Document title	Preliminary results of the SOM analysis
Code	3-5
Category	INF
Agenda Item	3 - Development of the regional MSP framework
Submission date	14.10.2020
Submitted by	HELCOM Secretariat (ACTION WP6)
Reference	

Background

Sufficiency of measures (SOM) analysis, carried out by the HELCOM ACTION project and the HELCOM SOM Platform, supports the update of the BSAP by assessing what kind of improvements in environmental state and pressures can be achieved with existing measures by 2030-2035, and whether these are sufficient to achieve good environmental status (GES) in the Baltic Sea. The methodology for the SOM analysis has been developed by the ACTION project with guidance from the SOM Platform, and endorsed by GEAR 22-2020 (Outcome, para 4.21).

The format of the presentation of the results has been developed based on discussions and comments from, in particular, the SOM Platform, Expert Network on Economic and Social Analyses (Outcome of EN ESA 9-2020, Agenda Item 4) and ACTION project. HOD 58-2020 noted the importance of presenting the uncertainties related to the results and proposed that an example of the presentation of the results is prepared for review by the Gear Group before HOD 59-2020 (Outcome, para 4.40).

This document presents the first results of the SOM analysis for all topics (provided in separate files). The results were submitted to the HELCOM BSAP UP workshops organized in August and September 2020 to provide supporting background information for the evaluation of proposed new actions. In addition to the main result, i.e. the probability of achieving GES/specific state improvements with existing measures, the documents present findings on which pressures contribute to state components, what are the reductions in pressures from existing measures, how effective are measure types in reducing pressures, and which activities contribute to pressures.

In addition, this document lists updates and revisions to the reporting and presentation of the SOM results based on review of the results and input gathered e.g. from SOM topic teams and BSAP UP workshops. It also describes the schedule of SOM work in the autumn 2020.

The results of the SOM analysis will be amended and revised in the autumn 2020 based on additional analyses and feedback received. The final results should be available in October after input from HELCOM groups and networks and validation of input data by the Working Groups.

Action requested

- take note of the preliminary results of the analysis of sufficiency of measures for all topics.

Results of the SOM analysis

Background

The SOM analysis involves estimating the status of the marine environment at a specific future point in time, given measures in existing policies, their implementation status and projected development of human activities over time (Figure 1).

The main components of the analysis are assessing: the contribution of activities to pressures (Step 3), the effect of existing measures on pressures (Step 4), the effect of development of human activities on pressures (Step 5), and the effect of changes in pressures to environmental state (Step 6). The result is the state (in terms of pressure reductions or improvements in environmental components) in 2030-2035, which can then be compared to the threshold for good environmental status, when available (Step 7). This allows assessing the probability to achieve GES with existing measures.

It is worth noting that in the SOM analysis, pressure inputs and pressures have been distinguished from each other. their relationship is one of the following: 1) pressure input and pressure are equivalent or assumed to be equivalent, 2) pressure input and corresponding pressure are present in the analysis but no connection is made between them, or 3) only the pressure is present in the model. For eutrophication, both the pressure input (input of nutrients) and pressure (effects of eutrophication) are present in the analysis, but they are not connected (i.e. option 2, see Figure 3). Thus, for some pressures, the analysis has not been able to include a quantitative link between the pressure inputs and pressures. Subsequently, it has not been possible to include reductions in all pressures when calculating the pressure reductions or the probability to achieve state improvements, and thus, the projected pressure reductions and state improvements are likely underestimated in the analysis. In particular, this is the case for the effects of eutrophication, which is a significant pressure to many state components.

A detailed description of the SOM methodology and data collection is presented in this document.

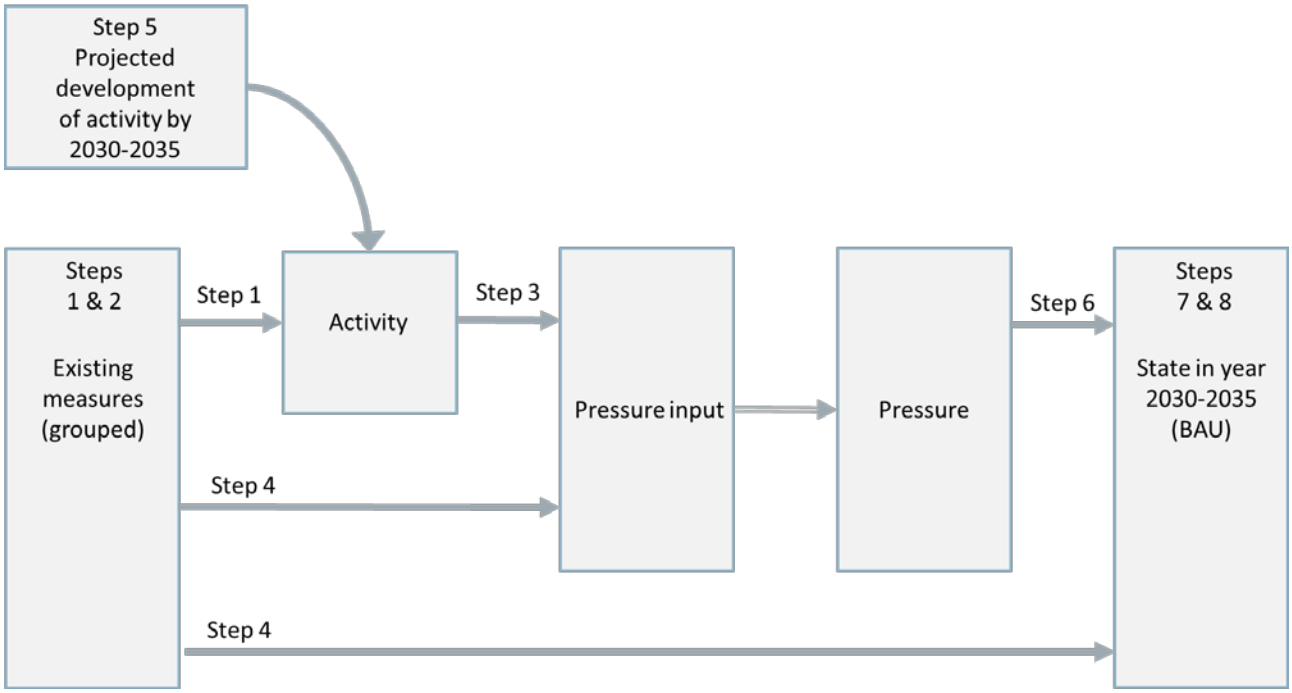

Figure 1. General schematic of the main components of the SOM analysis

The SOM analysis presents the first attempt to quantify the effects of existing measures and policies on the environment and achieving objectives. It presents a Baltic Sea level assessment on the overall sufficiency of

existing measures for a variety of environmental topics. The results of the analyses are based mainly on expert elicitation, and thus they should be interpreted appropriately. The findings do not provide complete and final answers on the reductions in pressures or improvements in state and should thus also be considered in relation to other relevant results and assessments.

Presentation of SOM results

The SOM results are presented in the format of percent shares or probabilities. The main finding of the analysis is the probability to achieve GES or specific state improvements/pressure reductions, taking into consideration the effects of existing measures and changes in the activities on pressures. The contribution of activities to pressures, the effect of measures on pressures, and the significance of pressures to state components are presented as percent values (e.g. how many percent would the measure reduce the pressure). Results are presented mainly in tables, which show the the most likely (expected) values and standard deviations. Standard deviation is a way of showing the variation in the values. When it is high, values are spread over a wider range, and when it is low, values are closer to the most likely value. Figures and graphs presenting distributions are mainly included in the annexes. They show the same results as the tables but allow either more detailed information or alternative visualisation of the results.

For the data that are based on expert surveys, the confidence rating gives the most common answer to experts' assessment of the confidence in their own survey responses on a low-moderate-high scale. More detailed information on how each result has been calculated is presented in a separate document.

SOM results documents

The first results of the SOM analysis are available as nine separate documents (one per topic). They are the same documents as submitted to the four BSAP UP workshops (except for eutrophication; see below), and available in a dedicated folder on the SOM workspace.

Note that due to the identification of more significant data related changes, the eutrophication results have been updated following the BSAP UP workshops. The update is largely limited to changes that impact the numeric results, and further revisions will be needed to address other aspects of the identified amendments and revisions listed later in this document.

The documents present the results based on the expert-based data (survey responses). Literature data on the effectiveness of measures have been collected but are not included at this point. The projected development of human activities is based on the most likely future development until 2030 (for details, see the SOM methodology document).

Identified amendments and revisions to the reporting and presentation of the SOM results

Several points of development and improvement have already been identified, e.g. based on feedback from the SOM topic teams. This section provides a list of proposed changes to the reporting and presentation of the SOM results, categorized based on their type. They are still to be implemented.

General changes

- Correct activity-pressure input data and results
- Implement changes on pressure reductions and state improvements based on changes in activity-pressure contributions for all topics
- Add information on the impacts of measure types that combines information on the effectiveness of measures types and activity-pressure contributions
- Add literature data on effectiveness of measures to the input data
- Add alternative human activity scenarios (no change, small, large change) to the results in addition to the current most likely to assess their effect on results
- Add description of the human activities scenarios and how they impact the outcomes to help understand and correctly interpret the results, explain which activities change and affect pressure reductions and which activities do not

- Add information on the state components most affected by the pressure in question (e.g. significance of effects of litter on state components)
- Ensure that the concept of pressure inputs and pressures is applied consistently across topics
- Address caveat that most data are based on the opinion of a limited number of experts
- Add explanations, interpretations and conclusions on the results
    a. Specifically, regarding the most important pressures that affect the gap to GES, and the existing measures in place for those pressures and where are the gaps in terms of measures and pressures.
- Add information on what purposes the results could be used
- Add information on the practical implications of the work and how to use the results
- Include in all figures and graphs the number of experts contributing to the result. Also, standard deviations or confidence intervals should be included in the graphs, where appropriate
- Include more information on the relationships between measure types. For example, some are alternative versions of a measure where only one version can be implemented.
- Take standard deviations better into account when presenting and interpreting the results.
- Consider which scenario to use as the default scenario for the projected changes in human activities due to effects of COVID-19.
- Add information on the credibility of the results and how they should (and should not) be interpreted.
- Include in all figures and graphs the number of experts contributing to the result
- Standard deviations or confidence intervals should be included in the graphs, where appropriate
- Methodological challenges to note:
    a. The technical challenges, which deleted many of the first answers by experts.
    b. The difficulty of using non-quantitative dots placed in a coordinate system to generate quantitative reduction estimates.
    c. (Litter) The questionnaire sometimes used effectiveness compared to top beach litter items and sometimes to more specific litter categories
- Include reflection on applicability/quality of MTs (too general, too specific, wrong link, etc.)
- Summary of results should be more qualitative and reflect uncertainties/problems with the data, give percent ranges or qualitative assessments of probabilities to achieve GES
- Achieving GES/state improvements/pressure reductions
    a. Include information on how many experts answered what
    b. Consider a simpler way of presenting results than the current graphs, especially graphs on cumulative probability functions are rather difficult to read
    c. Add more information on the most recent status assessment and GES threshold to help evaluate and interpret the results
    d. Clarify the explanation on the consequences of not being able to account the effect of all pressure input reductions on state components in the analysis
    e. Explain better what is meant by maximum possible pressure reduction and how it is calculated
- Projected pressure reductions
    a. Clarify what is the difference between reductions in pressure inputs vs. effectiveness of measure types (pressure reduction takes into account information on existing measures and activity-pressure contributions)
    b. Add information on which measures are driving the pressure reductions
    c. Clarify when pressure reductions can be negative, zero or positive
    d. Explain the role of changes in human activities on pressure reductions
    e. Clarify what is the baseline (BAU vs. existing measures that have an effect in 2016-2030/2035)
- Effectiveness of measure types
    a. Indicate which measure types are hypothetical and which have a corresponding existing measure, and look into whether it is possible to indicate whether a measure type has been/is being implemented

   b. Clarify that the effectiveness is presented per activity, not across all activities, and does not take into account activity-pressures contributions, i.e. the measure type reduces XX% of the pressure input from the specific activity and not of the total input
   c. Include more information on the relationships between measure types. For example, some are alternative versions of a measure where only one version can be implemented.
- Activity-pressure contributions
   a. Clarify what are activities and sources outside the Baltic Sea

Topic-specific changes

- Hazardous substances
   a. Clarify how existing pollution is included in the analysis
   b. Add discussion on geographic variation of status across the Baltic Sea
   c. Clarify the differing model structures shown in Figures 2 and 3
   d. Consider adding discussion on the impact of measures implemented before 2016 and how well the impacts of such measures are included in the SOM analysis
   e. Clarify the difference between Tables 2 and 6
   f. Include a short description about the issue of long-range emissions
- Litter
   a. Calculate how much total beach litter would be reduced in addition to reductions in the top litter items, additional table to show the percentages of total beach litter
   b. Provide percent share of each item as their share of total beach litter in Table 3 based on monitoring data (need to consider whether it can be presented as an average for the Baltic Sea or separately for the sub-areas in an annex)
   c. Consider whether the activity-pressure contributions can be added for the overall beach litter, averaged either across litter items or across sub-areas (or both)
   d. Litter effectiveness values are lower than expected based on cursory review of raw data. Investigate and respond appropriately.
   e. 100% reductions seem too high
   f. Need to be very clear about what is and isn't included in the effectiveness and pressure reduction values (top litter items, all litter, one item, etc)
   g. Clarify direct input of microplastics
- Fish
   a. Indicate which are assessed based on GES in Table 3
   b. Ensure that the correct spatial scale is used in Table 5
   c. Add comparison to ICES assessments/results to provide reflections and interpretations to the results of achieving GES/state improvements.
   d. Review results for cyprinids in the Gulf of Finland and herring in SD 30-31, and make changes if necessary.
   e. Consider further detailed comments from SE.
- Mammals
   a. Ensure that the correct spatial scale is used in Table 5.1
   b. Consider seeking input from EG MAMA to help with lack of expert responses for some populations and with the interpretation of the results for mammals
   c. Consider further detailed comments from SE.
- Birds
   a. Consider detailed comments from SE.
- Noise
   a. Pressure reductions for impulsive noise: note that future changes in the activity *coastal construction* have not been included in the development of human activities scenarios and examine options of taking it into consideration when calculating the pressure reductions
   b. Add explanations to Table 3.4 to give it the appropriate context
   c. Note that some of the SOM noise results should not be used in place of a literature backed CBA/EIA due in part due to the simplifications of using a single metric of percent reduction

in place of the interacting metrics of decibels and hertz and the combination of noise injury and disturbance into the single pressure of impulsive noise

d. Clarify that as there is no agreed GES threshold for noise, it is not possible to evaluate the sufficiency of existing measures in achieving the objective

- Input of nutrients
    a. Revise pressure reductions from agriculture to correct for an error in the calculations
    b. Change how background nutrient sources are handled by the SOM analysis which will in particular correct the presentation of atmospheric deposition of phosphorus.
    c. Important to discuss the lack of link between input of nutrient and effects of eutrophication and note that information on the link exists but has not been incorporated in the SOM analysis. Consider incorporating the link in later work.
    d. Include information on the pressure reductions per sector/source, if available
    e. Include more information on existing measures considered in the analysis for specific activities and sectors, e.g. agricultural measures, how WWTP plans have been taken into account in the pressure reductions/results
    f. Add discussion and conclusions on how to use the results, e.g. where are the most important gaps and which activities/sectors are still lacking measures
    g. Include short discussion on the importance of transboundary sources of nutrients in some sub-basins and how they are treated in the analysis.
- Non-indigenous species
    a. Add more explanation and interpretation why the projected pressure reductions in the input of NIS are rather low although effectiveness of measures types is high (related to few existing measures that have an effect in the time frame of the analysis and the development of human activities)
    b. Add information on where the gaps are in terms of vectors or activities of the introduction of NIS, discuss where existing measures are needed
    c. Add discussion on the activities and sources outside the Baltic Sea and its consideration and effect on results
- Benthic habitats
    a. Correct legend in the table on activity-pressure contributions
- Most of the measures seems to have an effect of 30% for all pressures they are relevant for (seems unrealistic). An explanation is needed how these numbers have been calculated or assessed.

Editorial changes

- Improve outlook, presentation and explanation of graphs and figures, and provide an example showing how they should be interpreted
- Decimals in data tables could be taken out and numbers rounded to integers
- Add what data have been used in the calculation in each table caption
- Check that NA is always explained in the tables

Schedule of the SOM work in the autumn 2020

Table 1 presents the remaining tasks in the SOM analysis of existing measures and their timetable in the autumn 2020. The work is carried out by the ACTION project, the SOM Platform, SOM topic teams and the HELCOM Secretariat, with input and guidance from HELCOM groups and networks.

First results of the SOM analysis have been provided as background information to the BSAP UP workshops in August and September 2020. Input data to the SOM analysis were sent for validation to HELCOM Working Groups and Expert Groups in August/September 2020. The results of the SOM analysis are also provided to Working Groups' fall meetings for review. Both the main report (see SOM Platform 4-2020 Document 3-1) and topic reports, describing the methodology and results of the analysis, will be finalized by the end of 2020.

Final SOM results will be available in October following SOM Platform 4-2020 and validation of input data by Working Groups and Expert Networks, both taking place in September.

Note that in addition to SOM analysis of existing measures, ACTION project is conducting a cost-effectiveness analysis of proposed new measures for the updated BSAP.

Table 1. Timeline for SOM analysis of existing measures

Task	Responsible	Timing (month in 2020)
BSAP UP workshops	Secretariat, experts	August-September
Validation of input data	Working Groups, Expert Networks	September
SOM Platform 4-2020 meeting	SOM Platform/Secretariat	September
Providing results to Working Group meetings	ACTION/Secretariat	September-October
Preparing overall and topic-specific reports to support BSAP update	ACTION/Secretariat	June-December
SOM Platform 5-2020 meeting	SOM Platform/Secretariat	November