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Background

The update of the HELCOM Baltic Sea Action Plan will be supported by analyses which estimate the sufficiency of existing measures and the cost-effectiveness of new measures in achieving the good environmental status of the Baltic Sea. The results of assessing the sufficiency of existing measures are described in [document 5-3](#). This document describes the method and progress of the cost-effectiveness analysis of proposed new measures for the updated BSAP. The cost-effectiveness analysis is conducted by the HELCOM ACTION project, with guidance from the SOM Platform.

SOM 3-2020 took note that the cost-effectiveness analysis is focused on the costs for the whole Baltic Sea region and not the costs of individual countries, but national information on costs will be utilized and cost estimates may be transferred across countries with appropriate adjustments ([Outcome](#) of SOM 3-2020, para 6.8). Data on the costs and effectiveness of potential new measures have been compiled from the synopses, via literature reviews and using data collected for the SOM analysis by the ACTION project. In addition, as agreed by GEAR 22-2020 ([Outcome](#), para 4.31), EN ESA supported the data collection by providing national cost estimates ([Outcome of EN ESA 9-2020](#)). Estimates of the effectiveness of proposed new measures collected by the ACTION project have already been provided to the BSAP UP workshops (see e.g. [Document 2-4](#) for BSAP UP WS-HZ 2020).

HOD 58-2020 took note that the cost estimates and results of the cost-effectiveness analysis for new measures would likely be available in October-November 2020 ([Outcome](#), para 4.39). GEAR 23-2020 took note that the results of the cost-effectiveness analysis might be used in the further drafting process for the actions for the updated BSAP that are not yet agreed in principle by HOD 59-2020 ([Outcome](#), para 4.25).

This document provides a description of the approach and progress of the cost-effectiveness analysis and the status of cost and effectiveness data collection.

Action requested

The Meeting is invited to consider the cost-effectiveness analysis of proposed new measures.

Analysis of cost-effectiveness of new measures

In addition to analyzing the sufficiency of *existing* measures (SOM analysis), the work plan for the BSAP update includes analyses of potential *new* actions in the updated BSAP (costs and effectiveness). The aim is to re-run the analyses of sufficiency of measures including proposed new HELCOM actions and prepare analyses of cost-effectiveness of potential new HELCOM actions.

The cost-effectiveness analysis of new measures builds on the assessment of sufficiency of existing measures to reach good environmental state in Baltic Sea. If the existing measures are not sufficient to close the gap between the current and the good state, then new measures are required, and information on their cost-effectiveness can support the BSAP UP process. The cost-effectiveness analysis studies and compares how effective new measures are in closing the gap between the BAU scenario(s) estimated in the SOM analysis and the good state, when also the costs of the new measures are taken into account. In principle, cost-effectiveness analysis can be used to define a set of measures that is adequate to reach a certain environmental objective with the lowest costs, or to define a set of measures that performs best in reaching an environmental objective, given a budget-constraint on the maximum costs. Cost-effectiveness of new measures will be analyzed following the steps and methods described by Kontogianni et al. (2015) and Oinonen et al. (2016). See below for more detailed information of the approach and steps for the cost-effectiveness analysis. The cost-effectiveness analysis is focused on the costs (and effectiveness) for the whole Baltic Sea region and not the costs of individual countries. However, information on costs from different countries will be utilized to estimate the regional costs, and cost estimates may be transferred across countries if needed with appropriate adjustments.

This document outlines the ongoing cost and effectiveness data collection process and describes how these data will be used in the analysis, as well as possible results of the cost-effectiveness analysis. The collected data will be used in a way that allows the comparison of costs for variety of measures, when different types of costs are included in the analysis. Probabilistic methods and cost categories will be used in the analysis and to present the results. Cost data contributors include EN ESA, ACTION WPs, SOM topic teams, and the same parties who have taken part in filling in the synopses on measures and most of these have already contributed to the cost collection. Also, experts responsible for the cost-effectiveness analyses for national MSFD POMs are encouraged to contribute, since there can be synergies between national and regional work.

The data on the effectiveness of new measures has been collected mainly through ACTION WPs, SOM topic teams, literature and from the synopses on potential new actions. The data were combined from all these sources as a document to the BSAP UP workshops in August-September 2020. Further, expert-based data on the measure type effectiveness that is used in the SOM analysis and in the cost-effectiveness analysis of new MSFD programmes of measures in Finland could potentially be applied also to estimate the effectiveness of new measures for similar measures/measure types.

The cost-effectiveness analysis builds on the same model as the analysis on the sufficiency of existing measures (SOM) and thus the results are produced either for the HELCOM sub-basins or for the Baltic Sea level. The analysis can in principal be conducted regionally, by sub basin, or nationally and thus it can also support the update of national programmes of measures (PoMs) and vice versa. However, the use of different spatial levels may require aggregation of data for a regional, Baltic-wide, analysis, or that aggregated data weighted by, for example, sizes of national marine areas is used for more disaggregated spatial areas. These issues have to be taken into account especially when interpreting or comparing the results of cost-effectiveness analyses. The extent of implementation cannot be explicitly defined for many of the proposed new measures, and therefore the effectiveness and costs are analyzed using low-medium-high scenarios for the extent of implementation.

Approach and steps for the cost-effectiveness analysis

- a) Identification of potential new measures based on synopses (incl. existing but non-implemented ones) (finished);
- b) Effectiveness of new measures: Building on the method framework for the sufficiency of measures analysis, the effectiveness of new measures is defined in a similar way as for the SOM analysis (i.e. reduction % of a pressure from an activity) (ongoing) (see next section);
- c) Joint effects of new measures: The joint effects of new measures are estimated by evaluating two kinds of overlaps:
 - Thematic overlap in measure types due to their existence on different policy levels (global, EU, HELCOM, national) or overlapping content (e.g. MPAs in general vs. fishing closures in a specific area);
 - Chain effects of measure types in reducing pressures. Assuming that measures take effect in a chain, a measure can only impact the pressure share that remains after the preceding measures. As the pressure reductions are in percent (%), the chain effect needs to be taken into account.;
 - More detailed method presentation of the joint effects in the SOM analysis is given in the [SOM methodology document](#), section 14.
- d) Cost collection and estimation: See a separate section;
- e) Scaling the effectiveness and costs of new measures based on the scenarios of the extent of implementation;
- f) Analyzing cost-effectiveness of individual new measures and sets of new measures: a cost-effectiveness analysis will be conducted for the proposed measures covered by the cost and effectiveness estimates. The cost-effectiveness results are primarily given for (optimal) sets of new measures but cost-effectiveness of individual measures excluding the joint effects can also be produced. The method in Oinonen et al. (2016) is used as the basis, but inspiration is sought from Kontogianni et al. (2015), Saikkonen et al. (2018) and ongoing and recent projects. New measures may be assessed in terms of their cost-effectiveness with respect to reaching good environmental state and possible budget constraints, certainty and other relevant aspects. Since the same approach is used for the cost-effectiveness analysis as for the SOM analysis, possible results could include:
 - effectiveness of individual measures in reducing pressures from activities with respect to costs;
 - total costs of all measures or subsets of measures with respect to improvement in state or probability to reach good state (averaging over state components per topic, or relying on other methods of aggregation);
 - cost database of the collected cost data.

Cost estimation

Steps to cost estimation for proposed measures for the updated BSAP are summarized in Table 1.

TABLE 1. CONCRETE STEPS TO ESTIMATE COSTS OF PROPOSED NEW MEASURES	
1.	List the proposed new measures that will be included in the analysis. (finished including identification of overlaps and dependencies among the synopses to prevent double counting in the cost and effectiveness estimation for groups of measures)
2.	Create causal pathways for implementation of the proposed new measures included in the analysis to understand who are affected by the measures and how (from expert workshops, synopses, descriptions of existing measures, reports...). (mainly disregarded due to time constraints)
3.	Identify the types of costs for proposed new measures based on causal pathways (from CEA reports, cost-guidance). (finished, the relevant information is stored in the cost database)
4.	Considering the cost types for proposed new measures, review available cost estimates and existing data sources that can be used to define the costs of proposed new measures. (ongoing, the cost database is described in more detail in "Cost data collection")
5.	Cost transfer and estimation: Categorical costs and/or probabilistic approaches will be used for calculating and presenting the costs due to multiple sources of uncertainty along the cost estimation process. The differences between countries and basins will be considered when transferring the collected cost estimates for different areas in order to estimate the total and basin/country specific cost estimates. Cost and effectiveness estimates will be scaled based on the extent of implementation scenarios (ongoing).
6.	Data validation and data gaps in existing cost data. Additional actions: expert opinion etc. (likely disregarded due to time constraints)

Effectiveness data collection

ACTION WP6 has already collected effectiveness data from the following sources:

- 1) Synopses of the proposed new measures (finished);
- 2) References listed in the synopses, with the types of sources listed below (finished);
 - a. peer-reviewed literature;
 - b. grey literature such as project reports;
- 3) ACTION project outcomes (finished);
- 4) Expert-based data collected for the SOM model, and identification of the links of new measures to the measure types in the expert surveys (finished);
- 5) Update the effectiveness estimates with the outcomes/notes from the BSAP workshops (finished).

The data above was combined from all these sources as a document to the BSAP UP workshops in August-September 2020 (see e.g. see e.g. [Document 2-4](#) for BSAP UP WS-HZ 2020). The following will be considered for further collection of effectiveness data depending on time/human resources:

- 1) Use the literature reviewed for the cost data collection when it includes suitable effectiveness estimates (ongoing).

Cost data collection

ACTION WP6 has developed a database template to support the collection of cost estimates and to use these estimates to assess the costs of new measures. Database will be applied for the collected data for storing and estimating the costs for the Baltic Sea. A draft of the database including cost estimates will likely be provided as a late document.

ACTION WP6 has already collected cost data from the following sources (in parentheses details on the progress and timing):

- 1) the cost descriptions in the synopses of the new measures (finished);
- 2) references listed in the synopses (finished);
- 3) The literature that have been reviewed for the effectiveness of existing and new measures (includes notes if cost data exists) (finished);
- 4) Cost data provided from ACTION WP2 estimation (finished);
- 5) Reviewing the cost estimates and relevant studies conducted for the Finnish Water Framework Directive (finished);
- 6) Finding synergies with the Finnish cost-benefit analysis for MSFD POMs. A survey to collect the costs of new measures for the Finnish MSFD POM is currently open. At minimum 53 of the proposed Finnish MSFD measures overlap at least partly with the new BSAP measures, and the collected costs may be used to assess the magnitude of the costs of new BSAP measures. Such synergies may also exist with other contracting parties;
- 7) Data collection for national and other estimates from other project partners, contracting parties and HELCOM EN ESA representatives. A simplified version of the costs database was created to facilitate the data collection. Cost estimates were provided by Finland, Estonia, Latvia, Lithuania and Sweden.

The following sources and approaches are still considered for further collection of cost data depending on time/human resources:

- 1) Searching relevant databases of scientific and other literature with the economic terms (e.g., “cost” or “value”), likely combining them with the search strings and terms that have been used for effectiveness of measures;
- 2) Conducting joint searches for the effectiveness and costs of new measures. In principle, the costs and effects of measures can be separate inputs to the cost-effectiveness analysis, but the use of the cost data that can be acquired from the same literature as effectiveness data is prioritized (ongoing, included in the estimation of implementation extent);
- 3) Checking the peer reviewed cost estimation studies that have been included in the systematic literature reviews in the BONUS ROSEMARIE project and going through grey literature that was collected in the same project but excluded from the reviews (partly disregarded due to time issues and overlaps with other data sources);
- 4) Conducting specific literature searches for proposed measures where the causal pathways were described concretely enough in the synopses to define cost items (ongoing, included in the cost estimation).

Timeline for the analyses of new measures

In the workplan for the BSAP update, the analyses have been planned for the fall of 2020. Previously, it was anticipated that results of the cost-effectiveness analysis could be submitted to the Working Group fall meetings, but this was not possible. HOD 58-2020 took note that the cost estimates and results of the cost-effectiveness analysis for new measures would likely be available in October-November 2020 ([Outcome](#), para 4.39). When ready, the results of the cost-effectiveness analysis will be sent to Working Groups for intersessional review.

References

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