



Baltic Marine Environment Protection Commission

HELCOM expert network on economic and social analyses
meeting

Helsinki, Finland, 3 June 2019

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Background

According to the Strategic plan for the update of the Baltic Sea Action Plan, agreed by HOD 54-2018, analyses of sufficiency of measures (SOM) to reach HELCOM goals and objectives should be carried out. The results of the analyses will indicate whether existing policies are sufficient to achieve good environmental status (GES) in the Baltic Sea and will support the selection of new and strengthened HELCOM actions for the updated BSAP.

This document describes the approach for and components of the SOM analysis. The approach builds on work initiated by the HELCOM SPICE project¹ and HELCOM ESA network. The detailed steps for the analysis have been developed by the HELCOM ACTION project, work package 6. The approach was discussed and has been further elaborated on the basis of the recommendations of the [HELCOM SOM Platform 1-2019](#). The document was made available for commenting by the SOM Platform in the period 5-17 April with one country responding (Germany).

It can be noted that some steps, in particular Step 6, will be further developed during the course of work in communication with HELCOM experts and the SOM Platform.

Action requested

The meeting is invited to

- take note of the information as background for the discussion in the meeting

¹ co-financed by the EU, implemented in 2017

Proposal for the SOM approach – updated 24/4/19

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1. Overall approach

The aim of the analysis of sufficiency of measures (SOM) is to assess whether existing policies are sufficient to achieve good environmental status (GES) in the Baltic Sea. It relies on estimating the status of the marine environment at some specific future point in time, given measures in existing policies, their implementation status, natural time lags, and predicted development of human activities/pressures over this time period. This is called the 'business-as-usual (BAU) status' (Figure 1). If the analysis indicates that GES is not achieved, then existing measures are not sufficient and additional measures are needed (or existing measures strengthened).

SOM analysis includes the following components:

- information on existing measures and their level of implementation, and possible time lags in their effect (Steps 1-2),
- identifying main pathways for pressures based on links between activities and pressures (Step 3),
- estimating the effect of measures on pressures and state (Step 4),
- projections of the development of human activities/pressures (Step 5),
- estimation of the changes in the state of the marine environment due to changes in pressures (Step 6),
- using the information above to assess the projected status of the marine environment (BAU status) by a specific point in time (Step 7),
- comparison of the BAU status to GES and evaluating how far we are from reaching GES, i.e. the sufficiency of measures (Step 7).

The steps are described in detail in Section 2.

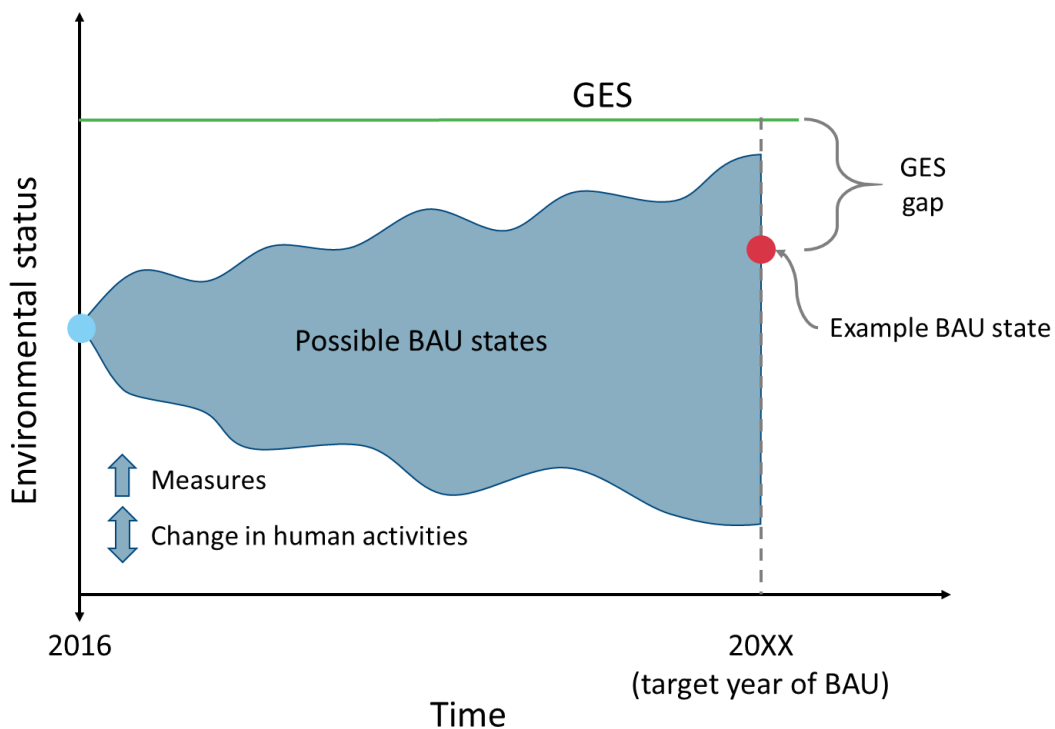


Figure 1. Illustration on the use of the BAU in the gap analysis. Source HELCOM (2018a).

Time frame

The time frame of the BAU should be consistent with the relevant target years of the HELCOM BSAP and the EU MSFD. The time frame should stretch beyond 2020/2021 to allow for more complete impact of existing

policies and measures, but it should not stretch too far into future to avoid uncertainties in changes in the climate and policies.

The kick-off meeting of the SOM Platform suggested to use either 2030 to coincide with the target year for the majority of the UN Sustainable Development Goals (SDGs) or 2033 to coincide with the EU MSFD cycle (Item 3.13 in the [Notes from SOM Platform 1-2019](#)). The HELCOM ACTION project proposes to use the year 2033 to better align with the previous interval between BSAP updates and to better support the model assumption that all accepted measures will be implemented in the time frame of analysis.

Existing policies and measures

Measures that are included in the BAU status need to be clearly defined. For all existing relevant policies (e.g. current BSAP, MSFD, WFD, EU Biodiversity Strategy 2020), implemented measures with unrealized effects on base year pressure levels, on-going (or partially implemented) measures and planned measures² are proposed to be included in the BAU, as suggested by EN ESA 2-2018 (Item 4.3 in the [Outcome of EN ESA 2-2018](#)) and agreed by SOM Platform 1-2019. Thus, it would be assumed that all measures in existing policy frameworks are fully implemented in the time frame of the BAU, independent of their current implementation status, and their effect on reducing pressures would be realized fully in the time frame of the BAU.

An additional analysis was agreed to at SOM Platform 1-2019. It would use the same methodology and included measures at the standard BAU described above, except HELCOM measures would be analysed at their implementation status in the base year rather than under the assumption of full implementation by the target year as is standard. HELCOM measures refers to all measures organized under the HELCOM structure including BSAP and HELCOM recommendations. This analysis provides an illustration how the implementation of ongoing and planned measures affects the state of the sea and where distinction between the two BAU analyses is necessary, the second analysis will be referred to as the BAU implementation analysis (BAUi).

The SOM Platform agreed with the proposal to include in the analysis all types of measures except those related to promotion of research and some administrative measures (i.e. monitoring, coordination, developing SOM indicators, setting targets, developing information systems/tools etc.), which have no direct effect on environmental status.

Environmental themes to cover

It is proposed that the SOM analysis will be carried out for the same environmental themes as in the State of the Baltic Sea report (Figure 2). For some themes a descriptor level evaluation could be appropriate, e.g. to compare the BAU state with the integrated status. For biodiversity, the analyses could be done by ecosystem component, groups of species (e.g. coastal fish) or in some cases by species (e.g. grey seal). For a majority of topics, the status threshold values are proposed to be used as the basis for the analyses. For eutrophication and possibly other pressure-related components, the analyses could rely on pressure targets as agreed in HELCOM. A reflection on this is provided under Section 2, Step 2. Decisions on this aspect will be made in collaboration with SOM topic teams.

For some topics there are no agreed GES threshold values or quantitative pressure reduction targets (e.g. marine litter, underwater noise) in HELCOM, and thus proper gap analysis is not possible. For these topics, it

² Note that the term *existing measures* covers implemented, partially implemented/ongoing and planned/not yet implemented measures in existing policies.

is still possible to assess how much the existing measures will contribute to improving the condition of the Baltic Sea. This is further discussed in Steps 6 and 7.

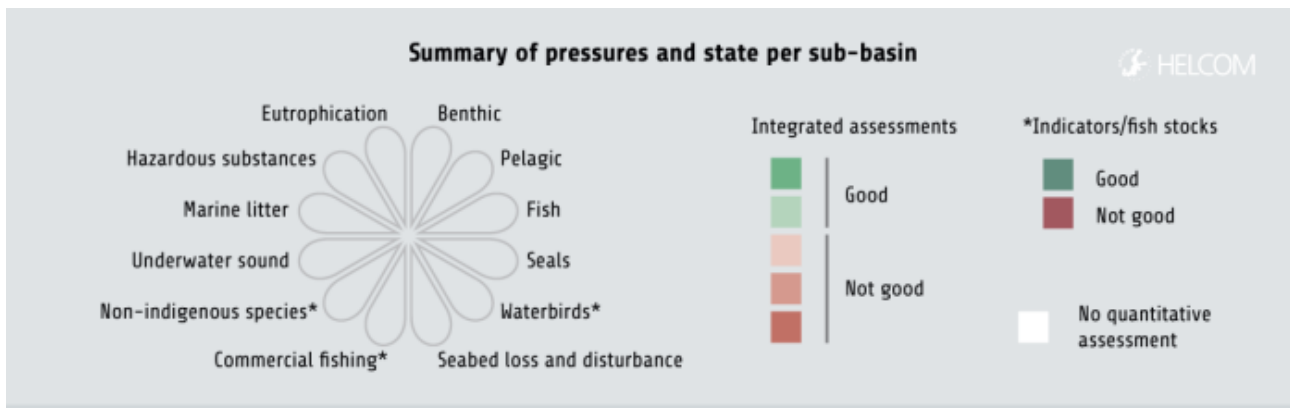


Figure 2. Proposed state components of the SOM analysis.

Geographical scale of the analysis

The geographical scale of the SOM analysis is aimed at supporting decisions from a regional Baltic Sea perspective. However, the SOM analysis will be carried out at the HELCOM scale 2 level where found relevant.

Two sets of geographic scales will be used in the SOM analysis. The first links activities to pressures and will be based on one of two maps for each environmental theme. The first map combines sub-basins that have similar activities and pressures and was developed by the ACTION project, with input from the SOM platform. The map contains six areas – aggregated from the HELCOM scale 2 sub-basins: (1) Gulf of Bothnia, (2) Åland Sea, (3) Gulf of Finland-Gulf of Riga, (4) Northern Baltic Sea Proper-Western Gotland Basin, (5) Eastern Gotland Basin-Gdansk Basin-Bornholm Basin-Arkona Basin, and (6) Basins west of Arkona Basin. When this approach is used all sub-basins with a group are assumed to be identical and gathered data is therefore in practice applied and analysed at the sub-basin level. Alternatively, a single Baltic-wide assessment will be used where appropriate based on data availability and other topic characteristics as determined in consultation with SOM topic teams. These maps will be used during the expert survey in step 3.

The second set of geographic scales will vary across environmental themes and reflect the fewest number of groupings required to accurately describe the measures and pressures relevant to each environmental theme as identified by experts in ACTION/SOM. The scale would not need to be identical to the activity-pressure scale but would also be based on HELCOM scale 2 sub-basins or aggregations thereof. These scales will inform work in steps 1, 4, 6 and 7. The geographical scales must be decided for each of the pressures before carrying out analyses.

Data requirements

Any proposed data inputs represent places where existing data may be incorporated, they are not data requirements. Additionally, there are no requirements for the spatial or temporal coverage. Topic teams are encouraged to be as data rigorous as is possible, but data availability will vary widely between and within topics. While not the desired process, the model can function entirely on expert opinion, and as such concerns over data availability or quality are not necessary.

2. Detailed approach

The proposed approach to carry out the SOM analysis is described in seven steps and follows the overall structure presented above and in Figure 3. The main objective is to assess the sufficiency of measures to achieve GES. This is done by estimating how much existing measures will reduce anthropogenic pressures in the time frame of the BAU, the consequent change in each of the state components presented in Figure 2, and whether this will be sufficient to achieve GES for these components.

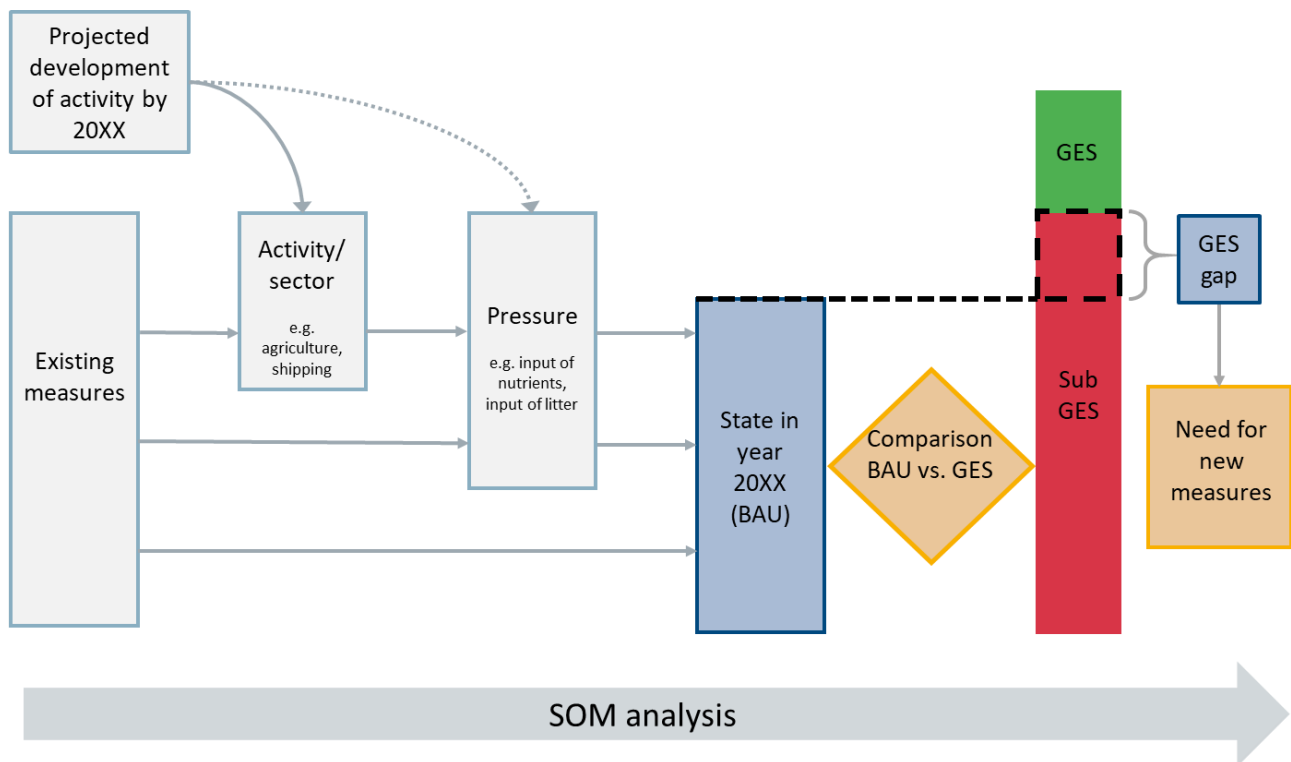


Figure 3. Structure of the SOM analysis: Linking measures with activities, pressures or state components; predicted changes in activities and pressures; comparison of the BAU state with GES; and estimation of the need for new measures.

Step 1. Existing measures

This section gives detailed information on SOM components related to existing measures and their level of implementation.

1a. Identify measures under existing policies (i.e. existing measures) to assess their effect on the marine environment. This includes global conventions, EU directives and regulations, regional HELCOM actions and national measures.

1b. Categorize measures into common groups based on, for example, the general type of the measure (e.g. legal, technical, monitoring, knowledge and awareness), and the key type of the measure (KTM) (as in the EU MSFD and WFD). The categorization will allow for simplifying the analysis (i.e. by aggregating similar type of measures) and linking them with activities and/or pressures (or in case of restoration measures, to state).

A majority of measures are linked with human activities, but some may be linked to pressures (e.g. long-range transboundary pollution) and a few are directly linked to state components (e.g. restoration, restocking) (Figure 3).

- If a measure is linked to an activity, i.e. the activity is restricted or changed, then one can follow the linkage framework and estimate the consequent reduction of pressures (Steps 3-4).
- If a measure is linked to a pressure or a state component (restoration measures), then the effect in Step 4 is directly estimated.

1c. Assess the implementation status of the measure, i.e. whether the measure 1) has been implemented and has unrealized effects on base year pressure levels, 2) has been partially implemented or implementation is ongoing, or 3) is planned to be implemented. The implementation status of the measures may differ by countries, which needs to be taken into account. The BSAP implementation status has been assessed already in previous HELCOM processes, but some other measures (e.g. national MSFD measures) may require such an assessment on the basis of EU Member State reports. This step informs especially Step 2.

Information needed	Data sources	Main contribution
List of measures	HELCOM Explorer HELCOM Recommendations EU MSFD Programmes of measures EU WFD Other EU policies/directives as agreed	ACTION project/secretariat
Implementation status (implemented, partially implemented/ongoing, planned)	As above + EU reports on implementation of PoMs	ACTION project/secretariat, complemented as needed by CPs
Type of measure (e.g. technical, monitoring, knowledge and awareness...)	As above	Initial sorting by secretariat/ACTION project, validation by SOM Platform
Whether a measure has an effect on activity, pressure or state	As above	Initial sorting by secretariat/ACTION project, validation by SOM Platform

Step 2. Estimating time-lags in measure-pressure and pressure-state links

Even fully implemented measures do not always have an immediate effect on the state due to time lags between measures and pressures (e.g. banned substance with persistent use of legacy production) and pressures and state (e.g. benthic communities after trawling).

Consideration of measure-pressure time-lags

- If a measure was fully implemented by the BAU base year, then one needs to estimate whether there could be any time-lag carrying its effect on effected pressures beyond the base year. If no time-lag is estimated to remain, then the effects of the measure should be visible in the pressure status and the measure does not need to be included in the SOM analyses. Otherwise, the measure is included.
- If a measure is only partially implemented or planned to be implemented, then the assumption is made that full implementation, including full effect on effected pressures, will take place by the BAU end year (cf. the urge by Ministerial Declaration 2018 to implement the BSAP). This assumption is partially suspended in the BAUi scenario, where HELCOM measures are evaluated only at the base year implementation status and measure-pressure time-lags will need to be considered during Step 4.

Consideration of pressure-state time-lags

- Pressure-state time lags are not included in the BAU scenario. Instead they will be evaluated as additional information alongside GES thresholds as in Step 7. By separating pressure-state time lags

from the BAU scenario, the effect of measures can be separated from unavoidable time-lags (e.g. population growth) and allow for the consideration of the sufficiency of measures in the case of avoidable time-lags (i.e. topic is projected to eventually reach GES under BAU conditions, but GES could be reached sooner if additional measures were implemented). Additionally, topics with the defining feature of very large pressure-state time lags (e.g. eutrophication) will only be evaluated to the level of pressure in the BAU analysis as it is already known that GES will not be achieved by the BAU target year.

Information needed	Data sources	Main contribution
Data on time lags of effect of measures on state	Literature	Input from SOM Topic teams ³ , ACTION project

Step 3. Identifying main pathways for pressures using activity-pressure-linkages

Assessing the effects of measures means describing how they affect pressures or state either directly or via activities. Thus, the links between activities and pressures need to be identified and quantified. Information on the linkages between activities and pressures is available, for instance, in the activity-pressure matrix of the [TAPAS project](#), and in more detail in similar matrices of the [DEVOTES project](#). These can be used as a starting point to identify the main pathways. A key issue is that the links should be (semi)quantitative and, hence, allow for assessing the relative contribution of the activities to the pressure. This is important for assessing the proportion of the pressure reduction attributable to each activity and for identifying potential new measures. This phase will include an expert survey which is supported by pre-filled information of significant activities for each pressure type. Experts will be asked to estimate the most likely contribution of relevant activities to specific pressures, as well as, the lower and upper bounds of contribution for each relevant activity.

Information needed	Data sources	Main contribution
Links between activities and pressures	Project results (e.g. HELCOM TAPAS linkage matrices , DEVOTES linkage matrices)	ACTION project. Anticipated that existing results can be used
Information on relative contribution to pressures from different activities	HELCOM reports, literature	Input from SOM Topic teams ³ , ACTION project
	Expert-based evaluation	Survey participation by SOM Topic teams, ACTION, HELCOM ENs, EGs, WGs

Step 4. Estimation of effects of measures

When the main pathways between activities and pressures have been identified, one will estimate how much measures will jointly reduce each pressure. In the case of restoration measures, this step will entail estimating how much measures will affect the state components and be used in Steps 6 and 7. The information on effects of measures will be first reviewed from several past and on-going projects and then surveyed from experts using probability scales and given prior information of the likely effects.

Expert evaluation can also be used to survey for possible hidden/neglected pressures that were not identified in Step 3. The relative effects of measures on pressures and state are proposed to be defined as probability

³ ‘SOM Topic teams’ refer to teams of national experts that will contribute to the analyses for topics covered by the SOM Platform, see also [document 5- 7](#) Organization of SOM work.

distributions that describe the probability of different reduction outcomes (e.g. using percentages (%)). The total effect of measures includes the effect of reduction in pressures on state and the direct effect on state.

Information needed	Data sources	Main contribution
Data on effects of measures	National data	Reporting by countries
	Research projects (e.g. BONUS, BLUE2) Scientific literature, studies and models EU MSFD Programmes of measures Sources listed in the SPICE project deliverable on Business-as-usual scenarios EC DG ENV databases (e.g. ARCADIS 2012)	Input from SOM Topic teams ³ , ACTION project on existing measures Input from SOM synopses on potential new actions and measures
	Expert evaluation/validation	Working Groups, Expert Groups, ACTION project, SOM Platform

Step 5. Projected development of human activities/pressures

The other component affecting the BAU state in addition to existing measures is the possible (external) change in activities and pressures due to changes in human behaviour in the time frame of the BAU. This may counteract the effect of existing measures if activities or pressures increase.

This step is proposed to be run as an additional scenario on top of the effectiveness of existing measures analysis. The analysis will be limited to the predominant activities and pressures. As this component would be considered as external to the rest of the framework, the BAU status could be developed by assuming 1) no change and 2) the most likely change in predominant activities/pressures. This would enable assessing how the future change in activities/pressures affects the BAU status.

At minimum, qualitative assessment describing the trend (increasing, decreasing, no change) in the activity/pressure should be made, but quantitative information should be used when available from existing studies. For developing the BAU, the information should be converted into numerical values, e.g. 10% increase in the activity, using expert evaluation when needed. If little information is available, it would be possible to assume something about the change in activities and see how the BAU status changes.

Information needed	Data sources	Main contribution
Information on the future development of activities (qualitative/quantitative)	Literature, sectorial future outlook reports Project outputs (e.g. BONUS) National data (e.g. on EU MSFD Initial Assessments, and MSPD)	secretariat/ACTION/ Input from SOM Topic teams ²
Converting the information into numerical values	Expert evaluation	Working Groups, Expert Groups, ACTION project, SOM Platform

Step 6. Linking reduced pressures with state components

Following the suggestions of the kick-off meeting of SOM platform, the SOM analysis will be structured using the same major pressure themes and biodiversity components as in the State of the Baltic Sea report (HOLAS

II) and other HELCOM agreements. Additionally, the methodology for the SOM analysis will be adaptable to cover both topics with and without established GES thresholds or pressure targets.

Due to the inclusion of projected development (Step 5) in the SOM analysis and the desired ability to rerun the SOM analysis to evaluate the optimal set of additional measures to reach GES if/when a gap to GES is identified, it is necessary to be able to evaluate the effect of the full range of potential pressure changes on state condition. Optimally this would be represented in a series of pressure-state response curves, similar to Figure 4. However, data availability and the presence/absence of GES thresholds will require flexibility in this approach. Qualitative and semi-qualitative options are being considered throughout this step to adapt to topic characteristics. Additional consultation with Topic Teams is required before the approach is fully developed but in general the conceivable methods are as follows:

- When a pressure target exists (e.g. eutrophication), the state will not be evaluated in the BAU model. However, the pressure-state time-lags are included in the final considerations.
- When a GES threshold exists, contributions of pressures to state will be determined. Pressure-state response curves would then be generated through existing data and expert opinion for each identified major pressure(s), which affect the state component. These data would then allow for the calculation of a BAU status and the gap analysis.
- When a GES threshold does not exist, an approximate good status based on qualitative environmental targets set in various HELCOM documents (BSAP, topic specific action plans, ministerial declarations, etc.) is proposed. This will allow for a generalized gap analysis, which can be used in an advisory capacity to express the scale of improvement required to achieve a hypothetical GES.

Two major topics still under consideration in consultation with SOM platform and ACTION partners are (1) whether to link pressure to state improvement or to the probability of achieving GES, which will impact how GES threshold values are used in the model, and (2) how to best link states to multiple pressures. The SOM platform and appropriate HELCOM bodies will be kept informed as this work progresses.

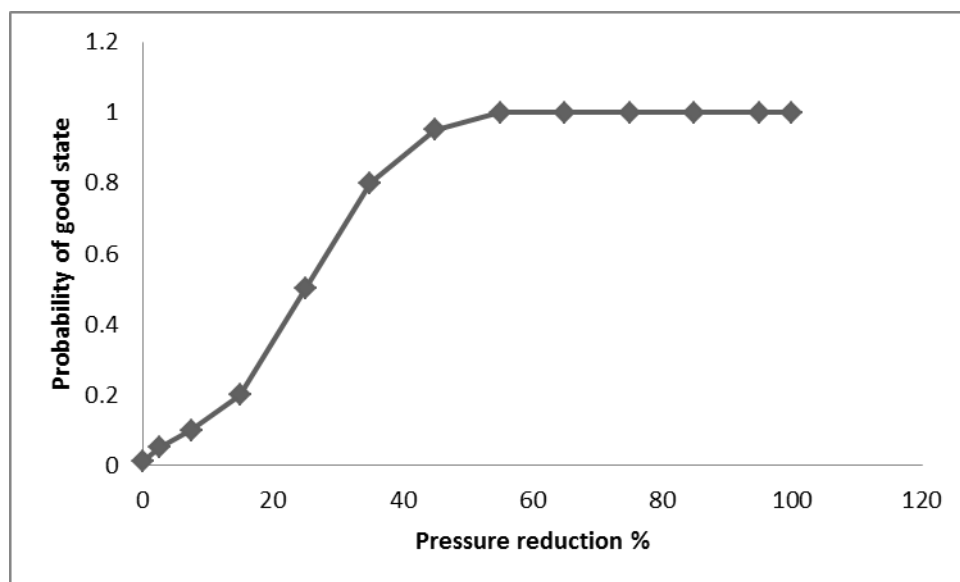


Figure 4. Conceptual pressure-state response curve. The curve illustrates the potential of pressure reduction to improve the state presented as a probability of reaching a good state. Alternative configurations might include semi-qualitative scales or be linked to state improvement.

Information needed	Data sources	Main contribution
Spatial data on pressures and impacts	HELCOM map and data service	Secretariat
Spatial data on state components	HELCOM map and data service	Secretariat
Information for selecting relevant pressures	Baltic Sea Impact Index (BSII) Core indicator reports, ODEMM framework	Secretariat/ACTION project
Responses of indicators/state components to changes in pressures	Previous research projects and reports Scientific literature Existing models	Input from SOM Topic teams ³ , ACTION project
	Expert evaluation/validation	Working Groups, Expert Groups, ACTION project, SOM Platform

Step 7. Comparison of BAU and GES and assessing sufficiency of measures

When the BAU status has been developed, it will be compared with GES to identify whether there is a gap and new measures are needed. The total effect of measures on state is calculated as the reduction of the GES gap resulting from reductions in pressures based on the previous steps. This reduction is proposed to be measured as an increase in the probability of reaching GES for different themes and components. The probabilistic approach further enables an extensive analysis of uncertainty and risk related to the BAU outcome. In addition, the Step 5 results (projected development in human activities/pressures) will also affect the outcome of the SOM analysis. If a pressure is predicted to increase and no measures are in place to control that pressure, the gap to GES may increase.

3. Time table for the SOM analyses

At the topical level, the HELCOM ACTION project will consider measures related to by-catch of mammals and birds, impacts on the seafloor, Marine Protected Areas (MPAs) as a conservation and protection measure, and eutrophication. The SOM Platform will focus its work on complementary topics to the ACTION project, i.e. hazardous substances, non-indigenous species, marine litter, underwater noise, and biodiversity aspects not covered by the ACTION project.

In terms of collecting data and information (for details see tables for each step of the approach), the ACTION project and the Secretariat will coordinate the collation of lists of measures and their implementation status for all topics and contribute to collating existing information on projections of development of human activities. The ACTION project will assess and collate other necessary information for the SOM analyses for the topics covered the project. For topics covered by the SOM Platform the collation of data and information will be done by the Topic teams that have been established to support the analyses of topics covered by the SOM Platform, in line with the proposed task list and time-line for 2019 activities below (for further information on Topic teams see [document 5-7](#)). SYKE, as partner in ACTION project and contributor to the SOM Platform, will carry out the BAU state and gap analysis for all topics, provided that all necessary information is available.

2019 SOM task list and timeline

Task	Outcome/contribution	Timeline
Identify relevant measures frameworks	Very short information document	April
Identify presence of time-lags between measures and pressures	Very short information document	April
Propose geographic scale of analysis	Proposal	April
Expert evaluation: activity-pressure matrix	Participate in survey	April/May

Pressure-state time-lags	Data (models, project outcomes, literature)	June/July
Measure-pressure time-lag verification	Verify time-lag effected measures from list provided by Secretariat	June-August
Measure list verification	Verify no missing relevant measures from list provided by Secretariat	June-August
Effect of measures data	Data (models, project outcomes, literature, national reports)	June-August
Expert evaluation: effectiveness of measures	Participate in survey/workshop	October
Expert evaluation: pressure-state linkage	Participate in survey/workshop	October
Development of future activities	Data (models, project outcomes, literature, national reports)	Late fall
Synopses on potential new measures	Information document	End of year

The ToR for the SOM Platform outlines the preparation of syntheses on potential new actions based on e.g. recent innovation and development projects or successful measures carried out on a national level. The format for such synopses was proposed by HELCOM SOM Platform 1-2019 (Annex 3) and HELCOM 40-2019 agreed that they can be submitted by Contracting Parties, HELCOM subsidiary bodies, international project and observers ([document 5-7](#)). Results from the HELCOM ACTION project will also inform the selection of new actions or strengthened actions. SOM synopses are aimed at being prepared by end of 2019 and the SOM analyses by March 2020. When the synopses and results of the SOM analyses are ready they will be compiled and serve as input to HELCOM Working Groups in support for proposing new HELCOM actions for the updated BSAP e.g. through organizing thematic workshops or similar. The second meeting of the SOM Platform, to be held 16-17 September 2019, will discuss the organization and format for such thematic workshops.

The last step of ToR for the SOM Platform outlines analyses of cost-effectiveness to support the selection of new HELCOM actions. In the HELCOM ACTION project, analyses of cost-effectiveness will be carried out for the topics covered by the project under work package 6.2. Such analyses will take place after the preliminary proposal on new actions. An analysis will then be carried out to evaluate the joint effects of proposed new measures and the cost-effectiveness of proposed measures. Preliminary results of such analyses are anticipated to be ready in autumn 2020.

The more detailed planning of cost-effectiveness analyses will also take place at the next meeting of the SOM Platform. Additional considerations to be discussed before the selection of new actions takes place, as highlighted by Contracting Parties, are e.g. to identify which measures are relevant to implement at the regional level, the sustainability of proposed measures, and to consider the potential to analyse the costs and benefits of the updated BSAP as a whole.

Table 1 outlines some of the central steps of planned work for the SOM Platform and tentative timing of required contributions from HELCOM Working Groups and Expert Groups to support the work as an outcome of HELCOM SOM Platform 1-2019 (Annex 4). HOD will inherently be informed on the progress and tentative proposals at each upcoming meeting. Observers are invited to participate in activities according to normal procedure and workshops and a dedicated stakeholder conference is planned for in 2020 (cf Work plan for the BSAP update).

Timetable for SOM analyses as in Annex 4, meeting of HELCOM SOM Platform-1 2019

YEAR	2019				2020			
Indicative steps	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Approach	ACTION/ SOM proposal 2nd version end of March	GEAR agreement 15-17 May 2019						
Collation of data and information input to analyses		SOM Platform/ ACTION End of June						
Synopses on potential new measures		Lead countries, international projects, NGOs	Lead countries, international projects, NGOs	Lead countries, international projects, NGOs				
2 nd meeting SOM Platform			Week 16-20 September 2019					
Expert-based input to SOM analyses. review of synopses			WGs, EGs, (SOM Platform, ACTION project)	WGs, EGs (SOM Platform, ACTION project)				
Running BAU on existing measures				SOM Platform/ ACTION				
3 rd SOM Platform meeting					March 2020 (joint meeting ACTION WP6)			
Thematic workshops, to discuss results and propose potential new actions						WGs, EGs, experts May/June 2019		
Assess status with potential new HELCOM actions							SOM Platform/ ACTION	
Cost-effectiveness analyses							SOM Platform/ ACTION	
4 th SOM Platform meeting							September 2020	
Continued elaboration and endorsement of new/strengthened HELCOM actions							WGs	WGs
[Benefits of the BSAP as a whole]							SOM Platform	SOM Platform

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