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Background

HOD 56-2019 agreed to establish a Task Group for finalizing a HELCOM science agenda to be adopted together with updated BSAP ([Outcome, para 2.32](#)). This document includes a proposal for further development of the HELCOM science agenda, as proposed by the Science Agenda Task Group and recently agreed by HELCOM 41-2020 ([Outcome of HELCOM 41-2020](#), para. 4.4).

Action requested

The Meeting is invited to take note of the information.

Background

HELCOM 40-2019 agreed to develop a HELCOM science agenda, with the aim of adoption in 2021 along with the update of the BSAP ([Outcome, para 2.29](#)). The science agenda is aimed at identifying knowledge and science needs for the implementation of HELCOM objectives and strategies. To support the development of the science agenda and collect views from HELCOM expertise, a survey on knowledge and science needs was circulated to HELCOM Working Groups and associated Expert Groups and networks in 2019. An overview of the survey results was presented to HOD 57-2019 ([document 3-9](#)).

The final HELCOM science agenda is envisioned as a report that highlight issues of major relevance for HELCOM work. To prepare the science agenda HOD 56-2019 agreed to establish a Task Group (TG) with representatives from the Contracting Parties ([Outcome, para 2.32](#)). The tasks of the Group include to:

- 1) check the proposals received through the survey and complement as needed if any central topics are found to be missing
- 2) agree on the outline and content of the final report
- 3) identify issues of particular importance for HELCOM work e.g. in the short-term and long- term
- 4) identify important external processes that could support the implementation of the Science Agenda

In addition, the original task list as agreed by HOD 56-2019 included to “develop a text proposal on the role of the Contracting Parties in supporting the implementation of the HELCOM Science Plan and on major future policy milestones that could be supported by the plan, as a potential HELCOM voluntary commitment to the UN 2020 Conference”. The development of such voluntary commitment has continued elsewhere and is presented for consideration at the high-level segment of HELCOM 41-2020.

The Science Agenda TG met for the first time on 17 December 2019 to discuss the tasks and agree on the mode of working ([Notes, Science Agenda TG 1-2019](#)). During the first meeting it was agreed to use the survey results as a document to draw from to develop the science agenda and it was also decided to make the survey compilation available as supplementary material to the main report. The TG was however of the view that it would not be practically feasible or appropriate to make a prioritization between the close to 200 individual contributions to the survey ([Notes, Science Agenda TG 1-2019](#)). The main target audience for the science agenda was identified as the national authorities engaged in HELCOM work and marine policies in general, national and international science financers, and the scientific community.

The second meeting of the TG was held 29-30 January 2020 in Helsinki, Finland, ([Notes, Science Agenda TG 2-2020](#)). At the second meeting the development of the science agenda was discussed in further detail resulting in the proposal to HELCOM 41-2020 as contained in this document. Two main issues are covered in the document:

- a proposal for how to identify issues of particular importance for HELCOM, including an example of how this can take place and a preliminary list of priority topics,
- a proposal for the outline of the science agenda report, including an example of how a priority topic could be presented.

Proposal for further development of the HELCOM Science Agenda

Format in brief

It is proposed that the science agenda is prepared in layout format for download and printing with a relatively light and accessible style of writing and appearance. The main part of the report will center around priority areas of work for HELCOM where highlighted science needs are summarized for each priority topic. In addition, annexes will provide more detailed information on e.g. links to HELCOM agreements and activities,

and the results of the HELCOM survey on knowledge and science needs will be made available as supplementary material. In this way the science agenda can both provide an easy to grasp overview of the knowledge needs as well as detailed level of information that may be of interest for scientists and potential research financiers.

Basis for identifying topics of priority for HELCOM work

To identify priority areas of HELCOM work it is proposed to draw from existing HELCOM agreement documents and strategies, namely Ministerial Declarations, Baltic Sea Action Plan, HELCOM [Roadmap for the Ecosystem approach](#), recent assessments such State of the Baltic Sea report, HELCOM Redlists and Pollution Load Compilations, and the [priority list of indicators](#) that has been identified through HELCOM workshops held in 2019. The priority areas that can be identified through these documents are proposed to be used to structure the science agenda. A preliminary review of these documents results in the priority areas presented in Table 1 where terms mentioned in these documents have been collated and structured hierarchically based on levels of detail and analyzed for complementarity.

It is proposed that the topics addressed in the science agenda should be general in nature and not too many, and the level of detail of the priority topic should be comparable across topics therefore following the 3rd column labelled “Topics” in Table 1. It is furthermore proposed that three overarching titles are used to structure the agenda; Biodiversity, Human dimension, and Holistic approaches. Note that Table 1 only represents a preliminary list of topics and that it may be amended or reduced in the process of further developing the science agenda.

It is also proposed as a general rule that knowledge and science needs identified as relevant on a regional level should be prioritized over those relevant on a national level. How this will be considered in practice will be discussed in the further development of the agenda. As an initial reflection it seems that a majority of contributions to the survey are relevant for the regional level, albeit projects may in some cases be more suitable to implement at national level.

In the further work the priority topics will also be mapped against the different aspects of science and research needed that has been indicated in the survey contributions, e.g. if they are related to indicators, pressure targets, development of measures, models etc. Such mapping is considered to provide a useful overview both for managers and scientists that seek information on HELCOM needs. An overview of how the contributions are distributed according to different type of science needs is available in [document 3-9](#), figure 1, to HOD 57-2019.

Timespan of the science agenda

The science agenda will reflect knowledge needed in the coming decade to support planned HELCOM assessments and the implementation of actions and measures outlined for the BSAP. The TG has discussed the possibility to separate the information into short- and long-term science needs but has at least for the time being abandoned this line of thinking since all topics highlighted as science needs are required as soon as possible in order to reach HELCOM objectives and agreements. If feasible, it is however the ambition to identify if some of the knowledge needs are a prerequisite for the continued work on other highlighted issues.

Overall the proposal is that the main sections of the science agenda should aim to have a relatively long shelf life, e.g. 10 years, however, that the annexes and survey could be regularly reviewed and updated in order to keep the information up to date and fit for HELCOM purpose.

Outline of the science agenda

The science agenda is proposed to be outlined as presented in Box 1. With regard to the main section 2 of the report, it is proposed that each priority topic (e.g. eutrophication) is briefly described in terms of why it

is a priority topic as well as to mention science needs in broader terms. This would be followed by more specific ‘highlights’, drawing from the survey of knowledge and science needs but summarizing and merging proposals from the contributions as suitable. It is envisioned that 3-8 highlights could be identified for each priority areas. An example is provided in Box 2. The envisioned maximum space for a priority topic is 1 page, in layout format for printing.

Section 3, How the science agenda can be implemented, is meant to follow up on the task of the TG to “identify important external processes that could support the implementation of the science agenda”. Such section will be written on a general level, i.e. not linked to specific priority topics.

Annexes are also seen as an important part of the science agenda. The TG is for example of the view that is important to link the priority topics, and in particular the highlights, to specific HELCOM activities, strategies and agreements such as recommendations. However, not to overburden the text in the main section of the report this type of information is proposed to be presented in annexes instead. Likewise, it is found useful to link the highlight to the ‘DPSIR’ concept which is now being used to develop the indicator framework in HELCOM.

The TG has also agreed to update the results of the HELCOM survey of knowledge and science needs in communication with original submitters before publication, i.e. by merging overlapping proposals and requesting clarification as needed. This step will be implemented in late spring 2020. A first draft of the HELCOM science agenda will be presented to HOD in June 2020 and the final report in December 2020.

Box 1. Proposed outline of the HELCOM science agenda

Outline:

- 1) Introduction;
 - Purpose (why is HELCOM developing a science agenda, who is the target audience)
 - Process (who participated, how were the priority areas identified)
- 2) HELCOM science needs
 - a. Biodiversity
 - i. Priority topic 1, highlights
 - ii. Priority topic 2, highlight
 - iii.
 - b. Human dimension
 - i. Priority topic 1, highlights
 - ii. Priority topic 2, highlights
 - iii.
 - c. Holistic approaches
 - i. Priority topic 1, highlights
 - ii. Priority topic 2, highlights
 - iii.
- 3) How the science agenda can be implemented
 - A reflection on external processes that could support the implementation of the science agenda

Annexes

- Mapping type of research needs vs priority topic
- Specification of highlights, e.g. providing links to HELCOM agreements and activities, providing links to DPSIR concept

Supplementary material

- Survey results

Box 2. FIRST DRAFTS, Examples on how a priority topic could be presented

Eutrophication

Baltic Sea is one of the most eutrophied seas in the world with high nutrient loads and eutrophication affecting about 97% of the sea area. HELCOM has agreed on a nutrient reduction scheme to reach good status in terms of eutrophication but despite long-term attempts to reduce the input of nutrients the concentrations in the sea are still high. Additional efforts are necessary to reduce the nutrient inputs from human activities and research is needed both to understand how the Baltic sea ecosystem responds to reduced nutrient input and where to best direct measures to reduce the loads, in particular from land-based activities which are the major contributors of nutrient input.

Highlighted science needs:

Input of nutrients to the Baltic Sea

- Improved and harmonized modelling of the catchment, quantifying retention and nutrient sources from the catchment;
- Estimation of reduction potential from different sectors and areas of the Baltic Sea countries;

Impact of nutrient inputs

- Improved understanding and modeling of temporal and spatial response of the Baltic Sea eutrophication to reduced nutrient inputs and climate change to facilitate adaptive management;
- Improved understanding of internal biogeochemical transformations of nutrients in the sea, including so-called internal loading;
- Improved understanding and modeling of the linkage between open sea and coastal eutrophication

Marine litter

Pollution of the marine environment by litter and plastics in particular is a global problem, that was recognized only in the 19X0s and research in the Baltic started in early 2000s. Due to the large drainage area and large population the Baltic Sea is subject to substantial input of litter. Studies of concentrations of macro and microlitter in the watercolumn and sediments are ongoing, but to are different methods for sampling and analysis the results are hard to compare. HELCOM has agreed on Regional Action Plan on marine litter which includes the agreement to significantly reduce marine litter by 2025 compared with 2015. To reach this goal fundamental knowledge is still needed on the sources of litter as well as on how to sample and assess the presence and impact of litter.

Highlighted science needs

Indicators and impacts of litter:

- Need for harmonized methodology (EU and RUS) for monitoring of beach litter, and microplastics in water and in bottom sediments.
- Impact of macrolitter and microplastics on biological organisms, including impact on humans

Input and fate of litter

- Sources and pathways of macrolitter and microplastics
- Degradation of different type of plastics, including degradation from macro- to microplastics

Measures to reduce input of litter

- Evaluation of effectiveness of management actions e.g. bans of plastics, wastewater treatment to remove microplastics, awareness programmes etc

Table 1. Mapping of key terms in existing HELCOM agreement and strategies

	Titles	Topics	Subtopic	BSAP	HELCOM MD2010	HELCOM MD2013	HELCOM MD2018	State of the Baltic Sea	Priority Indicators	Ecosystem approach roadmap	Redlist	PLC		
Ecosystem	Biodiversity	Habitats	Pelagic habitats											
			Benthic habitats											
		Species	Marine mammals											
			Birds											
			Fish											
			Benthic invertebrates											
			Macrophytes											
			Plankton											
		Foodwebs (Ecosystem function and dynamics) ¹												
		Conservation												
	Human dimension	Climate change												
		Eutrophication	Nutrient input											
			Nutrient recycling											
			Internal nutrient reserves											
			Waste water											
			Agriculture											
		Hazardous substances												
		Marine litter												
		Underwater noise												
		Non Indigenous Species												
		Shipping	Oilspills											
		Infrastructure												
		Fisheries	Disturbance to seabed											
			Removal of species											
			Bycatch											
			Management											
			Recreational											
	Aquaculture													
	Hunting													
	Cumulative effects													
Holistic approaches	ESA	Ecosystem services												
	MSP													
	Ecosystem approach													

¹Description of on what would be considered still needed, possibly to be moved to "Holistic approaches" and renamed.