as rare). Therefore, it was suggested that scoring shall be checked once again.

Possibilities for improving of the data sets:

- It was proposed to remove for the time being the mammals' data from the aggregated ecological value map, until more complete data set would be available. The limitations of the mammals' data set shall be addressed within the GI concept report.
- During the meeting a HELCOM map on areas important for bird migration were presented. It was suggested to add this data set to the ecological value mapping exercise.
- The present HELCOM data set on fish component shall be replaced with mapping results of the EFH group, when aggregated map will be available.

Open questions:

- The issue of assessment scale was raised by participants. Currently the assessment was applied to the whole Baltic sea scale, but the criteria value might differ by the sub-regions.
- The purpose of GI mapping shall be discussed, e.g. what would be application of such pan Baltic scale assessment approach – would it be suitable/informative for the national MSP process.
- Weighting of criteria might be considered.
- So far, the proposed PBS approach for GI mapping do not address the 'Connectivity' issue, since that would require sophisticate connectivity modelling methods and additional data sets (e.g. water movement, physical structures), which might be not feasible within the project. However, the issues shall be highlighted in the GI concept report.

13th December: Mapping of Ecosystem services

Proposed method: The mapping of ecosystem service supply potential will be performed based on assessment of the same HELCOM HOLAS II ecosystem components in relation to their potential to supply the selected ecosystem services. The project experts so far have decided to test assessment of seven regulating services, defined according to CICES version 5.1, although consideration of few provisioning and cultural services (e.g. recreational potential) were also discussed. It is planned to use binary assessment scale (0/1) to avoid too much uncertainty in assessment due to limited knowledge and data about the capacity of different ecosystem components to supply particular services within the Baltic Sea conditions.

The matrix for assessment of the ecosystem services were presented during the meeting. It was suggested in some cases to divide the ecosystem service categories proposed by CICES in more specific services suitable for marine environment (e.g. 'Filtration/sequestration/ storage/accumulation by micro-organisms, algae, plants, and animals' can be divided in

'Filtration/sequestration/ storage/accumulation of nutrients' and 'Filtration/sequestration/ storage/accumulation of hazardous substances' as applied in BASMATI project.

In addition to the assessment matrix, a table indicating all ecosystem services, suitable for GI mapping, their definitions and possible indicators were developed and presented at the meeting. Suitable indicators could be also selected for specifying the ecosystem service assessment within the matrix.

Feedback on proposed method:

- Several of the proposed ecosystem service assessment indicators were questioned by the participants of the meeting. It was suggested to amend the indicator list, where possible also including HELCOM Core indicators.
- It was suggested to include in assessment also cultural services (e.g. 'physical and experiential interactions with natural environment/recreational potential). Possibilities for including provisioning services were discussed (e.g. wild animals for nutrition), however a clear agreement on suitability of these services for GI mapping was not achieved.
- Possibilities to apply more detailed scoring of ecosystem service supply instead of the binary approach (0/1) was discussed. However, experts admitted that providing relative value of the ecosystem service supply, e.g. 0-4 (like in assessment performed by HELCOM, and Sweden in Symphony tool) or 0-3 (line in UK study, Potts et al., 2014) would cause too high uncertainty due lack or research data and knowledge.

Open questions:

- How to demonstrate interrelation between biodiversity and ecosystem services, conceptually as well as technically?
- What should be the appropriate aggregation method for development of ecosystem service supply map. A number of services supplied per grid cell would demonstrate the multifunctionality of the area, while a more sophisticated approach, proposed in previous meeting (i.e. multivariable analysis of ecosystem services and related ecosystem components, which would allow to identify bundles of ecosystem services) would demonstrate the functional variety of marine areas. The aggregation method shall be discussed and agreed during the next Skype meeting of the GI expert group.

Next steps:

- Mapping of high ecological value shall be finalised by end January 2019: mammal data shall be removed, and assessment scores must be checked once again.
- Updated matrix for assessment of the ecosystem service supply potential shall be sent out to national experts in marine ecology. Ecosystem service supply potential shall be scored in scale 0/1. Mapping of singe ecosystem services based on matrix results shall be finalised by end of January 2019.
- Method for aggregation of ecosystem service map as well as aggregated GI map shall be discussed at a skype meeting in January/beginning of February 2019.
- Draft report on GI concept shall be ready by end of March 2019 and final version until June 2019.

Annex 1a: Matrix for assessment of the ecological value of the marine ecosystem components

HELCOM BSII Ecological Diversity Components	Biodiversity	Rarity	Importance for threatened, endangered or declining species and/or habitats	Vulnerability, fragility, sensitivity or slow recovery	Special importance for life-history stages of species	Biological productivity
Availability of deep water habitat, based on occurrence of H2S	0	1	0	0	0	0
Infralittoral hard bottom	0	1	0	0	0	0
Infralittoral sand	0	1	0	0	0	0
Infralittoral mud	0	1	0	0	0	0
Infralittoral mixed	0	1	0	0	0	0
Circalittoral hard bottom	1	1	1	1	1	1
Circalittoral sand	0	1	1	1	1	1
Circalittoral mud	0	1	1	1	1	1
Circalittoral mixed	1	1	1	1	1	1
Sandbanks which are slightly covered by sea water at all time (1110)	1	1	1	1	1	1
Estuaries (1130)	1	1	1	0	1	1
Mudflats and sandflats not covered by seawater at low tide (1140)	0	1	0	0	0	0
Coastal lagoons (1150)	1	1	1	0	1	1
Large shallow inlets and bays (1160)	1	1	1	1	1	1
Reefs (1170)	1	1	1	1	1	1
Submarine structures made by leaking gas (1180)	1	1	1	1	1	1
Baltic Esker Islands (UW parts, 1610)	1	1	1	1	1	1
Boreal Baltic islets and small islands (UW parts, 1620)	1	1	1	1	1	1
Furcellaria lumbricalis	1	1	1	1	1	1
Zostera marina	1	1	1	1	1	1
Charophytes	1	1	1	1	1	1
Mytilus sp.	1	1	1	1	1	1
Fucus sp.	1	1	1	1	1	1
Productive surface waters	1	1	1	0	1	1
Cod abundance	0	0	1	0	0	1
Cod spawning area	1	1	1	1	1	1
Herring abundance	0	0	0	0	0	1
Sprat abundance	0	0	0	0	0	1
Recruitment areas of perch	1	1	1	1	1	1
Recruitment areas of pikeperch	0	1	1	1	1	1
Wintering seabirds	1	1	1	1	1	0
Breeding seabird colonies	1	1	1	1	1	0
Grey seal distribution	0	0	0	0	0	0
Harbour seal distribution	0	0	0	0	0	0
Ringed seal distribution	1	1	1	1	0	0
Distribution of harbour porpoise	1	1	1	1	0	0

Annex 1b: Matrix for assessment of the marine ecosystem services

HELCOM BSII Ecological Diversity Components	Bio-remediation by micro-organisms, algae, plants, and animals	Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals	BASMATI: Filtration/ sequestration/ storage/accumulation **of nutrients**	BASMATI: Filtration/ sequestration/ storage/accumulation of **hazardous substances**	Control of erosion rates	Maintaining nursery populations and habitats (Including gene pool protection)	Pest control (including invasive species)	Regulation of the chemical condition of salt waters by living processes	Regulation of chemical composition of atmosphere and oceans	BASMATI: Regulation of atmospheric CO2 (and other greenhouse gases) by biological fixation in process of photosynthesis, dissolution in the sea water and sequestration in sediments
Availability of deep water habitat, based on occurrence of H2S										
Infralittoral hard bottom										
Infralittoral sand										
Infralittoral mud										
Infralittoral mixed										
Circalittoral hard bottom										
Circalittoral sand										
Circalittoral mud										
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Sandbanks which are slightly covered by sea water at all time (1110)										
Estuaries (1130)										
Mudflats and sandflats not covered by seawater at low tide (1140)										
Coastal lagoons (1150)										
Large shallow inlets and bays (1160)										
Reefs (1170)										
Submarine structures made by leaking gas (1180)										
Baltic Esker Islands (UW parts, 1610)										
Boreal Baltic islets and small islands (UW parts, 1620)										
Furcellaria lumbricalis										
Zostera marina										
Charophytes										
Mytilus sp.										
Fucus sp.										
Productive surface waters										
Cod abundance										
Cod spawning area										
Herring abundance										
Sprat abundance										
Recruitment areas of perch										
Recruitment areas of pikeperch										
Wintering seabirds										
Breeding seabird colonies										
Grey seal distribution										
Harbour seal distribution										
Ringed seal distribution										
Distribution of harbour porpoise										

Annex II: Preliminary results in mapping of areas of high ecological value

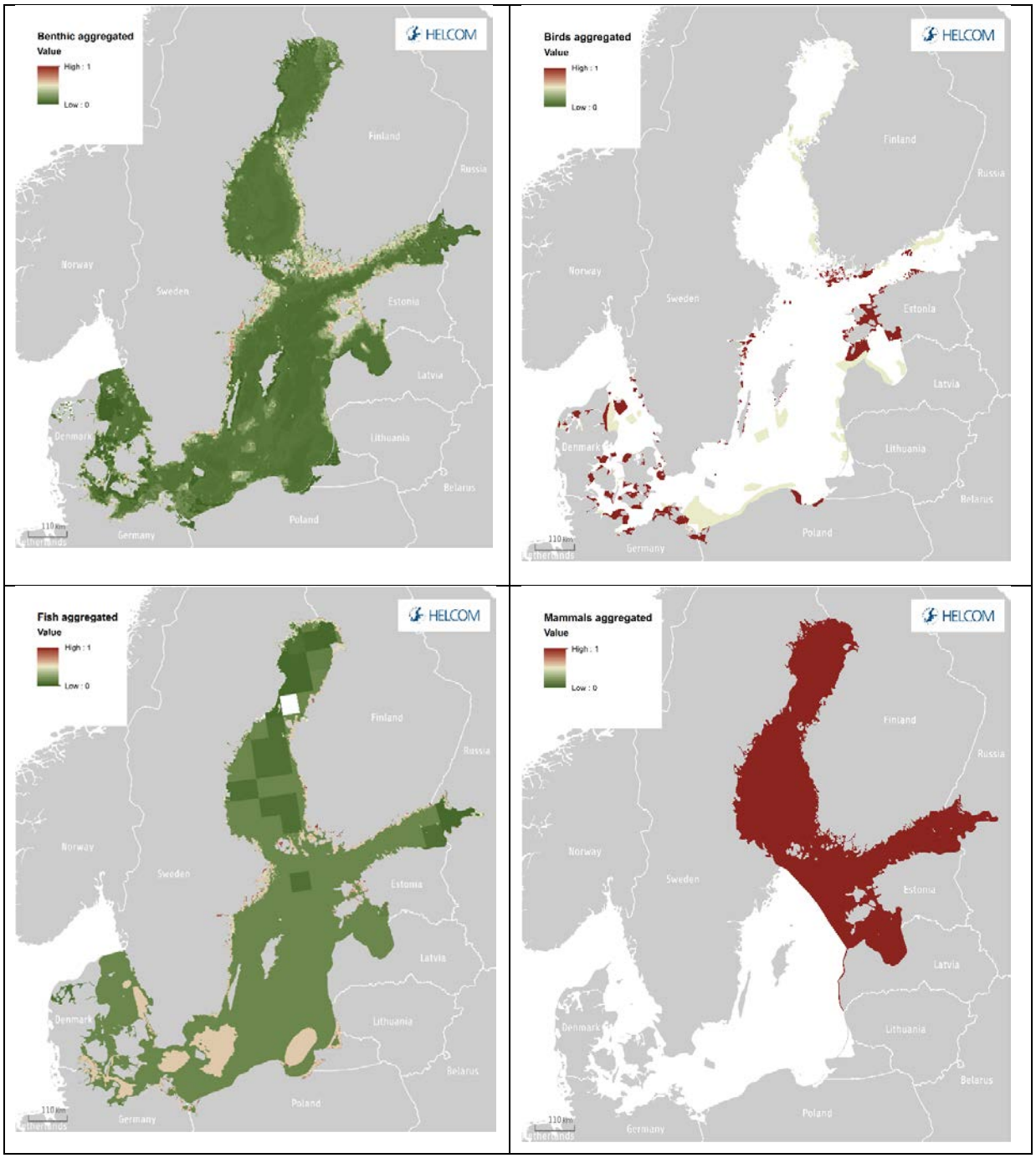

Fig. 1. Preliminary results of aggregated ecological value maps on four groups of ecosystem components: habitats, birds, fish, mammals.

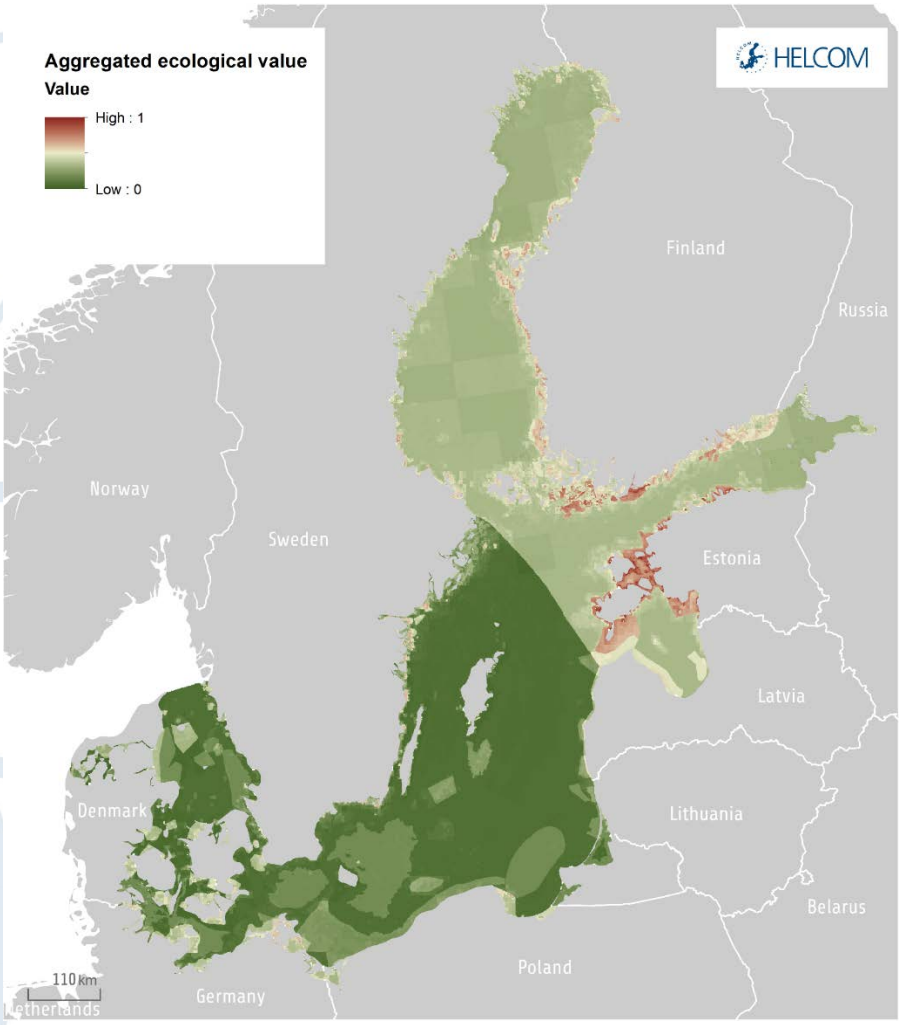

Fig. 2. Preliminary results of the map indicating the areas of high ecological value

List of Participants

of the Workshop Green Infrastructure
12.-13.12.2018.
12:30 – 17:30 and 9:00 - 14:00
Riga/Latvia

Total number of participants:
Name of the responsible project partner organisation: MoEPRD

No	Name of Participant	Participant's Organisation
1	Solvita Strāķe	MoEPRD / Latvian Institute of Aquatic Ecology
2	Anda Ruskule	MoEPRD
3	Margarita Vološina	MoEPRD
4	Jan Schmidbauer Crona	SwAM
5	Ingūna Urtāne	MoEPRD
6	Philipp Arndt	BSH
7	Juho Lappalainen	Finnish Environment Institute SYKE / Marine Research Centre
8	Kristīne Kedo	MoEPRD
9	Aurelija Armoskaite	Latvian Institute of Aquatic Ecology
10	Ingrīda Puriņa	Latvian Institute of Aquatic Ecology
11	Kristīna Veidemane	BEF