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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 to reach HELCOM goals and objectives should be carried out to support the selection of new and strengthened HELCOM actions for the updated BSAP. These analyses will be carried through two connected activities:

1) The HELCOM platform for analyzing sufficiency of measures (SOM Platform), established by HOD 55-2018.
2) The HELCOM ACTION project which is co-funded by the EU and will run in 2019-2020.

These activities will jointly and in coordination prepare analyses of sufficiency of measures for topics addressed by HELCOM. HELCOM Working Groups will guide the activities and review the results which are aimed at supporting the agreement on new or strengthened HELCOM actions. Of particular relevance to the Fish Group is the HELCOM ACTION project which will address effectiveness of measures to reduce by-catch of mammals and birds and measures to reduce the impact of human activities on seabed habitats, including from fisheries.

This document includes a brief introduction to the organization of work, the ToR for the SOM Platform, and an extract of the HELCOM ACTION project application. Both activities will be initiated by kick-off meetings in February 2019. Contracting Parties have been invited to nominate participants to the SOM Platform by 15 January 2019 and to inform on possibilities to take the Lead on specific topics that will be analyzed through the SOM Platform. The planned work will require e.g. collation of information in existing measures to reduce pressures or improve the environmental status in the Baltic Sea region. Information on the effectiveness of existing measures and syntheses on the potential effect new measures will also be prepared to support the analyses.

Action requested

The Meeting is invited to:

- take note of the establishment of the HELCOM SOM Platform and the planned analyses to support the BSAP update under the SOM Platform and the HELCOM ACTION project.

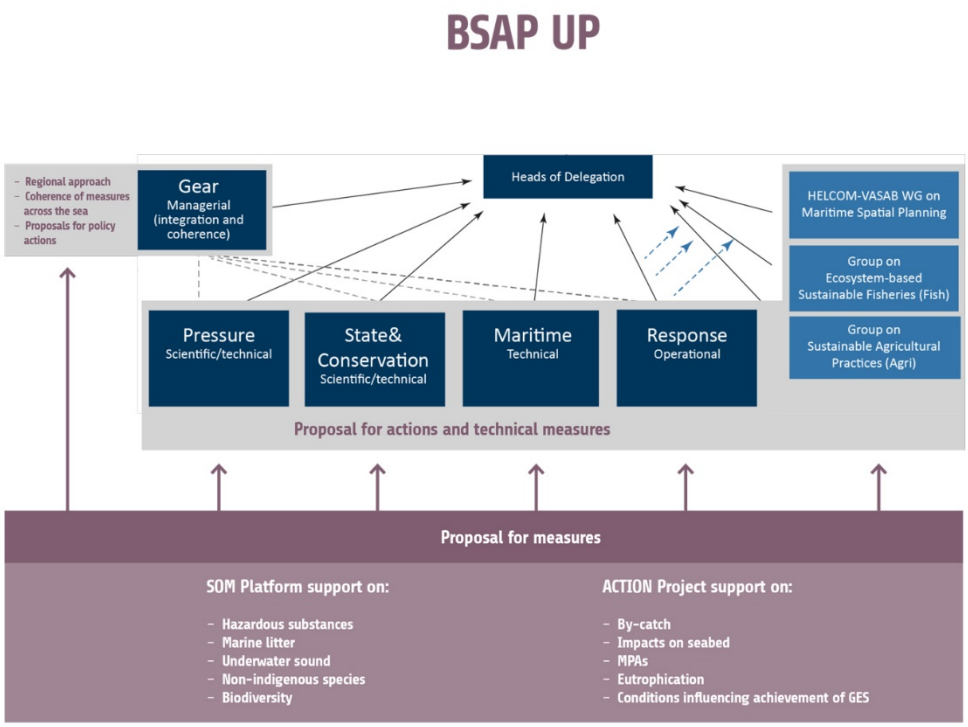
Analyzing sufficiency of measures

In order to support the update of the BSAP an analysis of the sufficiency of existing measures to achieve good environmental status in the Baltic Sea will be carried out. These analyses will be based on analyzing measures implemented through HELCOM (BSAP, Ministerial Declarations, HELCOM Recommendations) as well as under other policies that contribute to the improvement of the Baltic Sea. The analyses will be carried out by the HELCOM SOM Platform and the HELCOM ACTION project. The two activities will specifically address:

- SOM Platform: hazardous substances, marine litter, underwater noise, non-indigenous species, selected biodiversity aspects,
- HELCOM ACTION project: by-catch of mammals and birds, impacts on the seabed (including from fisheries), MPAs as a measure to protect biodiversity, and eutrophication.

The two activities aim at using coherent approaches and to work in a coordinated manner. For an overview of the planned approach to analyze sufficiency of measures see description of WP 6 of the HELCOM ACTION project. Both activities have starting dates in early 2019 and will continue work throughout 2020.

The analyses will be carried out in an interdisciplinary manner by expertise on economic and social analyses as well as expertise on the specific topics to be addressed. The plans for the activities will be presented for guidance and review by the HELCOM Working Groups during the course of work. In 2020 HELCOM workshops are planned to be arranged (cf Workplan for the update of the BSAP, activity 2.6) to discuss the outcome of the analysis and use it as a basis for identifying the need to strengthened existing HELCOM actions or to agree on new HELCOM actions to be included in the updated BSAP.



Participants: HELCOM Economic and Social Analaysis (ESA) network, topical expertise, Chairs of WGs, national focal point for BSAP update, first meeting in Feb 2019.

Participants: Partners of the HELCOM coordinated, EU co-financed, ACTION project, first meeting in Feb 2019.

ToR for an ad hoc HELCOM Platform on sufficiency of measures (HELCOM SOM Platform)

(as agreed by HOD 55-2018)

The purpose of the platform is to support the update of the HELCOM Baltic Sea Action Plan (BSAP) with regard to analysing sufficiency of measures to reach HELCOM objectives and targets, and to support identification of new actions (cf. activities 2.5 and 2.6 of the Strategic Plan for the BSAP update). The first meeting of the platform will be held in February 2019.

The SOM Platform will:

- Summarize existing knowledge that can support decision on HELCOM actions
- Identify need for collection of information on other measures than those agreed in HELCOM (for some topics through ACTION project)
- Further develop the regional BAU/sufficiency of measures approach under the guidance of GEAR and for approval by HOD (through ACTION project)
- Plan for regional BAU/sufficiency of measures for the prioritized topics for which a quantitative approach might be taken and for other topics for which an expert based evaluation is required or more suitable
- Carry out analyses of sufficiency of measures
- Make proposals on new actions based on analyses of sufficiency of measures and on synthesizing existing information on effectiveness of potential new measures
- Possibly, towards end of process, carry out analyses of cost-effectiveness of proposed new actions.

1) Syntheses of knowledge:

Time-line: February 2019 – December 2019

The work will start from synthesizing existing knowledge to support the regional analysis of sufficiency of measures and the identification of potential new HELCOM actions to be included in the updated BSAP (cf. page 3, Strategic Plan for the BSAP update). The syntheses could focus on potential new measures and their effectiveness, conservation approaches and impacts of climate change, and are anticipated to build e.g. on results of recent BONUS projects.

Task of the SOM Platform

- Identify for which of the prioritized topics that existing syntheses can be used to support the BSAP update and for which topics that new purpose-made syntheses should be developed.
- Develop instructions for carrying out the syntheses e.g. structure, content, type of information to be collected, indicative length.

The Task of the SOM Platform is to be carried out at the kick-off meeting. Contracting Parties will be invited to offer the lead for preparing the synthesis. The syntheses will be reviewed by relevant EGs and WGs.

2) Collection of information on existing measures:

Time-line: January – September 2019

HELCOM actions only represent part of the actions taken to mitigate pressures on the Baltic Sea. To support the analysis of sufficiency of measures a compilation of additional measures implemented through other policy requirements is needed (cf. Activity 4c in the Strategic Plan for the BSAP update). The collected information, together with information on the level of implementation of HELCOM agreements, will be used for establishing the regional BAU scenario (item 3).

Task of the SOM Platform:

- Identify relevant additional policies and propose how to carry out the collection of information on other (than HELCOM) existing measures and their level of implementation (cf. Activity 4c in the Strategic Plan for the BSAP update)

The task will be carried out at the kick-off meeting. The collection of information could be supported by a dedicated staff at the Secretariat. Contracting Parties will be offered to review and complement the information.

3) Establish a business as usual (BAU) scenario for the purposes of the BSAP update.

Timing: February 2019-end 2019

The analysis of sufficiency of measures will build on the regional BAU approach. BAU describes how the state of the marine environment would change over time due to changes in marine uses and implementation of the existing policy frameworks with an impact on the marine environment and can be used for assessing the sufficiency of planned measures for achieving HELCOM objectives and targets i.e. to estimate a potential gap between BAU and good environmental status.

The work on this task will build on the EU-funded HELCOM SPICE project deliverable "Development of a regional "business-as-usual" scenario (BAU) to be used as a baseline in the integrated assessment of the marine environment". The report was presented to GEAR 18-2018, commented by CPs, and the next step will be to propose how the regional BAU work can be taken forward within HELCOM.

It is foreseen that the analysis of effectiveness of existing measures, which is part of the BAU analyses, may for some topics be based on a quantitative approach and that such analyses will require extended time (months) in order to collect required data and carry out the analyses. For other (most) topics an expert based evaluation will likely be the most practical approach considering lack of existing information on effectiveness of measures as well as time constraints.

Task for the SOM Platform:

- Further develop the regional BAU approach under the guidance of GEAR and for approval by HOD (through ACTION project), considering the use of both quantitative and expert-based approaches,
- Carry out the BAU scenario for prioritized topics to support analyses of sufficiency of measures.

The further development of the BAU approach should take place during spring 2019 and analyses are to take place by the end of 2019. Work could be organized in smaller interdisciplinary groups and Contracting Parties will be invited to allocate time of experts appointed to the group.

4) Carry out analyses of sufficiency of measures to reach HELCOM objectives and targets (cf. Activity 5 and 6 in the Strategic Plan for the BSAP update).

Timing: late 2019- mid 2020

Analyses of sufficiency of measures will build on the regional business as usual (BAU) scenario for the purposes of the BSAP update. The first step in the planning of work on sufficiency of measures will be carried out as part of the preparation of the BSAP update Work Plan, to be taken up at GEAR 19-2018. This is to be followed by the planning in the SOM project group.

Task for the SOM Platform:

- Plan for and carry out thematic workshops to discuss and conclude on the need for additional measures.

- Provide information to support the identification of new measures, .e.g. through synthesising information on effects of potential new measures, and make proposals on new actions based on analyses of sufficiency of measures and on synthesising existing information on effectiveness of potential new measures. Such proposals could e.g. be based on reviewing the list of measures implemented in the respective countries.

The analysis of sufficiency of measures will involve working/expert groups e.g. joint workshop arrangements. The analyses of sufficiency of measures may will also generate proposals on potential new or complementary HELCOM actions that could fill gaps towards the goals of the BSAP.

Tentatively, towards end of process, carry out analyses of cost-effectiveness of proposed new actions. This would require that the work of the SOM Platform is extended until end of 2020.

5) **Any other tasks as may be decided by the HELCOM Heads of Delegation.**

Working method

The SOM Platform is of an ad hoc character, meaning it has a time limited mandate. It will be established as soon as decided by HODs and finish its work by mid-2020.

The group will include expertise in environmental economy and natural scientists. The group will consist of:

- the HELCOM network on social and economic analysis (ESA network); HODs should ensure their representatives in the ESA network are nationally assigned this new task;
- experts assigned to the work by the countries in their lead country role or contributing role;
- chairs and vice-chairs of HELCOM working groups (WGs) and relevant expert groups (EGs) will be invited to become members of the group;
- WGs and relevant EGs will be invited to co-organize and join thematic workshops;
- CPs (HODs) are invited to nominate any additional experts as they deem appropriate, including technical experts e.g. from the existing working and expert groups and including for kick-off meeting and thematic workshops.

Secretariat will evaluate the situation and communicate with HODs on any additional need for expertise in the group. The aim is to ensure sufficient expertise for all areas prioritized for the analysis.

Participation in the SOM Platform is open to HELCOM Observers.

The group will act as an interdisciplinary platform to harmonize the approach on analysis of sufficiency of measures, particularly for topics where an expert based evaluations will be used.

Contracting Parties will be invited to offer resources for preparing syntheses and carrying an analysis i.e. take up the leading role, assign national experts or institutes, and provide funding to the HELCOM budget.

The Secretariat and BSAP update Project Manager will support the work of the SOM Platform. The SOM Platform will utilise physical meetings and intersessional and online interaction. It will elect a chair and a vice-chair at its kick-off meeting.

The SOM Platform will communicate its proposals and results to WGs in line with the mandates of the WGs. The specific role of the Working Groups will be to provide guidance to the SOM Platform on how to carry out the analyses, support the collection of required data for analyses, review the results before submission for consideration by HODs.

Progress of work under the SOM Platform will be regularly reported to HODs.

Administrative support to the SOM Platform will be provided by the Secretariat.

Extract from the HELCOM ACTION project application

For work packages related to by-catch (WP 1), impacts on the seabed (WP 2) and analysis of sufficiency of measures (WP 6) the technical plans for work is included in full. For other topics only abstracts are included.

Summary of project

The HELCOM ACTION project is designed to support EU Member States in updating and implementing MSFD Programme of Measures and to contribute to the update of the HELCOM Baltic Sea Action Plan by 2021. This takes place through evaluating the effectiveness of existing measures with regard to by-catch of mammals and birds, impacts on the seabed, marine protected areas, and eutrophication. The topics have been chosen based on the priorities of the Call indicated for the Baltic Sea region as well as on the main pressures on the Baltic Sea ecosystem as identified in the 'State of the Baltic Sea' report (HELCOM 2017). In addition, the project will analyse the natural conditions that influence achievement of GES in the Baltic Sea region, including impacts of projected changes in the climate.

The project will furthermore develop business-as-usual (BAU) scenarios for selected topics to identify potential gaps in measures to achieve GES and estimate cost-effectiveness of tentative new measures to fill the gap towards GES. The project aims to base as many activities as possible on data driven analyses but will also make use of expert based evaluations to complement existing data and information derived from the project activities.

The supervision of the project takes place through the regular HELCOM working arrangements i.e. through guidance and review by HELCOM technical groups and expert groups during the course of the project. Through this arrangement the project results will also be directly available to national policy leads for the MSFD in the Baltic Sea region that can follow the project and ensure that it remains relevant for requirements of the MSFD.

The methodological framework developed in the project is expected to be applicable also in other marine regions and dissemination through MSFD CIS and other Regional Seas Convention, in particular OSPAR, will take place during the course of the project.

Specific objectives

The application is built around seven work packages (WPs). WPs 1-5 will analyse the effectiveness of existing measures, provide information on tentative new measures, and deliver background information to WP6 which is an overarching activity focused on analysing sufficiency of measures to reach GES in the Baltic Sea region. WP7 is dedicated to project coordination and to provide a policy-project interphase. The links between WPs are further outlined in Figure 1

WP1 By-catch; high-risk areas and evaluation of measures to reduce by-catch

Drowning in fishing gear is a major pressure on Baltic Sea marine mammals and birds and for the harbour porpoise by-catch is the greatest source of mortality.

WP1 will define high-risk areas for by-catch of marine mammals and birds. The study will be covering mainly the south-western Baltic Sea but will also explore the possibility to evaluate marine mammal by-catch in other parts of the Baltic Sea. The project will also estimate the cost and effect of measures such as gear modifications and gear use restrictions.

Partners in WP1: National Institute for Aquatic Resources (DTU Aqua, Denmark – Lead partner), Swedish University of Agricultural Sciences (SLU, Sweden), Swedish Agency for Marine and Water Management (SwaM, Sweden), Finnish Environment Institute (SYKE, Finland), HELCOM.

WP2 Impacts on the seabed; relevant areas for measures and evaluation of those measures

Physical disturbance to benthic habitats has been identified as a wide-spread pressure in the Baltic Sea; about half of the seabed is potentially disturbed by human activities with the most wide-spread disturbance caused by trawling and shipping (HELCOM 2017). Also other human activities, such as dredging, sand and gravel extraction, and constructions, contribute to the disturbance and loss of benthic habitats.

WP2 will evaluate measures to restore coastal habitats, identify where such measures would be particularly relevant along the Baltic Sea coast, and estimate the cost of such measures. The effect of spatial regulation of fisheries in offshore areas will also be evaluated, considering the impacts on seabed communities and habitats as well as on the fishery.

Partners in WP2: Finnish Environment Institute (SYKE, Finland – Lead partner), National Institute for Aquatic Resources (DTU Aqua, Denmark), Swedish University of Agricultural Sciences (SLU, Sweden), Swedish Agency for Marine and Water Management (SwaM, Sweden), HELCOM.

WP3 Marine protected areas; GES and effectiveness of the MPA network in the Baltic Sea

The designation of Marine Protected Areas (MPAs) has been an instrument for protection in the Baltic Sea for more than 30 years with the overarching HELCOM target to achieve a coherent and effectively managed network of MPAs in the Baltic Sea. While assessment of the ecological coherence of the MPA network has been carried out previously (HELCOM 2016) there is no common approach or regional compilation of effectiveness of management of MPAs.

WP3 will develop and apply a common approach for assessing management effectiveness in the Baltic Sea. The method will be developed so that the contribution of MPAs towards reaching GES at the Baltic Sea level can be assessed.

Partners in WP3: Klaipeda University (KU, Lithuania – Lead partner), University of Tartu (UT, Estonia), Aarhus University (AU, Denmark), Finnish Environment Institute (SYKE, Finland), HELCOM.

WP4 Input of nutrients; effectiveness of measures

The ‘State of the Baltic Sea’ report shows that eutrophication remains the main pressure on the Baltic Sea environment. HELCOM countries have implemented numerous measures aimed at reducing input of nutrients both as a result of HELCOM instruments and initiatives but also in response to EU and national regulations. These measures appear to be reducing nutrient loads when assessed across the Baltic Sea (HELCOM 2018c). However, there is wide variation between catchments as to the effectiveness of implemented measures and there remain knowledge gaps concerning whether HELCOM countries can meet their national commitments through existing measures.

WP4 will address these open issues and assess the effectiveness of existing measures to reduce input of nutrients to the Baltic Sea.

Partners in WP4: Swedish Agency for Marine and Water Management (SwaM, Sweden - Lead partner), Finnish Environment Institute (SYKE, Finland), Swedish University of Agricultural Sciences (SLU, Sweden), Tallinn University of Technology (TTU, Estonia), Aarhus University (AU, Denmark), HELCOM.

WP5 Conditions that influence GES

Based on the results of the ‘State of the Baltic Sea’ report it can be concluded that the majority of descriptors and even indicators will not achieve GES by 2020/2021. This is partly due to an insufficient

implementation of measures (HELCOM 2018b). However, natural conditions of the Baltic Sea have a significant impact on the time it will take for the ecosystem to recover from the current state. For topics such as eutrophication, existing estimates indicate that it will take decades after the targets for input of nutrients have been achieved to reach GES for state related indicators (e.g. nutrients, chlorophyll in the sea). Furthermore, the projected change in climate is expected to influence the effect of measures and the potential to meet GES already in the upcoming 8-9 decades,

WP5 will review the current knowledge and analyse how natural conditions influence the recovery of the Baltic Sea as well as how the projected future change in climate will affect the measures taken to improve the Baltic Sea.

Partners in WP5: Tallinn University of Technology (TTU, Estonia), Aarhus University (AU, Denmark), HELCOM. [1]

WP6 Sufficiency of existing measures and cost-effectiveness of potential new measures

The analysis of sufficiency of existing measures will build on business-as-usual (BAU) scenarios for selected topics. In such scenarios estimates of future changes in human activities creating a pressure on the Baltic Sea will be combined with estimates of effectiveness of existing measures to estimate the gap to targets for pressures and/or GES by a specific target year.

WP6 will operationalize the approach for BAU that was developed in the HELCOM SPICE project, co-financed by the EU. Cost-effectiveness of not yet implemented measures and tentative new measures will be evaluated once the gaps for achieving GES have been established.

Partners in WP6: Finnish Environment Institute (SYKE, Finland – Lead partner), Klaipeda University (KU, Lithuania), National Institute for Aquatic Resources – (DTU Aqua, Denmark), Swedish University of Agricultural Sciences (SLU, Sweden), Swedish Agency for Marine and Water Management (SwaM, Sweden), Tallinn University of Technology (TTU, Estonia), University of Tartu (TU, Estonia), Aarhus University (AU, Denmark), HELCOM.

WP7 Project coordination and policy-project interphase

HELCOM has agreed to update the Baltic Sea Action Plan by 2021. The update aims at complementing the already agreed actions and objectives in areas where identified as necessary. In 2022 EU Member States should also report on their second cycle PoMs under the MSFD. The WP will serve as a hub to ensure coordination between the policy processes and that appropriate guidance is provided to the project. Overall project coordination is also part of WP7.

[1] In addition, IOW (The Leibniz Institute for Baltic Sea Research, Warnemünde) has expressed willingness to contribute to the project in-kind by offering advice on issues related to climate change and based on the current cooperation with HELCOM.

Partner: HELCOM – Lead partner, All partners

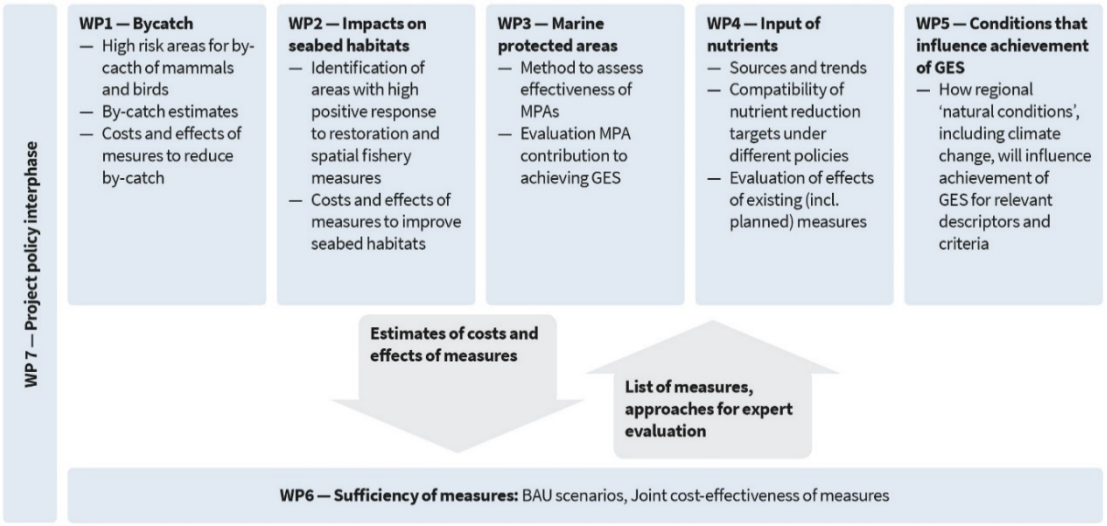


Figure 1. Linkages between work packages in the HELCOM ACTION project.

Methodology

WP1 By-catch; high-risk areas and evaluation of measures to reduce by-catch

By-catch of marine mammals in gillnets has been documented in many gillnet fisheries and is regarded as a major anthropogenic impact on marine mammals (Read et al. 2006). By-catch of seabirds is also reported in large numbers. WP1 will identify high-risk areas for by-catch of marine mammals and birds in the south-western Baltic Sea covering German, Swedish and Danish fisheries. For certain marine mammals the possibility to expand the coverage area to other parts of the Baltic Sea will be considered, pending data availability. Furthermore the effects and costs for the implementation of measures to reduce by-catch will be evaluated, including gear modifications and gear use restrictions. The tasks will be carried out in communication with relevant HELCOM Working Groups and expert networks as specified in section e.

1.1 Identification of high-risk areas

Identification of high-risk areas for by-catch and by-catch estimates can be used to evaluate the level of pressure on non-target populations from the fisheries industry and/or identify areas where monitoring of by-catch needs to be intensified. In the Skagerrak Sea it has been shown that overlaying information on harbour porpoise densities and gillnet fishing effort can be used to identify high-risk areas for by-catch (Kindt-Larsen et al 2016). In this study the density data of harbour porpoises together with gillnet fishing effort data will be used to model areas of porpoise by-catch risk. The model will be verified by the use of CCTV video footage on actual porpoise by-catches from commercial gillnet vessels. The high-risk maps will be developed for the south-western Baltic Sea, including the sound, Bay of Kiel and Bay of Mecklenburg, and also the Kattegat as this is part of the harbour porpoise population area. In other areas such as the eastern Baltic Sea the project will explore the possibility to create high-risk maps based on available fishing effort data and harbour porpoise abundance data. Furthermore total by-catch estimates of harbour porpoises will be provided as these will feed into the work in task 1.2.

Density maps of sea birds (eider ducks, cormorants, and scoters) and seals (grey seal and harbour seal) are incomplete, however registrations of by-catches of these species are available from video footage. For these species by-catch estimates will be made as well as a gap analysis on the additional needs for data to identify high-risk by-catch areas.

a) <u>Data collection:</u>

- Preparation of data from CCTV video footage. The video footage data is essential as it provides by-catch data on both marine mammals and sea birds. CCTV video footage, however, only exits from Danish gillnet fishing vessels restricting the analysis to the south-western Baltic Sea.
- Gillnet fishing effort from Swedish, Danish and German (VMS, REM, DCF, AIS) fisheries will be gathered to give an estimate of the total gillnet effort for the south-western Baltic Sea both in relation to fishing grounds and quantity. If data is available also eastern Baltic Sea will be included in the analysis.
- Porpoise density and abundance data exists from satellite tagged porpoises and acoustic monitoring. These will be mapped to fit gillnet fishing effort data and CCTV data.
- In many areas sea bird data is not available. Thus, collection and review of historical data on species abundance will be made to provide the best possible by-catch estimate.

b) High-risk areas for by-catch: Finally all data sources will be linked in a model to predict high-risk areas and by-catch estimates of the relevant species.

1.2 Evaluation of measures to reduce by-catch of harbour porpoises

There are few mitigation measures available to reduce by-catch of marine mammals, principally fisheries closures, alternative fishing gears and acoustic deterrents. For porpoises the main method to reduce by-catch is use of acoustic deterrent devices so called pingers. Pingers have been shown to reduce the by-catch of harbour porpoises while still maintaining a viable fisheries. In the southern Baltic Sea where Swedish, Danish and German gillnet fisheries are carried out, mainly targeting cod, there is a risk for the Baltic harbour porpoise to be by-caught. In this project the cost-effectiveness for implementing pingers and fisheries closures will be evaluated. The results will feed into the work of WP6.

a) Evaluation of cost of measures:
   - Calculation of the cost for implementation of pingers, taking into regard the cost for the individual fisherman and the possibility to control pinger use.
   - Predicting the performance of the tested management measures to minimize the by-catch of harbour porpoise by displacing the fishing effort to surroundings areas. This bill be done by use of the DISPLACE model (Bastardie et al 2014, see also WP2), informed with the by-catch estimates and high-risk areas from this project. The resulting extra-cost for the fisheries will also be evaluated.
   - Calculating the costs if both mitigation methods are combined i.e. pinger implementation in combination with fisheries areas closures.

b) Evaluation of the effect of measures: The decrease in by-catch when implementing pingers, closed areas or a combination of the two measures will be estimated.

WP2 Impacts on the seabed; relevant areas for measures and evaluation of those measures

Understanding the impacts of human activities on the seabed in the Baltic Sea region has significantly advanced through previous EU co-financed and HELCOM led projects (BalticBOOST, TAPAS, SPICE). This includes the insight that major pressures on the seabed differs between the Baltic Sea sub-basins. WP2 will consolidate existing information on impacts on the seabed and existing measures to reduce these impacts in the Baltic Sea region. Existing models and approaches will be used to identify the human activities for which measures are most urgently needed. The effectiveness of measures for improving the state of the seabed in both the open sea and coastal areas will also be evaluated. The tasks will be carried out in communication with relevant HELCOM Working Groups and expert networks as specified in section e.

2.1 Identification of major pressures in Baltic Sea sub-basins

a) Consolidation of existing results: Results from previous HELCOM projects co-financed by the EU will be consolidated to a coherent overview of existing knowledge of impacts on seabed species and habitats due to human activities in the Baltic Sea, including both wide-spread and local impacts as well as spatial extent of impacts. For information on human activities and pressures to be covered by this activity, see e.g. BalticBOOST report. Information on status for benthic species and habitats as reported by EU Member States in the 2018 reporting of MSFD Article 8 will also be gathered,

focusing on benthic features for which there is no agreement on region-wide indicators (i.e. for which there is no complete assessment in the 'State of the Baltic Sea' report, HELCOM 2017). The information will be used in tasks 2.1 b and 2.2 b and also in the BAU scenarios implemented under WP6.

b) HELCOM ACTION Workshop 2.1: Project partners and national experts from the Contracting Parties will be invited to a two-day workshop with the aim of:
   - identifying the pressures and activities that are causing the major impacts on a sub-basin scale. In preparation of this exercise a template will be prepared that national experts will be requested to fill in advance of the workshop to justify the evaluation;
   - providing guidance to the project on the approach for carrying out BAU scenarios under WP6, i.e. whether to take a risk-based approach (based on information on level of activities and pressures) or whether existing definitions of GES for benthic can serve as end-point for the BAU scenario for impacts on the seabed;
   - making available the results and workshop outcome to the MSFD CIS process to follow up the GES decision on descriptor 6 and components of descriptor 1 related to seabed habitats and of relevance for the Baltic Sea region.

The results of the workshop will serve as a basis for further work in the project to identify potential measures to reduce impacts on the seabed.

2.2 Identification of effective measures to reduce impacts on the seafloor

a) Restoration of coastal habitats: Results from restoration projects in the Baltic Sea region will be evaluated focusing on coastal habitats, e.g. coastal vegetated habitats, which are under extensive exploitation pressure in the Baltic Sea and at the same time are pivotal for production of ecosystem services (Kraufvelin et al. 2018). The analysis will consider costs, effects and feasibility of restoration projects. The activity will also identify the areas where such measures would have the highest impact and provide information to the cost-effectiveness analysis to be carried out in WP 6.

b) Spatial fishery management measures: The DISPLACE model will be applied to evaluate the effect of closure of areas for fishing, both in terms of impact on benthic habitats and impacts on catch/revenue/profit for fisheries (Bastardie et al 2014). DISPLACE simulates individual vessels and how they will redistribute their fishing effort given spatial or temporal closures. A module for modelling the benthos dynamics provides information on depletion/recovery of specific benthic habitats and seabed types. Time and space mitigation scenarios will compare the effects of fishing restrictions and closures in different areas and habitat types (e.g. important fishing areas vs. marginal fishing area). The model will also be applied in WP1. The specific tasks in WP2 are:
   - integrating information on the status and threshold values for benthic indicators, as collated in 2.1a and discussed upon in the 2.1.b workshop, in the model;
   - conditioning the modelling platform with Baltic-wide, or case specific as found appropriate, ecological-economic data by extending the existing application to the newest available data including benthos and fisheries-related data from the existing monitoring programmes at national or international levels, partly using inputs from 2.1.b;
   - conducting the evaluation by testing the performance of alternative scenarios for management measures and spatial plans in closing the gap towards GES for benthic communities and habitats affected by fisheries, and in being robust in maintaining GES. This is analysed by tracking the different MSFD descriptors specifically affected by the fishing pressure, at the same time as detailing the costs/benefits for the fisheries economics;
   - in cooperation with WP6, further evaluating the outcomes from the scenario evaluation in broader economic context using feedback associated to the workshop outlined under 2.2 c.

c) HELCOM ACTION Workshop 2.2: A workshop will be held to evaluate how far existing and tentative new measures can contribute to closing gaps towards GES with regards to the status of benthic species and habitats. Results from the activities related to restoration and fishery management measures will be complemented with information consolidated under 2.1a, including

also additional pressures of concern such as construction works, extraction of material from the seabed, invasive species, and hypoxic areas.
In preparation of the workshop a 'score card' will be developed to estimate effectiveness of measures where quantitative estimates are not available. The scales of activities and pressures affecting the seabed differ in space and time but their impact on GES also depends on the species (Brown et al. 2018; Kraufvelin et al. 2018). Since effects of measures may be wide spread (e.g. to restrict bottom trawling) or local (e.g. a measure to improve fish spawning habitat at specific site), the semi-quantitative score card approach will allow for comparing measures with different spatial range (e.g. FP7 STAGES study by Uusitalo et al. 2016). The results of the scorecard can directly feed into the WP6 analyses. The workshop will be results-oriented and run for three days.

WP 6 Sufficiency of existing measures and cost-effectiveness of potential new measures

WP6 contributes to the implementation of the EU MSFD and the update of the HELCOM Baltic Sea Action Plan (BSAP) by developing a regionally coordinated approach to assess the effectiveness of existing measures, the need for new measures, and the cost-effectiveness of the new measures (incl. non-implemented existing ones). The analyses will be limited to the topics addressed by WPs 1-5. The WP6 method is applicable at the regional level to support the update of the HELCOM BSAP and could also be used at the national level to support the update of MSFD PoMs as required by 2022. In addition, the developed approach is agile in that the effectiveness and costs of measures can be estimated using models, data and expert opinions. WP6 draws upon work carried out in WPs 1-5 and supports a coherent formulation of the outputs to be usable for the analyses of business-as-usual (BAU) scenarios and cost-effectiveness of measures. WP6 will be developed under guidance of the HELCOM GEAR group and HELCOM expert networks as outlined in section e.

6.1 Regional business-as-usual (BAU) scenarios

Task 6.1 will operationalize the approach for the BAU scenarios in the Baltic Sea, based on the proposal developed in the HELCOM coordinated SPICE project, co-financed by the EU. The scenarios will be used to analyse the gap between BAU and Good Environmental Status (GES). Scenarios will be developed for eutrophication, by-catch of mammals and birds, and impacts on the seabed, taking into account results on relevant elements of biodiversity and seabed habitats from the assessment of effectiveness of marine protected areas (WP3). The scenarios will make use of data-driven models and a semi-quantitative, probability-based expert survey. Figure 2 visualizes the approach in task 6.1

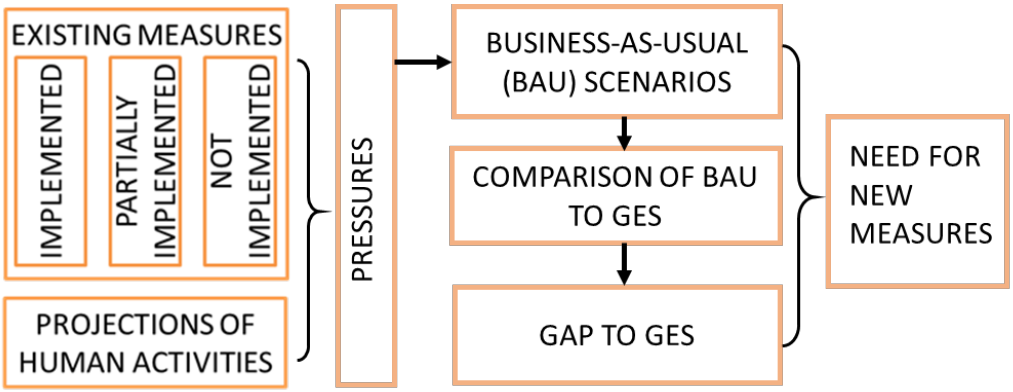


Figure 2. Approach for BAU scenarios inWP 6.1.

Task 6.1 will consist of the following steps:

a) Approach: The first step develops a common method framework for the BAU and cost-effectiveness analysis in task 6.2. The method framework will build on the previous works by Reinhard et al. (2012), Kontogianni et al. (2015), Börger et al. (2016), Oinonen et al. (2016) and the HELCOM SPICE project. This will ensure coherent outputs from all WPs contributing to the WP6 analyses e.g. recording outputs from models and expert surveys into a comparable format. The method will be presented for review by the HELCOM GEAR Group before implemented in the project.
b) Linkage framework: The link between human activities, pressures and state in the Baltic Sea marine region have been outlined in previous HELCOM projects (e.g. TAPAS) and the ODEMM project. These linkage frameworks will be further developed in this project to include also the link between measures and human activities for each of the existing or new measure or group of measures considered in the project in order to (i) support evaluating the effectiveness of measures and (ii) identify new measures to reduce pressures and improve status. Whether BAU scenarios will be developed with respects to pressures or status may depend on the topic/descriptor in question. This step will also evaluate whether a measure is linked to more than a single pressure/state descriptor and what type of joint effects can be expected.
c) List of existing measures and their status: Information will be collected on relevant existing measures including the MSFD PoMs and as compiled in WP 4 for nutrients e.g. under EU WFD. The status of the implementation in these measures will be established. In addition, information on the status of implementation of the existing HELCOM measures not reported in the HELCOM Explorer[2] so far will also be collected.
d) Effectiveness of existing measures: An evaluation of the effectiveness of the existing measures will be carried out based on input from other WPs of the project and published information. Quantitative indicators for the effectiveness of a measure and input from WPs 1-4 will be used as far as possible and complemented with expert-based evaluations as needed. The expert evaluation will build on a semi-quantitative survey with discrete probability categories among the project partners, HELCOM experts and invited experts (e.g. Uusitalo et al. 2015, Oinonen et al. 2016). These can also be supported by the numerical models used in other WPs.
e) Projections of human activities or pressures: To estimate the development of human activities and/or the respective changes in the pressures, existing projections in the region will be used to the extent available, e.g. from the BONUS BALTICAPP project, and complemented with expert-induced scenarios in cases where projections are missing (by using the method described in step d).
f) Gap analysis: Based on the steps a-e, the remaining reduction in pressures (or improvement in state) to reach GES will be evaluated by comparing the state in a BAU scenario with the GES. The potential impacts of natural conditions on the implementation of measures will be considered in this analysis (input from WP5) as well as possible synergetic and antagonistic effects between measures (step b).
g) HELCOM ACTION Workshop 6: A workshop will be held to discuss the outcome of the gap analysis and come to a common view on how results should be interpreted to support the identification of new measures where this is needed.

6.2 Potential new measures and their cost-effectiveness

For those topics where a need for new measures is found and quantified between the BAU scenarios and GES under task 6.1, potential new measures will be identified by building on expertise in other work packages. Cost-effectiveness of these measures will be analysed following the steps and methods described by Kontogianni et al. (2015), Börger et al. (2016) and Oinonen et al. (2016), and using results from WP1-4 as relevant for proposals on new measures. The existing, but not yet implemented measures will also be added to the analysis. This work will be based on the estimated costs and effectiveness of potential

[2] HELCOM Explorer is a web-based platform where the implementation of HELCOM agreements by the Contracting Parties is presented.

measures. All the evaluations will include the aspect of uncertainty by using probability scales. Given natural conditions, certainty of the evaluation and effectiveness of the potential measures, sets of measures will be formulated.

The task 6.2 will consist of the following steps:

a) Identification of potential new measures (incl. existing but non-implemented ones): Co-operation with WPs 1-4 will advise the WP6 on potential new measures. Their feasibility is also estimated in co-operation with WP 1-5.
b) Effectiveness of new measures: Building on the method framework from 6.1a, a common method will be developed for recording the effectiveness of measures for eutrophication, impacts on seabed, bycatch and marine protected areas. This follows Oinonen et al. (2016). Information on effectiveness of potential new measures will be collected from other work packages 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 (WP 6.1 b) and analysed following Saikkonen et al. (unpublished) from existing literature, projects and expert evaluation. Confidence of the estimation is expressed by probability (Uusitalo et al. 2015).
d) Cost estimation: Guidelines will be developed for estimating costs of new (or not yet implemented) measures and information collected from literature, sectorial organizations and selected experts by using broad categories. The broad categories allow for uncertainty and cross-region variability in the costs, but also probabilities can be applied to illustrate this uncertainty.
e) Finding optimal sets of new measures: Cost-effectiveness analysis will be run for all the new and not yet implemented measures. 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. Identify and present the sets of new potential measures in terms of their cost-effectiveness, certainty and other relevant aspects. The set can be expressed over all topics or for each topic separately.

Project management

The project will be carried out by a team consisting of the HELCOM Secretariat and the eight additional partners.

The HELCOM Secretariat will act as overall coordinator of the project activities, contribute to the work carried out as specified in the application, and ensure effective and timely communication and monitoring of progress with relevant HELCOM Working Groups and projects (see below, Supervision). These tasks fall within the current mandate and role of the Executive Secretary, the chief administrative official of the Helsinki Commission, and the Secretariat she is heading, which are defined in Article 21 of the Helsinki Convention and HELCOM Rules of Procedure. The HELCOM Secretariat has coordinated three recent projects co-financed by the EU to support the implementation of the MSFD (BalticBOOST, SPICE, TAPAS) and several other projects co-financed by the EU (e.g. BALSAM).

The ACTION project will be guided through the existing working arrangement in HELCOM (see Figure 3). This includes guidance from the Working Groups HELCOM GEAR, State & Conservation, Pressure, Fish and Agri, each consisting of officially nominated representatives of the Baltic Sea countries and the EU. Competent authorities in the Baltic Sea countries as well as the European Commission will thus act as an advisory board to the project and will be able to oversee that the project follows the agreed priorities and that it remains relevant for national work and requirements of the MSFD. Regular reporting to and review by HELCOM Working Groups also forms the quality control of the project. The project will also be closely linked to the BSAP update process in HELCOM involving all Contracting Parties.

Figure 3. Management and supervision of the ACTION project.

HELCOM Working Groups to guide the project:

- AGRI: Group on Sustainable Agricultural Practices, focuses on reducing input of nutrient through development and application of sustainable agricultural practices.
- FISH: Group on Ecosystem-based Sustainable Fisheries, deals with fisheries in relation to the implementation of the ecosystem-based approach.
- GEAR: HELCOM Group on the Implementation of the Ecosystem Approach, works towards region-wide co-operation on all elements of national marine strategies.
- PRESSURE: Working Group on Reduction of Pressures from the Baltic Sea Catchment Area, provides the necessary technical basis to HELCOM work on inputs of nutrients and hazardous substances.
- STATE&CONSERVATION: Working Group on the State of the Environment and Nature Conservation, covers monitoring and assessment functions as well as issues related to nature conservation and biodiversity protection.

HELCOM expert networks and projects to be consulted in the project:

- ESA EN: HELCOM expert network on economic and social analyses (ESA) works to enhance regional collaboration to produce comparable information on the economic and social aspects of the Baltic Sea marine environment.
- EN-DREDS: supports reporting and validation of data on dredging/depositing operations at sea and facilitates the work of the Pressure Group in terms of assessment of environmental pressure caused by dredging/depositing operations at sea.
- CG FISHDATA: HELCOM Correspondence Group on fisheries data for operationalizing indicators used for the purposes of MSFD implementation.
- MPA Task Group: Group of national representatives that is activated ad hoc to support HELCOM work on marine protected areas.
- PLC project: Project that regularly compiles of pollution load data (PLC), focusing on annual and periodic assessments of inputs of nutrient and hazardous substances.