Baltic Marine Environment Protection Commission

HELCOM Platform for sufficiency of measures — SOM Platform 2-2019

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Background

The HELCOM ACTION project includes the step of analysing cost-effectiveness of proposed new actions for the updated BSAP and this step is also mentioned in the ToR of the SOM Platform. In the synopses on tentative new actions for the updated BSAP, information on cost-effectiveness has been asked for, if available. This document provides a general description of the approach for the cost-effectiveness analysis and the steps involved, as well as a guidance for providing cost data (Annex 1) for a more elaborate evaluation of costs of measures, proposed to be carried out only for the 'short-list' of proposed actions for the updated BSAP selected in the thematic workshops in spring 2020 (see document 4-3 Proposal on an approach for the selection of new actions for the updated BSAP). The guidance has been discussed at EN ESA 4-2019 and 5-2019 meetings.

Action requested

The Meeting is requested to:

- consider the approach for analyzing cost-effectiveness of new measures
- consider the proposed guidance for estimating costs of new actions and identify tentative contributors.

Cost-effectiveness analysis of new measures, including guidance for providing cost data

Cost-effectiveness analysis of new measures

Detailed cost-effectiveness analysis will take place for a 'short-list' of new actions that are proposed to be selected according to agreed criteria in thematic workshops in the spring 2020 (see document 4-3 Proposal on an approach for the selection of new actions for the updated BSAP). Rough estimates of cost-effectiveness collected in the synopses of measures could also be used as selection criteria to rule out measures that are obviously not cost-effective. However, care needs to be taken so that measures that may be cost-effective are not accidentally excluded from the analysis.

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 their cost-effectiveness needs to be analyzed. 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 measure 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.

Annex 1 of this document outlines guidance for providing available cost data on proposed new measures to support the cost-effectiveness analyses. These data can then be used in a way that allows the comparison of costs for variety of measures, when different kinds of costs can be included in the analysis. In addition to asking for the sources of costs related to each measure, the cost guidance asks for existing cost estimates and their uncertainties. Further expert validation may be required to complement this data, and especially to assess the uncertainties of measure costs. Tentative cost data contributors include EN ESA network, ACTION WPs, SOM topic groups, and all the same parties who have taken part in filling in the synopses on measures.

The data on the effectiveness of new measures will be collected mainly through ACTION WPs, SOM topic groups, and some available estimates may also come from the synopses on potential new actions. Further, surveyed data on the measure type effectiveness that is used in the SOM analysis can be applied also to estimate the effectiveness of new measures. Joint effects, aka synergistic or antagonistic effects of measures will be identified and assessed using the activity-pressure-state linkage chains.

The cost-effectiveness 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. 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.

Approach and steps for the cost-effectiveness analysis

a) Identification of potential new measures (incl. existing but non-implemented ones).

b) Effectiveness of new measures: Building on the method framework for the sufficiency of measures analysis, a common method will be developed for recording the effectiveness of measures, following Oinonen et al. (2016). Information on effectiveness of potential new measures will be collected as described in document 2-2 Proposed methodology for assessing effectiveness of measures and pressure-state response, and outcomes of other projects. If necessary, targeted and facilitated interviews are carried out among the experts producing the results. The effectiveness will be estimated as % of the GES gap to be covered and it can be expressed on a probability scale.

c) Joint effects of new measures: The joint effects of new measures will be estimated by evaluating possible additive, synergistic or antagonistic effects of all the measures on all gaps to GES. This will be collected by using the linkage framework developed for the SOM approach and analyzed following Saikkonen et al. (unpublished) from existing literature, projects and expert evaluation. Confidence of the estimation is expressed by probability, as in the overall SOM approach (Uusitalo et al. 2016).

d) Cost estimation: Guidelines are developed for providing available cost data on proposed new actions for the updated BSAP (see Annex 1 on Guidance for providing available cost data on proposed new actions for the updated BSAP).

e) Finding optimal sets of new measures: Cost-effectiveness analysis will be run for the 'short-list' of proposed actions for the updated BSAP selected in the thematic workshops in spring 2020 (see document 4-3 Proposal on an approach for the selection of new actions for the updated BSAP). The method in Oinonen et al. (2016) is used as the basis, but inspiration is sought from Kontogianni et al. (2015), Saikkonen et al. (unpubl.) and on-going and recent projects. New potential measures are presented in terms of their cost-effectiveness, certainty and other relevant aspects, over all topics or for each topic separately.

Annex 1: Guidance for providing available cost data on proposed/new BSAP measures

Background and general guidelines for providing cost data for new measures

The purpose of this document is to provide guidance for collecting information on *cost* data on proposed/new BSAP measures. Cost data can be used to analyze the cost-effectiveness of new measures to achieve good environmental state in the Baltic Sea. The cost-effectiveness analysis for new measures builds on an 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 their cost-effectiveness needs to be analyzed. Note that a more elaborate analysis of cost-effectiveness, as outlined in this document, is only planned for when a more detailed selection of actions for the updated BSAP has been proposed (a so-called short-list of proposed actions).

In principle, the costs and effects of measures are separate inputs to the cost-effectiveness analysis, but ACTION WP6 is also interested in existing models and their results that take both costs and effects into account (for example the Displace model). In general, ACTION WP6 will only gather available cost data that can be applied to analyze cost-effectiveness, and therefore it is asked that possible contributors do not start estimating any new cost values without discussing it first with ACTION WP6 participants. Thus, if a contributor wishes to take part in the cost estimation, please consult ACTION WP6 to ensure that the methodology applied for cost estimation is compatible with the approach.

Provided cost data can include anything from the description of different agents and institutions that are affected by the implementation of the measure to the actual measure cost estimates (also qualitative and relative cost estimates are welcomed, in addition to monetary). In addition to cost estimates for new measures, ACTION WP6 is interested in the available cost estimates that have been used in the previous analyses for MSFD, BSAP, WFD and other relevant policies. Any references to such documents are appreciated.

The reported cost data can be used in the cost-effectiveness analysis as such or as an input for cost calculation. The cost data used in the analysis may further be validated by expert evaluation. To harmonize the analysis among measures the partners of WP6 will choose what types of costs related to measures are included in the analysis. Therefore, it is suggested that possible contributors provide as disaggregated cost data as possible for each measure. Further instructions for disaggregated cost reporting are given in section 3.

Short introduction to different types of costs

The costs of measures can be defined from different perspectives. From the perspective of a whole economy, the **economic costs** are assessed based on the impact on total welfare of a society, whereas the costs for an individual agent (e.g. firm), an institution (e.g. body responsible for implementing a measure) or a sector (e.g. agriculture) do not include the economic effects encountered by others.

Opportunity costs refer to costs of foregone opportunities. For example, a measure that restricts fishing in a certain area can decrease the profitability of the fishing sector, and this economic loss is an opportunity cost resulting from such a measure. Fishing restrictions can also impose **out of the pocket (financial/accounting) costs** for the institution that is implementing the measure and for the sector/agent that the measure is targeted to. For the implementing institution, financial costs include **direct costs**, such as labor costs of monitoring and fish stock assessment, and **indirect costs,** such as overhead costs of the whole institution or the depreciation costs of general multipurpose monitoring equipment. For a sector/agent, financial costs can result, for example, from an increased use of fishing efforts and requirements for new fishing equipment. The distinction between direct and indirect costs is that direct costs can be traced to the measure, whereas indirect costs are more difficult to allocate to specific cost objects. The costs for the same types of measures are often similar. As an example, the

common cost types related to marine protected areas are listed in Table 1 (Naidoo et al. 2006). **Capital costs** are fixed one-off expenses incurred by the purchase of some tangible or intangible goods that can be used over a longer time period. For example, a capital cost can be the cost to purchase a boat for fishing monitoring.

Table 1. Example cost types and descriptions for marine protected areas.

Cost type	Description
Direct/Indirect, Capital cost	Acquirement of property rights for protected areas
Direct/Indirect	Management of a conservation program.
Transaction Direct/indirect	Negotiating an economic exchange of property rights
Opportunity cost	Damages to economic activities arising from conservation program
Opportunity cost	Foregone commercial opportunities

Discount rate is needed in order to estimate the net present value of costs resulting from a measure extending over multiple years (or some other longer time period). It is a rate that is used to discount future costs to present value. Especially for measures whose implementation require future one-off capital costs, or if the measure costs are unequally distributed over the assessment period (unequal annual costs), the discount rate can have a significant impact on the net present cost value.

Taxes, subsidies and interest on borrowing are direct transfers between agents and institutions of an economy and do not therefore constitute an economic cost. However, ACTION WP6 is interested in all economic incentives used for measure implementation and thus they should also be reported.

Possible formats for providing available information on measure costs

Table 2 can be used as a format for reporting the costs for new measures. An example of using the format of Table 2 on a sub-measure of a measure is provided in Table 3. The same format can also be used to provide available data on existing measures based on, for example, available cost-effectiveness analyses. However, this can be time consuming and thus reports on cost data for existing measures can also be reported as references and their short summaries.

The steps to provide information on the costs related to a certain measure using Table 2 include:

A. Definition of what is included in a measure in the table name. Can a measure be divided into more detailed sub-measures? Costs can be broken down to separate tables by sub-measure.

B. Description: Identification of agents affected and institutes involved by the implementation of a measure. Identification of agent activities (preferably from MSFD activity list) affected and institutional involvement required by a measure.

C. Cost type: Determination of cost types related to activities and involvement. What kind of involvement is required? How is the activity of an agent affected? Are the costs direct, indirect, opportunity costs, capital costs, or costs of some other type?

D. References: Assessment of data sources that can be used to estimate the costs. What kind of data are available? Are there available cost estimates? Are there other data available that can be used to estimate the costs?

E. Estimate: What are the estimated costs? If there is a cost estimate available, provide it here.

Also provide the currency and time unit (per year or other) and possible uncertainty of the cost estimate.

F. Time aspects: Definition of temporal scope of the costs. Are the costs annual or are they non-recurring such as capital costs? What is the life-time of the cost estimate/measure? If existing measure is reported, provide also the year of estimation.

G. Notes and methodology: Description of methods used to estimate the costs, if an estimate for costs is provided. What was the method used to estimate the cost? What is included in the cost estimate? What was the discount rate used for estimation? Is the cost estimate national, regional or for sub-basin or some other geographical unit?

H. Add all available **data on taxes, subsidies and other economic incentives** that may be used for the implementation of the measure at the end of the table.

It is important to identify different costs that can be associated to a measure, even if their estimated values are not available!

Table 2. Format on reporting the measure costs for measure/sub-measure defined in step A.

B. Description	C. Cost type	D. References	E. Estimate	F. Time aspects	G. Notes and methodology
H. Additional data on taxes, subsidies and other economic incentives					

The example presented in Table 3 shows how the costs have been estimated for a (sub) measure included in the Swedish MSFD POM: Introducing new fishing regulation to protect threatened coast spawning stocks inside trawling boundaries (measure): a ban on cod fishing inside the trawling boundary in Skagerrak and Kattegat (sub-measure) for a 4-year period (Vretborn, 2016). In this example the data sources vary across the costs, but for some measures there may already exist cost evaluation reports that can be used as uniform sources (for an example see Bacher and Albrecht (2013) on Evaluating the costs arising from new maritime environmental regulations).

For available cost estimates that have been used in the previous analyses for MSFD, BSAP, WFD and other relevant existing policies, the references for reports and other documents can be provided simply by writing a short summary of the report/document and providing a reference/link to it. Reports in other languages than English are welcomed as well.

Table 3. Costs of Swedish PoM sub-measure 4: a ban on cod fishing inside the trawling boundary in Skagerrak and Kattegat for a 4-year period

B. Description	**C. Cost type**	**D. References**	**E. Estimate**	**F. Time aspects**	**G. Notes and methodology**
Decrease in commercial fishing, **MSFD activity:** fish and shellfish harvesting	Opportunity cost	The 2014 Annual Economic Report on the EU Fishing Fleet.	700 x 10^3 SEK/year	Annual, for 2016-2020 (?) Estimated in 2016	Decrease in value added of commercial fishing.
Decrease in recreational fishing, fish and shellfish harvesting	Opportunity cost	SCB (2013). Fritidsfisket i Sverige 2013.	8 000 x 10^3 SEK/year	Annual, for 2016-2020 Estimated in 2016	Decrease in consumer surplus from recreational fishing.
Recreational fishing monitoring	Direct/indirect	Interview survey on monitoring of recreational fishing	4 800 x 10^3 SEK/year (range: 3200-6400 x 10^3 SEK/year)	Annual, for 2016-2020 Estimated in 2016	
Commercial fishing monitoring	Direct/Indirect		Not available		
New fishing regulation	Capital Direct/Indirect	Estimate based on previous experience	350 x 10^3 SEK/year	Annual, for 2016-2020 Estimated in 2016	
Analyses of fish stocks, Research, survey and educational activities	Direct/Indirect	Estimate based on previous experience	200 x 10^3 SEK/year	Annual, for 2016-2020 Estimated in 2016	

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