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<b>Document title</b>	Draft HELCOM Holistic Assessment Methodology Development Project (HELCOM MetDev), 2021-2022
<b>Code</b>	6-18
<b>Category</b>	DEC
<b>Agenda Item</b>	6 - Matters arising from the HELCOM Groups
<b>Submission date</b>	16.11.2020
<b>Submitted by</b>	Executive Secretary
<b>Reference</b>	

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## Background

In the approved plan for HOLAS III, in line with the wishes expressed by the Contracting Parties, all technical development work and improving of infrastructure needed to support the State of the Baltic Sea report takes place prior to the start of the actual HOLAS assessment process. This development work is clustered under a HOLAS III preparatory phase. The preparatory phase is structured along three distinct but interlinked projects outlining the main stands requiring further work (as illustrated in Figure 1 in this document):

1. consolidation and development of indicators;
2. establishing and improving data flows;
3. refining and further developments of the assessments.

The preparatory phase is proposed to run from the beginning of 2020 to the first quarter of 2022, in a staggered structure (as presented in Figure 3 in this document). The project plans for the development of indicators and improving data flows have been approved in HOD 54-2018, and HOD 57-2019 respectively. Following the approval of the provisional plan for HOLAS III, which includes the preparatory work, at HELCOM 41-2020, the work on drafting the project plan for the third step of the preparatory phase has commenced, as contained in this document.

Development of the content of the proposal has progressed, for spatial pressure and impact assessment, as included in Work package 1 of this document, GEAR established a three step process to come to a common understanding and identify further development needs. The first step included a survey to the CPs and the second step, a Scoping Meeting, was held 8-9 September 2020. The output of the scoping meeting was then used as the basis for a Technical Workshop which took place 3-4 November 2020. The conclusions and input provided by this process has been used to guide the content of WP1.

Work package 2, which looks at development and improved integration of ESA for the Third State of the Baltic Sea report, has been developed together with the EN ESA network. In comparison to the version of the project proposal presented to HOD 58-2020 the tasks under WP 2 which deal with the economic benefits from marine protection and cost-benefit analysis have been proposed for inclusion in the draft HELCOM BLUES project proposal (EMFF/MSFD call 2020) and any overlap has been removed from the current version of this document. In addition a section for exploring driver indicators has been included in this version of the document. This builds on support for including trend-based indicators (i.e. driver

indicators as outlined in the draft HELCOM indicator manual), as presented in the causal framework for indicators endorsed by the [Second Indicator Workshop](#) and [State and Conservation](#) 11-2019, to provide context for the state and pressure assessments. This task would utilize work done under similar initiatives under OSPAR and NOAA as well as explore using existing HELCOM fact sheet information and other trends as a basis for a more coherent approach to presenting trend-based information.

Further development of the HEAT, BEAT and CHASE tools, originally included in Work Package 3 in the draft submitted to HOD 58-2020 for information, have since been incorporated into other ongoing processes. HEAT, and partially BEAT, have been included in the successful Baltic DataFlow project proposal (submitted to CEF Telecom in 11/2019). A number of other tasks related to additional developments for BEAT have been included in the HELCOM BLUES project proposal (EMFF/MSFD call 2020), however the status of this application is not confirmed. The MIME tool, the analytical tool that is applied prior to CHASE for the assessment of hazardous substances, would also greatly benefit from further developments and discussion with the developers of the MIME tool and ICES is ongoing. As MIME is, to a large extent, a tool shared with OSPAR the Secretariat has initiated informal communication with the OSPAR Secretariat regarding possible synergies and explore possible joint financing options. The envisioned HELCOM contribution has been include as part of the hazardous substance related project proposal submitted to NEFCO

As a consequence of this the further development of the tools, and thus WP3, have been removed from the MetDev project proposal. Should the open applications not be successful, to ensure necessary development takes place prior to HOLAS III, alternative options will need to be explores. (see Figure 2 for an overview of how the various projects feed into the priorities for HOLAS III).

The content of this draft has been presented for input to GEAR 22-2020, STATE&CONSERVATION 12-2020, STATE&CONSERVATION 13-2020 and GEAR 23-2020, as well as to HOD 58-2020 for information. Guidance provided by the WGs and other relevant processes has been incorporated in the further development of the project proposal, prior to the proposals submission to HOD 59-2020 for approval.

Funding for the project has been secured from the HELCOM budget.

### Action requested

The Meeting is invited to:

- review and approve the project proposal for MetDev, thus enabling the work to begin in early 2021;
- approve that the resources from the HELCOM budget can be used to fund the outlined work,
- take note that changes stemming from the BLUES and NEFCO project applications, should it not be successful, may still require that changes are made to the proposal or alternative solutions are found;
- consider providing national funding to support the work.

## PROJECT DESCRIPTION

### 1. Title of Project

HELCOM Holistic Assessment Methodology Development Project (HELCOM MetDev), 2021-2022

### 2. Project Manager(s)

HELCOM Secretariat, Professional Secretary.

### 3. Proposing Party

Contracting Party

Commission

Subsidiary body

Heads of Delegation

Executive Secretary

### 4. The body supervising the project

State and Conservation Working Group and relevant Professional Secretary.

### 5. Target and activities

#### Background

Early preparation for the HOLAS III process has been identified as important for the successful implementation of the next holistic assessment. The provisional plan for HOLAS III divides the work into two main work phases, the preparatory work and the holistic assessment. The preparatory work is intended to review and further develop the necessary components and improve infrastructure to support the next holistic assessment. This is required in order to ensure that critical components (indicators, dataflows and tools) are fit for purpose, and to maintain the continued policy relevance of the work.

The preparatory work has been structured along three distinct but interlinked projects: consolidation and development of indicators (HELCOM Indicators), establishing and improving data flows (HELCOM DataFlow), and refining and further developing the assessments (HELCOM MetDev) (as illustrated in figure 1). The preparatory phase has been agreed to run from the beginning of 2020 to the first quarter of 2022, in a staggered structure where each project provides information to, and helps guide, the consequent projects throughout the duration (as illustrated in figure 3).

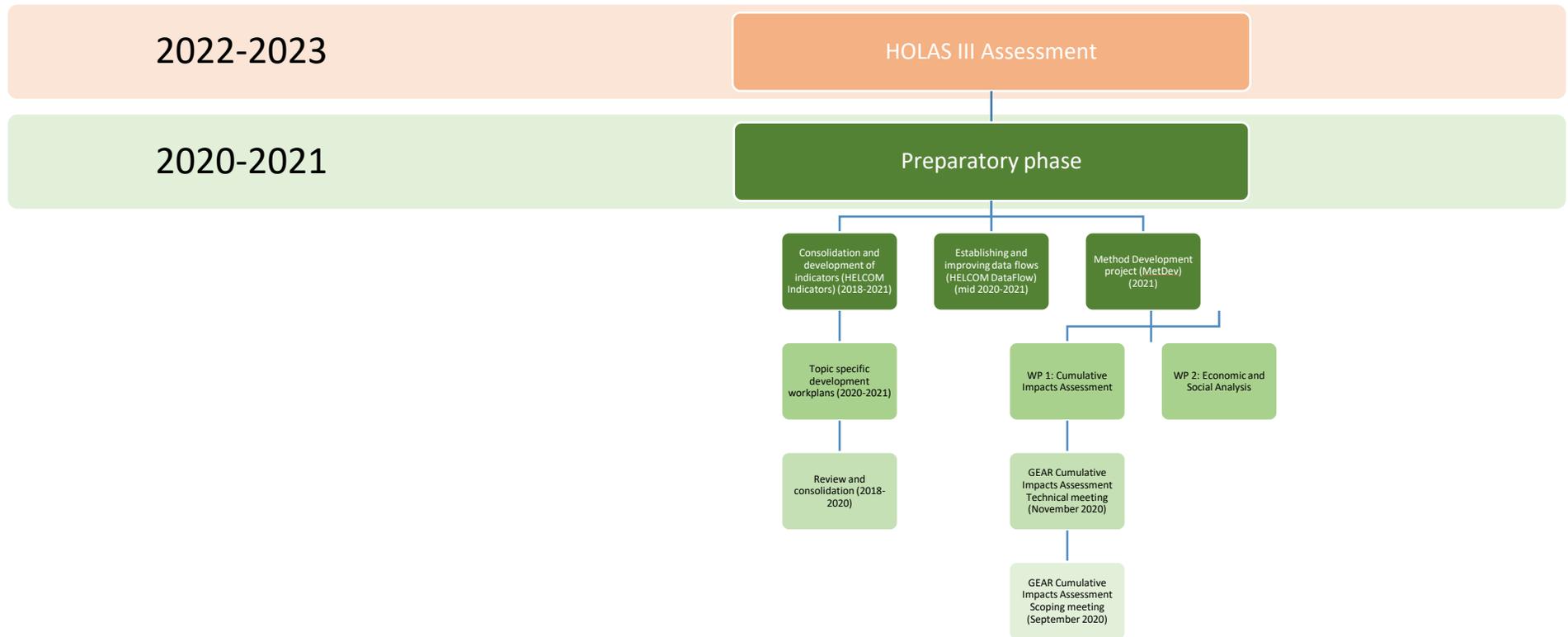


Figure 1. The preparatory work has been structured along three distinct but interlinked projects: consolidation and development of indicators (HELCOM Indicators), establishing and improving data flows (HELCOM DataFlow), and refining and further developing the assessments (HELCOM MetDev).

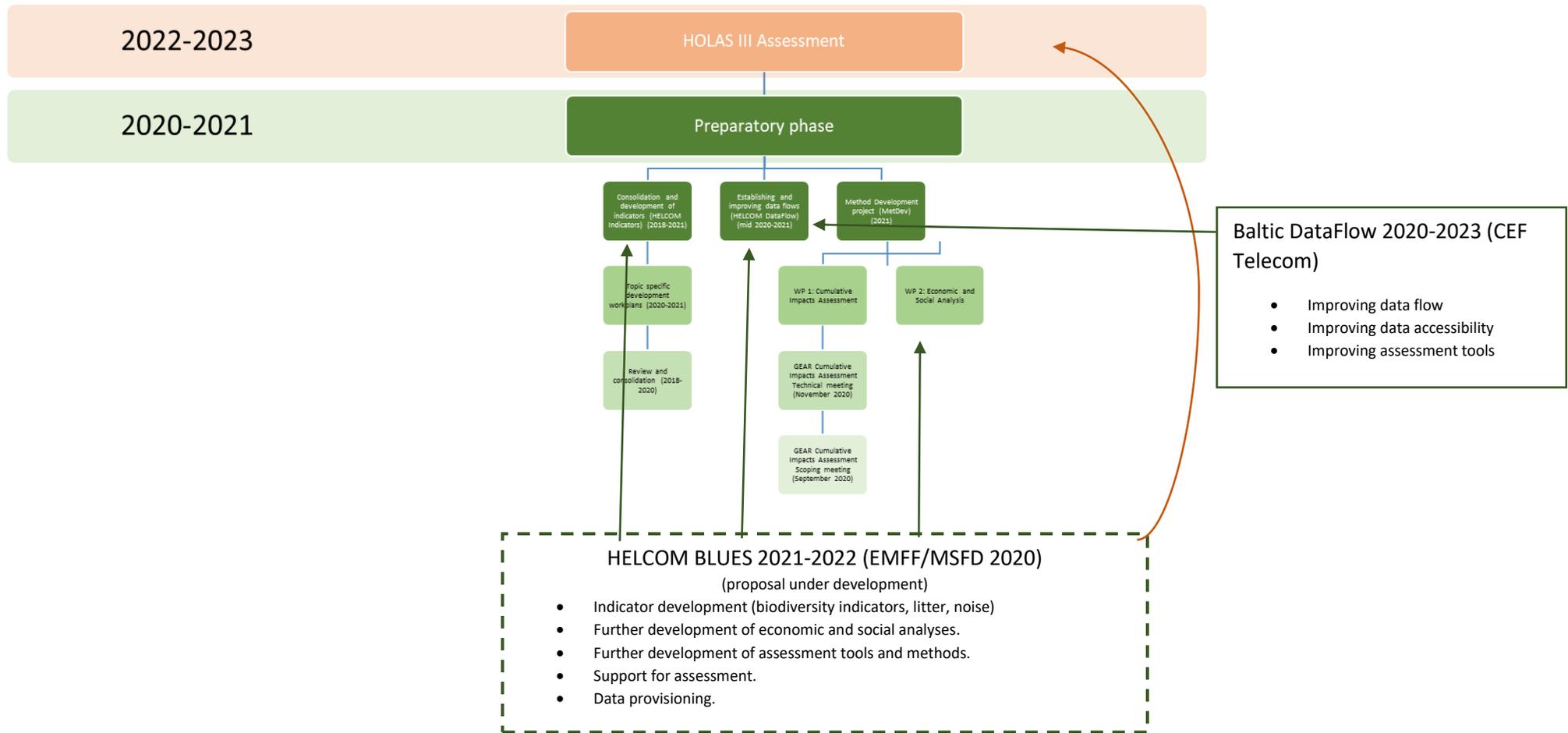


Figure 2. Visualizing the links between internal preparatory phase projects, the HOLAS III assessment and approved and proposed externally funded projects.

	2020				2021				2022				2023			
	Q1	Q2	Q3	Q4												
Indicator development/consolidation (HELCOM Indicators)																
Establishing and ensuring dataflows (HELCOM DataFlow)																
Refining and further developments of assessments (HELCOM MetDev)																
HOLAS III Assessment																

Figure 3. The preparatory phase is proposed to run from the beginning of 2020 to the end of 2021, in a staggered structure where each project provides information to and helps guide the consequent projects throughout the preparatory phase

The MetDev project, as outlined in this document, would be targeting the third and final step of the preparatory phase, namely improving the indicator driven integrated assessment tools as well as other tools or methods such as cumulative impacts and methods used for analysis of economic and social aspects, which underpin the holistic assessment of the Baltic Sea environment. Consequently, the HELCOM MetDev project is proposed to consist of two distinct work packages, corresponding to the two work strands for which further development would be beneficial and for which resources for the outlined tasks have not been included elsewhere:

- **Work package 1: Cumulative Impacts Assessment**
- **Work package 2: Economic and Social Analyses**

The aim of the project is to ensure that the tools and methods used are fit for purpose and fully operational for the Third State of the Baltic Sea Assessment (HOLAS III).

GEAR 20-2019 invited the Secretariat and the relevant Expert Groups to prepare more specific information on identified gaps and development needs for the various work strands not covered by the indicator work, as identified in the HOLAS II process or in subsequent work. This information, together with input received through the HOLAS II Lessons Learned survey have been considered when outlining the work under the respective work packages presented in this project plan.

The project will build on lessons learnt from the Second State of the Baltic Sea report (HOLAS II 2018) as well as link closely and contribute to the work done under the two already approved preparatory projects, HELCOM Indicators and HELCOM DataFlow. It is e.g. likely that modification and refinements of the integrated assessment tools are needed following the incorporation of new data strands stemming from step two (HELCOM DataFlow) and possible new or consolidated indicators stemming from step one (HELCOM Indicators). The project would also work closely together with organizations hosting and/or maintaining some of the HELCOM assessment tools, e.g. ICES, as well as externally funded project aiming to support the HOLAS III preparatory and assessment work e.g. Baltic DataFlow and, if successful, HELCOM BLUES (see Figure 2 for an outline of how the projects support the HOLAS III process).

## Activities

### *Work package 1: Cumulative Impact Assessment*

Project staff: project researcher/data analyst (located at Secretariat), application developer

HELCOM Expert Support: HELCOM Expert Groups based on identified need

Review, guidance and approval: State and Conservation (scientific/technical) and GEAR (policy/strategic)

Human activities in the Baltic Sea and its catchment area create a variety of potential pressures. To support ecosystem-based management of human activities and to provide a system that enables linking the quality of the environment to its management there is a need to identify relevant activities and quantify intensities and distribution of the anthropogenic pressures affecting the marine environment, as well as to identify and quantify their impacts on the Baltic Sea ecosystem.

If each of the pressures affecting the Baltic Sea is considered individually, they may appear to be at sustainable levels. However, at any given point multiple pressures are affecting the species and habitats of the marine environment. When considered together, particularly when their temporal and spatial distribution overlap, the total impact of these pressures on the environment may be considerable and especially so when acting on habitats or species with variable sensitivity.

To bring together spatial information on the distribution and intensity of activities/pressures and their potential impacts on ecosystem components HELCOM has, for its previous holistic assessments HOLAS I in 2012 and HOLAS II 2018, developed and used the Baltic Sea Pressure Index (BSPI) and the Baltic Sea Impact Index (BSII).

As part of the early planning for the HOLAS III process, leading up to the publication of the Third State of the Baltic Sea report, the question arose how to tackle spatial pressure and impact assessment in the Baltic Sea region in future assessments, as well as the role of the Baltic Sea Pressure and Impact Indices (BSPI/BSII) in HOLAS III. It was concluded that spatial pressure and impact assessment should be included as part of HOLAS III, but in what capacity and format still needed further considered. GEAR 21-2019 concluded that further discussion is needed, but not limited to

- identifying what is required from such an assessment
- what the current and possible use of the assessment outputs are
- considering the added value of such assessments
- the analysis and interpretation of results
- how to handle uncertainty and possibilities for validation of assessment results
- how to better link the assessment with the indicator evaluation.

A three step process was set up to reach a shared view on these questions and by extension the development needs for HOLAS III. HOD 58-2020 took note of the arrangements of the three step approach (cf. [HOD 58-2020 outcome para. 5.2](#)) which included a questionnaire, a scoping meeting and a technical workshop. Contracting Parties also discussed to broaden the scope of the discussion with a view to discussing how pressure, impact and status information can be linked.

The first step of the process was collecting national information on the view and potential use of spatial pressure and impact assessments through a [survey](#), to be used as a basis for further discussion at the Scoping meeting. The first step was executed by distributing a survey to GEAR contacts. The questionnaire provided examples of policy contexts for spatial pressure and impact assessment and explored in two sets of questions for what purposes it has previously been used and what parts of the assessments have been used, as well as identified weak and strong points.

The responses were collated and used as a basis for the discussion at the [Scoping Meeting](#), the output of which includes an overview of envisioned uses for pressure and impact assessment, provides long and short term priorities for further development and identifies how current challenges and barrier could be tackled. At the Scoping Meeting the participants recognized spatial pressure and impact assessment as providing a good platform for regional cooperation and needed support for transboundary work. Overall the meeting advocated a broader scope of pressure and impact analysis, one that supports ecosystem based management more directly, e.g by supporting prioritization, planning and implementation of measures and management actions. To increase the added value of the further development planned to take place prior to HOLAS III an assessment tool must be able to:

- Be used for subset analysis (e.g. analyses of specific species/pressures/activity combinations). Such subset analyses were recognized as providing valuable spatial support and context for status assessments.
- Strive to show results at an ecologically relevant scale, and any tool developed should thus be scalable within the same analyses.
- Separate between direct and indirect pressures
- Include information regarding the scale of a pressures to the overall impact, by presenting proportional values, and linking back to the activity causing the pressure, by 1km<sup>2</sup> square.
- Assign proportional values of impact to different sectors/activities.
- Present distribution of pressures and impact at 1km<sup>2</sup> resolution and identify "hot spots"/risk areas of high pressure.
- Include temporal resolution (e.g. retrospective changes over time/within a year), to account for that impact has a temporal aspect in addition to a spatial one.
- Start considerations on how to account for antagonistic/synergistic effects of pressures and activities to account for the more complex dynamics of human activities affecting the ecosystem.
- Be very clear on the method, assumptions and data included. Consider how the significance of the uncertainties and confidence can be communicated, e.g. differences in quality of underlying data.
- Allow for results to be validated.

These priorities formed the basis for the work at the [Technical Workshop](#) which focused on identifying how aspects developed under various existing tools can, from a technical perspective, accommodate the prioritized functionality, as well as how these functionalities can be incorporated in the further development of a tool for region wide assessment of spatial pressures and impact, both for HOLAS III and in the long term. The Workshop also identified concrete tasks needed to bring the development forward and the feasibility of the work within the given timeframe and resources.

Prior to the Workshop the Secretariat was invited to do a provisional comparative analysis of the various existing tools in the region, based on the information provided at the Scoping Meeting, to identify which of the tools would likely need the least amount of further development in order to fulfil as many of the priorities as possible, as well as some base requirements (ownership, no additional cost for use, publicly available etc). The outcome, consequently supported by the Workshop, was to use the BSPI/BSII as the core for further development of a new regional tool. The background can be found outlined in [document 2-2](#) to the Workshop.

Based on the outcome of the scoping and technical work the following priorities and associated task for further development for HOLAS III were identified:

- A. Capacity for subset analyses of any activity/pressure/impact/ecosystem component combinations
- B. Improve sensitivity scores and matrices
- C. Improve links between pressures and change in state
- D. Linking back proportion of impact to the relevant human activity/ pressures/ecosystem component
- E. Differentiate between direct and indirect pressures
- F. Include temporal resolution (e.g. retrospective changes over time/within a year)
- G. Explore inclusion of antagonistic/synergistic effects of pressures and activities
- H. Improved confidence assessment and presentation of uncertainties and assumptions.
- I. Validation of results
- J. Other tool development
- K. Other data development

The work on further development of the cumulative impact assessment approach is closely tied to data availability and as such Work Package 1 is especially tightly linked to the work done under the HELCOM DataFlow project and a dynamic and close cooperation between WP1 and a number of the activities under the DataFlow project are foreseen. The first step has been initiated through a dedicate State and Conservation WG meeting to review and prioritize the need to update the various existing data layers, consider the inclusion of existing data layers previously not included in the analyses and to consider and propose new data which could be included.

Much of the work under WP1 will be utilizing development efforts already available or underway for the various national tools available in the region, and to ensure synergies and alignment where possible, it is foreseen that small, targeted meetings or workshops focused on technical issues, involving relevant national experts, will be needed.

#### A. Capacity for subset analyses of any activity/pressure/ecosystem component combinations

- Include the possibility to do subset analysis for any pressure / ecosystem component combination in the tool
- Explore the possibility to do subset analysis for any combination of human activities within each aggregated pressure layer

#### B. Improve sensitivity scores and matrices

- Improve the sensitivity scores by exploring the approaches of other tools

#### C. Improve links between pressures and change in state.

- Explore the possibility to find threshold values for pressures and ecosystem components, indicating distance to threshold value

#### D. Linking back proportion of impact to the relevant human activity/pressures/ecosystem component

- Include the functionality to see the proportional value of each pressure/pressure sector/ecosystem component to total impact
- Include the functionality to link back to proportions of human activities to total pressure/impact
- Explore the possibility to add a functionality that would enable exploring the underlying human activities/ pressures/ecosystem components and their proportions to total impact per grid cell

#### E. Differentiate between direct and indirect pressures

- Differentiate the pressures to direct and indirect pressures
- Include the possibility to select between direct and indirect pressures in the tool

#### F. Include temporal resolution (e.g. retrospective changes over time/within a year)

- Identify activity, pressures and ecosystem components for which temporal considerations are relevant

- check the data availability to present temporal change by season spatial distribution of activities, pressures and ecosystem components.
- Include information on temporal aspects also in the metadata.

#### G. Explore inclusion of antagonistic/synergistic effects of pressures and activities.

- Explore the possibility to develop the tool to handle inclusion of antagonist/synergistic effects (linking layers from EC to pressure, positive/negative sensitivity scores etc.) by modifying the tool to be able to handle separate ecosystem component as pressure layer and to accommodate negative sensitivity scores and input of custom sensitivity scores.

#### H. Improved confidence assessment and presentation of uncertainties and assumptions.

- Explore methodological questions regarding how to improve confidence/uncertainty assessment, e.g. using existing uncertainty products from the indicator work.
- Consider how and what to account for when it comes to uncertainties (uncertainty of independent layers, data uncertainties, model uncertainties, uncertainty in sensitivities) including how to account for gaps in data.
- Rank uncertainty in the metadata for each layer.

#### I. Validation of results

- Explore the possibility to validate the results

#### J. Other tool development

- Incorporate the running of Monte Carlo for uncertainty for sensitivity scores into the tool.
- Explore the possibility to develop stand-alone command line tool using Python to be shared in GitHub
- Explore the use of data cubes to improve subset analyses
- Develop functionality which allows the scaling of results e.g. define area using polygon or aggregated 1x1km results into larger units.
- Update the existing web-based user interface to accommodate all new developments
- Explore automating the transformation of activities to pressures

#### K. Other data development

- Further development of principles for how activities are handled and transformed into pressures, including the need to account for interactive effects.
- Explore possible ways to address climate change in the CIA
- Explore methodological questions regarding data normalization and interpolation

#### Timeline WP1

Guidance
Review
Approval

Task	2021												2022		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
A. Capacity for subset analyses of any activity/pressure/impact/ecosystem component combinations															
B. Improve sensitivity scores and matrices															
C. Improve links between pressures and change in state															

D. Linking back proportion of impact to the relevant human activity/ pressures/ecosystem component																
E. Differentiate between direct and indirect pressures																
F. Include temporal resolution (e.g. retrospective changes over time/within a year)																
G. Explore inclusion of antagonistic/synergistic effects of pressures and activities																
H. Improved confidence assessment and presentation of uncertainties and assumptions.																
I. Validation of results																
J. Other tool development																
K. Other data development																

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*Work package 2: Economic and Social Analyses*

Project staff: Project researcher (located at Secretariat), supported by intersessional work of EN ESA experts.

HELCOM Expert Support: EN ESA

Review, guidance and approval: GEAR

The aim of the work package on ESA within MetDev is to further develop regional methods and results for economic and social analyses (ESA) to support the holistic assessment of the marine environment by addressing some of the shortcomings and development needs identified in previous regional ESA work. It builds on previous HELCOM experiences and work on ESA for the State of the Baltic Sea report in HOLAS II ([TAPAS](#) and [SPICE](#) projects, 2016-2018), maritime spatial planning ([Pan Baltic Scope project](#), 2018-2019) and analyses of existing and new measures to support the BSAP update ([ACTION](#) project and SOM Platform, 2019-2020), as well as reflects the [ToR](#) for HELCOM EN ESA and [Roadmap](#) for continued HELCOM work on ESA. Implementing ESA for HOLAS III as proposed here would meet some of the aims of the ESA roadmap.

The economic and social analyses (ESA) for State of the Baltic Sea report in HOLAS II covered the entire Baltic Sea region but were limited to selected human activities (use of marine waters) and environmental themes/ecosystem services (cost of degradation). Furthermore, although a conceptual framework for linking the use of marine water and cost of degradation analyses was developed, they were conducted separately in HOLAS II due to lack of suitable data, approaches and resources, and the link between the environmental status assessment and ESA was missing. An important development area is the improved integration within the components of ESA, and between ESA and environmental assessments, which enables a meaningful evaluation of how the marine environment affects human welfare and ensures improved relevance of the assessment for future management.

Following an invitation from GEAR 20-2019 to prepare more specific information on identified gaps and development needs for HOLAS III, a proposal for ESA in HOLAS III was presented to GEAR 21-2019 ([Document 5-1](#)). GEAR 21-2019 supported the proposal and the integration of ESA to other work strands in HOLAS III, and took note that priorities and ambition level of the work needs to be adjusted depending on the resources ([Outcome](#), paras 5.29-5.31). The following is based on that earlier proposal for ESA in HOLAS III.

These have been identified as priority areas for ESA in HOLAS III:

- A. Improved integration of ESA and environmental assessments
- B. Improved implementation of the ecosystem services approach
- C. Pilot assessment of the prospects of marine ecosystem accounting
- D. Driver indicators

Although listed separately, the priority areas are interlinked, and will be developed in parallel (see timeline at the end of WP2). The work entails some conceptual development, in particular related to items A and C, and development of approaches, data collection and analyses for regional assessments. In addition to regional approaches, the outcomes of the work are aimed to support national ESA assessments, e.g. related to EU MSFD Programmes of Measures.

To achieve its objectives, the work package works closely together with the other work strands in MetDev and the two other preparatory projects, HELCOM Indicators and HELCOM DataFlow, as well as the HELCOM BLUES project, if successful. In addition, contribution from the HELCOM EN ESA is required in terms of concrete inputs, guidance and review of the work. This activity can also support the development and operationalization of the causal framework developed in the state/pressure indicators process.

#### A. Improved integration of ESA and environmental assessments (EN ESA, Project researcher)

Activity A establishes conceptual and operational relationships between the marine environment and human welfare by linking measures/actions, human activities, pressures, state, ecosystem services and human welfare in a causal framework. It is necessary for developing a connection between ESA and other components of HOLAS III, and the elements within ESA (e.g. use of marine waters and cost of degradation analyses). The activity enables assessing the connections between economic activities, current and future use of the sea, as well as human welfare and the state of the Baltic Sea. This activity is linked to developing the ecosystem services approach under activity B and uses inputs from the other activities in the work package and from the BLUES project.

Furthermore, activity A would directly support and provide added benefit for the application of the HELCOM indicators. The methodology would enable data collection that could be described and visualized to highlight trends and changes in human activities and drivers (i.e. supporting indicators) that help outline the root cause of the pressures or state changes monitored by HELCOM Contracting Parties. In doing so, the HELCOM indicator catalogue would be better integrated into a causal framework and build structures that would enable improved follow up for the BSAP in the future.

The activity builds on the development of concepts, approaches and data in the HELCOM SPICE, Pan Baltic Scope and HELCOM ACTION projects. The sufficiency of measures (SOM) analysis, carried out by the ACTION project and SOM Platform to support the BSAP update, can provide a partial basis for integrating ESA and environmental assessments in a causal framework. The SOM assessment links measures, activities, pressures and environmental state, but additional development is required for covering ecosystem services and human welfare, as well as linkages between the use of marine waters and cost of degradation analyses.

Although being a part of the ESA work package, the work is interdisciplinary in nature and requires the involvement of economists, marine scientists and experts from other fields for successful assessment. To that end, regular planning and working meetings between the Work Packages under MetDev, as well as the other preparatory projects HELCOM Indicators and HELCOM DataFlow, ESA, relevant HELCOM EGs and other experts involved in the preparatory work for HOLAS III are organized.

This activity would start at the beginning of the project and run until the end of the project.

#### B. Improved implementation of the ecosystem services approach (Project researcher)

Activity B entails developing approaches and collecting background information for identifying and assessing marine and coastal ecosystem services, including how the marine ecosystem contributes to the provision of ecosystem services, and what benefits and socioeconomic values people derive from these ecosystem services. The literature review of studies on the provision and value of marine and coastal ecosystem services is planned to be implemented in the HELCOM BLUES project. The aim of this activity would be developing an approach for incorporating the compiled information to the overall HOLAS III framework and assessment, including linking the existing information on marine ecosystem services to the other results of the holistic assessment and presented alongside them. This activity is tightly linked to activity A and supports the integrated assessment of the marine environment by developing an approach and providing information on one of the linkages.

The activity builds on previous work on ecosystem services in HOLAS II and other assessments, such as BONUS projects. It advances the application of the ecosystem services approach in regional ESA, and provides information on the interlinkages between the ecologic and social-economic systems by illustrating how human well-being is dependent on the ecosystem and services it provides. The approaches and information will support the application of the ecosystem services approach for the regional assessment of the use of marine waters and cost of degradation.

#### C. Pilot assessment of the prospects of marine ecosystem accounting (Project researcher)

Activity E builds on recent EU work on ecosystem accounting and develops an approach for conducting a marine ecosystem accounting pilot study for the Baltic Sea to describe and quantify interactions between the

economy and marine environment. It considers the existing frameworks and methods for ecosystem accounting and examines how these could be applied to the Baltic Sea region to describe how and to which extent the Baltic Sea provides benefits to people, as well as how social and governance factors affect the status and associated benefits. The activity develops an approach for including the outcomes of ecosystem accounting to HOLAS III assessment.

The advancement of marine accounting approaches provides additional information and perspectives for describing and valuing the linkages between the ecosystem and social-economic system in activity A, and thus supports the integration of economic and social analyses to the other components of HOLAS III. The work builds on the data, methods and expertise in the HELCOM EN ESA.

#### D. Driver indicators (Project researcher)

Activity D explores the possibilities to develop indicators for drivers in the Baltic Sea region. Based on the DPSIR framework and its further versions (e.g. see the HELCOM indicator manual and the conceptual indicator framework endorsed by S&C 11-2019), these drivers could be considered as something that drive changes in human activities and sectors utilizing the marine environment, thus contributing to changes in pressures in the medium and long-term. The drivers may include population and urbanization trends, international trade, technology development, policies and institutions, environmental policies and regulation, land use, energy production, consumption patterns and lifestyles etc. These drivers could be linked to activities and further to pressures and state via a causal framework to assess their effect on the state of the marine environment over time. This would provide further information on how societal changes affect the state of the Baltic Sea. The information could be linked to the economic and social analysis of the use of marine waters and also utilized in the development of future analyses of effectiveness and sufficiency of measures, as well as provide valuable context for presentation of the results of the state and pressure assessments.

The activity would use input from an ongoing project on driver indicators in Gothenburg University as well as similar work done under initiatives in OSPAR, as well as explore the use of information prepared for existing HELCOM Fact Sheets for use as the basis of driver indicators. The work in the activity would entail exploring ways to include the findings of the project to HOLAS III as part of the indicators and assessments and their presentation. This would contribute to the indicator development work on supporting indicators (so-called potential causative factors, HELCOM indicator manual).

#### Timeline WP2

Activity A would run the entire duration of the project. For activity B, the literature review in the BLUES project would be conducted in the first half of 2021, and the work in activity B would begin in April 2021. Activities C and D would run mainly in 2021. All activities would seek guidance from spring Working Groups and EN ESA meetings, and outcomes would be reviewed in the fall Working Group and EN ESA meetings. The approaches would be approved by HOD in December 2021. The efforts allocated for 2022 would entail work towards presenting the assessment results in HOLAS III.

Guidance
Review
Approval

Task	2021												2022					
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3			
A. Improved integration of ESA and environmental assessments					Guidance from WGs and EN ESA				Review by WGs and EN ESA			Approval by HOD						
B. Improved implementation of the ecosystem services approach																		
C. Pilot assessment of the prospects of marine ecosystem accounting																		
D. Driver indicators																		

## 6. Expected results

The expected results are in the form of direct method an tool development, as well as exploratory work to support HOLAS III Assessment, more explicitly:

### *Work package 1:*

The expected results are in the form of approaches, tools and methods that support HOLAS III assessment and analysis:

1. An improved, fit for purpose spatial presentation tool capable of:
  - subset analyses
  - identifying proportional value of activity/pressure/ecosystem components to impact
  - identify proportional value of impact by various sectors
  - differentiating between direct and indirect pressure
  - for relevant pressures and ecosystem components present temporal changes in spatial distribution of pressures and impacts.
  - Transparency of the assessment
  - Improved means of presenting and exploring the results of the assessment
2. Improved confidence assessment and presentation of uncertainties and assumptions
3. Improved, ecologically valid, sensitivity scores and matrices, where possible.
4. Improved, ecologically valid, links between pressures and changes in state, where possible.
5. Exploratory testing of including synergistic/antagonistic effects.
6. A method for validation of analysis results.

### *Work package 2:*

The expected results are in the form of approaches, tools and methods that support HOLAS III assessment and analysis:

1. Improved approach for integrating ESA to other components of HOLAS
2. Improved method for regional ecosystem services approach
3. Approach for pilot marine ecosystem accounting assessment
4. Approach and data for driver indicators

## 7. Consistency with HELCOM priorities

yes  no

## 8. Timetable (including number of Project Team meetings)

The project will start in Q1/2021 (January) and will finish in Q1/2022 (March).

## 9. Budget (taking into account financial year from 1 July to 30 June)

### 9.1 Total Costs

The planned 27 man months would require an estimated 79 966,40 Euros funding.

This is intended to be divided as follows:

- 15 man months for cumulative assessment development (HELCOM) (developer 4 months, 11 months divided across a project researcher and a data analyst);
- 12 man months for development of methods for economic and social analyses (HELCOM).

### 9.2 Sources of financing divided per financial year

Financial Year	HELCOM budget
1/2021-6/2021	51 000,00 eur
7/2021-6/2022	28 966,40 eur

## 10. Additional requests (manpower, equipment, facilities, etc.)

### 10.1 From the Contracting Parties

For some tasks the project results will benefit from specific information from and cooperation with national experts, e.g. through cooperation with Expert Groups, through intersessional processes and possible targeted meetings or workshops depending on the topic.

### 10.2 From the Secretariat

The Secretariat will ensure coordination of the project with other planned and ongoing HELCOM processes, including indicator development work, data flow development, facilities and equipment needed for the work, and in-house support for the development of tools and methods.

## 11. Procedure of nomination of the Project team members

Two project researchers, one data analyst and one data developer to be employed to the Secretariat.

The appointed staff will follow the HELCOM risk management procedure.

## 12. Signature of the Project Manager(s)

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## 13. Opinion of the Chairs of the relevant body

Both STAT&CONSERVATION 13-2020 and GEAR 23-2020 endorsed the project proposal.

## 14. Opinion of the Executive Secretary

## 15. Decision of the Heads of Delegation

(Reference is to be given to the relevant Minutes of the Heads of Delegation's Meeting)

to establish  not to establish