



Baltic Marine Environment Protection Commission

14 September 2017

Final summary report

Project activities
1.1.2016 - 30.6.2017

Development of HELCOM tools and approaches
for the Second Holistic Assessment of the
Ecosystem Health of the Baltic Sea



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1. General Information

Programme concerned: LIFE programme (under the call “Assistance in the preparation of a regionally coordinated assessment for the Baltic Sea region (Art. 8 and Art. 17 MSFD) and establishing links to WISE-Marine”)

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Title of the project: Development of HELCOM tools and approaches for the Second Holistic Assessment of the Ecosystem Health of the Baltic Sea (HELCOM TAPAS)

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Name of partners in the project and abbreviations used:

Finnish Environment Institute (SYKE)

University of Tartu, Estonia (UT/EMI)

International Council for the Exploration of the Sea (ICES)

NIVA Denmark Water Research (NIVA Denmark)

Stockholm Environment Institute Tallinn Centre, Sweden (SEI Tallinn)

Start date and end date of the reporting period: 1/1/2016 – 30/6/2017

Start date and end date of the project: 1/1/2016 – 30/6/2017

2. Summary of achievements of the TAPAS project

The TAPAS project aims to contribute directly to the development of the '[State of the Baltic Sea' report](#) that is developed by HELCOM through the [HOLAS II project](#). The assessment report covers the whole Baltic Sea marine region and will provide information on the overall environmental status of and pressures on the Baltic Sea as well as social and economic aspects that are linked to the status of the Sea. It is developed to follow-up the goals and objectives agreed by all coastal countries and EU in the [HELCOM Baltic Sea Action Plan](#) (BSAP, 2007) as well as to be used for the 2018 reporting under the EU Marine Strategy Framework Directive (MSFD) as agreed by those Contracting Parties of the Helsinki Convention that are also EU Member States. The first version of the "State of the Baltic Sea Report" was published in July 2017, after the approval by the Contracting Parties (52th meeting of the Heads of Delegation).

Under Theme 1 of the TAPAS project the Baltic Sea pressures and impact indices (BSPI/BSII) are further developed. The indices are used to assess cumulative impacts of human activities and pressures on ecosystem components of the Baltic marine environment. The human activity and pressures component of the indices have been developed to align with the MSFD and the draft revision of its Annex III.

The development of the BSPI/BSII as well as other HELCOM activities requires availability of data on spatial distribution of specific ecosystem components. In TAPAS Theme 2, national data as well as other data available to HELCOM are compiled to Baltic-wide maps to support the regional assessment. The maps developed in the project have served both status and impact assessments of HOLAS II. Under this theme a HELCOM indicator for assessing the condition of benthic biotopes has also been further developed.

Under Theme 3, the TAPAS project develops a common conceptual framework for economic and social analyses in the Baltic Sea. The results have been directly used in HOLAS II with the aim to support a coherent MSFD ESA reporting by Baltic EU Member States in 2018. The analysis of social and economic impacts are further intended to be linked to the human activities and pressures and the state of the marine environment.

A specific objective of Theme 4 is to establish workspaces on the HELCOM website as technical means for making assessment data and information available online enabling open access and efficient reuse of the collected data. This technical solution is an extension to the existing HELCOM Map and Data service infrastructure, hosted by the HELCOM Secretariat.

The final report

The report has the following structure

- 1) Final summary report (this document); contains a brief summary of activities and results under each theme and tabular overview of achievements of tasks and deliverables.
- 2) Deliverables (Appendix 1); contains deliverables from the project e.g. reports and fact sheets.
- 3) Workshop outcomes (Appendix 2); contains the outcomes and recommendations of workshops held to guide project components.

Section 6 of this document provides a list and explanatory text of HELCOM Working Groups and expert bodies that have participated in the management and guidance of the project.

Theme 1: Baltic Sea pressure and impact indices (BSPI/BSII)

Aims

The Baltic Sea Pressure index (BSPI) and the Baltic Sea Impact index (BSII) were applied in the initial HELCOM holistic assessment of ecosystem health (2010) and have subsequently been developed further for the eastern parts of the North Sea by the HARMONY project (Andersen & Stock 2013). The impact index (BSII) is based on georeferenced data sets of anthropogenic pressures, human activities and ecosystem components, and on sensitivity scores that estimate the potential impact of each assessed pressure on specific ecosystem components. The BSPI is a simplified version the BSII and focuses on pressures only.

TAPAS has further developed the BSPI and BSII for use in the first version of the 'State of the Baltic Sea' report. Particular aspects to be considered in the project included improvement of sensitivity scores, improvement of spatial layers by consideration of extent of pressures and temporal aspects.

Working mode

Two TAPAS workshops with participation of representatives of the Contracting Parties were held to provide recommendations to development of the indices: HELCOM TAPAS Pressure Index WS 1-2016 and HELCOM TAPAS Pressure Index WS 2-2016 (see section 5, List of workshops). Further guidance was given by the HOLAS II core team and the State and Conservation Working Group. HELCOM HOD 51-2016 agreed in principle to use the method to calculate the Baltic Sea Impact Index (BSII) as presented in this report in HOLAS II.

Main outcomes by June 2017

The project reviewed the index methods from the previous scientific literature and suggested three alternative calculation methods to the 5th meeting the HELCOM State and Conservation group. The meeting agreed that the final calculation method will be decided after evaluating the results of further testing of the methods. The project proposed for the meeting of the HELCOM GEAR group in June 2017 that the BSII should be calculated by the so-called 'sum method'.

An important objective of the TAPAS BSII/BSPI work was to suggest how the pressure layers will be produced from the source data. This work included (1) production of a linkage framework between all activities and all pressures (except the physical pressures which were developed by the EU-co-financed BalticBOOST project coordinated by HELCOM and implemented in 2016-16), (2) proposal for the source data for each activity and pressure, and (3) defining how the temporal and spatial data is aggregated. This work was presented to the 5th meeting the HELCOM State and Conservation group as well as to the two TAPAS Theme 1 workshops. The methods were agreed by the 6th meeting the HELCOM State and Conservation group in May 2017.

Theme 1 also had the objective to develop the sensitivity scores for the BSII. This was carried out through an expert survey which was circulated through the HELCOM working groups. The survey was responded by 81 experts. The results were evaluated and a set of sensitivity scores and an associated report were presented for the 6th meeting the HELCOM State and Conservation group in May 2017.

The data call and pre-processing of spatial layers for pressures and human activities have been carried out by the HELCOM Secretariat, outside the TAPAS project. The TAPAS project post-processed the data layers according to the TAPAS results in order to have operational pressure input data into the BSPI and BSII.

The data layers as well as sensitivity scores were tested in the TAPAS project and the method was recommended to be used for the HOLAS II.

The final results of the Theme 1 are presented in the Appendix 1, Theme 1 Final deliverable 1.

Theme 2: Spatial information on ecosystem components

Aims

The application of BSII in the initial HELCOM holistic assessment was based on a limited number of Baltic-wide data sets of specific ecosystem components. In the TAPAS project Baltic-wide maps for selected benthic habitat forming species, mammals, birds, and fish are updated and improved. In the 'State of the Baltic Sea' report (HOLAS II) these ecosystem component maps are used together with broad-scale habitat maps developed by the EMODnet Seabed Habitats components (EUSeaMap 2).

In HELCOM, a set of commonly agreed core indicators form the basis for the assessment of status of the Baltic Sea marine environment. Although there are currently more than 30 agreed core indicators only one of these, a recently developed test indicator for HOLAS II (i.e. threshold agreement in some assessment units only), address the status of benthic habitats per se. In TAPAS, the development of an indicator addressing the area, extent and quality of benthic habitats has been initiated. The indicator ('Condition of benthic habitats') is developed with the view to fulfil criterion D6C5 of the revised Commission Decision on GES criteria i.e. 'the extent of adverse effects from anthropogenic pressures on the condition of the habitat type'.

Working mode

The choice of maps to develop for use in HOLAS II was made by the State and Conservation Working Group (Outcome State & Conservation 5-2015, para 6J-1-6J.8) based on an inventory of nationally available data. A call for data to support the development of the maps was issued by the HELCOM Secretariat. The maps were subsequently prepared by the TAPAS project in communication with HELCOM expert groups and networks.

The development of the indicator has been carried out by the lead partner Estonian Marine Institute. The development work on the indicator concept has been communicated with experts from other HELCOM countries at an [intersessional online meeting](#), and through meetings of the HELCOM IN BENTHIC Group. The indicator was discussed in detail at the HELCOM TAPAS benthic habitat indicator workshop ([Outcome of HELCOM TAPAS benthic indicator WS 1-2016](#)) and the recommendations from the workshop were incorporated in the indicator concept. The indicator was presented for consideration at State & Conservation 5-2016, where it was agreed that the indicator will be further developed in HELCOM towards a core indicator. The further developed indicator will be presented to State & Conservation 7-2017.

Testing of the updated indicator has been initiated in Estonian waters and other HELCOM Contracting Parties have carried out equivalent testing in their national waters. The updated indicator text and developments in methodology and threshold setting proposals, based on the Estonian case study will be presented to the HELCOM State and Conservation 7-2017 meeting. The national reporting process of other HELCOM Contracting Parties is currently underway. Provisional indications on these case studies indicates that the development of the indicator will require detailed discussion, particularly on aspects of agreeing valid thresholds that are applicable across such extensive environmental and biological gradients. Once these national and HELCOM reporting processes have been completed it is anticipated that the HELCOM IN-BENTHIC Group will convene to bring together the findings and develop a viable plan for operationalisation of the indicator.

Main outcomes

Ecosystem component maps

The following ecosystem component maps have been collated/modelled on the Baltic wide scale in the TAPAS project.

Benthic species:

- Chara distribution

- Fucus distribution
- Furcellaria distribution
- Mytilus distribution
- Zostera distribution

Broadscale habitats:

- Circalittoral hard substrate
- Circalittoral mixed substrate
- Circalittoral mud
- Circalittoral sand
- Infralittoral hard substrate
- Infralittoral mixed substrate
- Infralittoral mud
- Infralittoral sand

Natura 2000 habitats:

- Baltic esker islands
- Boreal Baltic islets and small islands
- Bubble reefs
- Estuaries
- Lagoons
- Large shallow inlets and bays
- Mudflats or sandflats
- Reefs
- Sandbanks

Pelagic habitats:

- Bottom oxygen
- Chl-a concentration log10

Birds:

- Breeding area for birds
- Wintering area for birds

Fish:

- Cod abundance
- Cod spawning areas
- Herring abundance
- Perch recruitment areas
- Pikeperch recruitment areas
- Sprat abundance

Mammals:

- Grey seal distribution
- Harbour porpoise distribution
- Harbour seal distribution
- Ringed seal distribution

For each ecosystem component map a fact sheet has been developed to clarify data source, data quality, spatial resolution etc. The draft fact sheets produced under the TAPAS project are submitted as a deliverable. They have been updated as needed based on the review by Contracting Parties and made available through the HELCOM website (general information) and HELCOM Metadata catalogue (metadata on spatial datasets). The ecosystem component layers have been in the BSII.

Indicator development

The indicator on “Condition of benthic habitats” (currently a HELCOM pre-core indicator) evaluates the status of the benthic habitats in the Baltic Sea by assessing three different properties: the area, extent and quality of benthic habitats. The indicator is used per single habitat and gives an assessment of the condition of the particular habitat in an assessment unit (geographically defined area). All habitats are assessed separately and the indicator can be used according to different habitat classifications and different hierarchical levels.

The general principle of the proposed assessment system is based on practices used for reporting under the EU Habitats Directive (Evans & Arvela 2011) taking into account requirements of the Commission Decision on GES criteria. As a rule, Good Environmental Status (GES) for assessed habitat is achieved when the area and extent of the habitat are stable and at least 90% of the assessed habitat is in good quality status. The determination of whether GES is reached is based on a comparison of the observed variables with the baseline values. The status class of the indicator within the assessment unit is determined using OAO principle between the status assessments of the three habitat properties (area, extent, quality). The overall assessment result is presented in three status classes (GES; sub-GES, close to GES; sub-GES, far from GES). The indicator is applicable in the waters of all countries bordering the Baltic Sea. The availability of data is however currently unknown and the data has not been collected yet for a Baltic Sea wide assessment. However, some case studies have been initiated by HELCOM Contracting Parties, covering a wide range of environmental gradients, as part of a directed effort to test the wider applicability of the indicator.

One test run on one particular biotope defined by characteristic species – *Fucus* spp. habitat - has been conducted. The geographical assessment unit for this test case was the whole marine area of Estonia. In the demonstration exercise the area of the habitat was estimated in 1X1 km cells (data from years 1995-2015) and compared to area determined in year 2012 (baseline data from years 1959-2012). No decline in the area was observed so the classification of this property was GES. The observed extent was compared to extent determined in year 2012 and no decline was observed and the classification of this property was thus also GES. For this demonstration exercise we used three indicators to describe the habitat quality: 1) status of typical species (available national methodology), 2) modelled Secchi depth, and 3) modelled phosphate concentration in winter. Threshold values were taken from existing HD assessment scheme (status of typical species) and from the Estonian Initial MSFD Assessment (Secchi depth, phosphates). The median value of indicators resulted in the quality of habitat being assessed as sub-GES, close to GES. Since the parameter with lowest status determines the overall assessment, the status of this habitat in Estonian waters turned out to be sub-GES, close to GES. This test run is presented in the Deliverable 2 from Theme 2 to illustrate the practical application of the indicator methodology.

The indicator is currently not operational, however there have been significant developments in the threshold setting and testing of the indicator. In addition to case studies carried out in Estonian waters there have been case studies initiated by HELCOM Contracting Parties. These studies are currently undergoing national reporting and have highlighted a number of interesting challenges related to the operationalisation of this indicator across the entire Baltic Sea region. The updated indicator will be presented at the HELCOM State and Conservation Working at the seventh meeting in October 2017 and once the national reporting of other HELCOM Contracting Parties has taken place the HELCOM IN-BENTHIC Group will be convened to operationalise the indicator.

Theme 3: Framework for economic and social analyses (ESA) in the Baltic Sea region

Aims

The main objectives of Theme 3 in the HELCOM TAPAS project were to build capacity for economic and social analyses (ESA) in the Baltic Sea region and to propose a framework for the regional economic and social analyses for the ‘State of the Baltic Sea report’ in 2017 and the EU Marine Strategy Framework Directive (MSFD) Initial Assessment reporting in 2018.

Working mode

The proposed approach is an outcome of expert workshops, literature review and data collection to provide a practical application of the concept. The chosen approaches are in line with the guidance document provided by the European Commission’s Working Group of Economic and Social Analyses of the MSFD (WG ESA 2010).

The development of the approach and the analyses was made in close collaboration with the TAPAS project partners (HELCOM, Finnish Environment Institute and SEI Tallinn) and HELCOM Contracting Parties. This was achieved by organizing two TAPAS ESA workshops that allowed the co-development and relevance check of the approach and results by experts in and those responsible for the economic and social analyses in the Baltic Sea area ([TAPAS ESA WS 1-2016](#), [TAPAS ESA WS 2-2016](#)). The framework and findings were also presented at HELCOM HOLAS and GEAR meetings, HELCOM-VASAB meeting, and the 15th Meeting of the Working Group on Programme of Measures, Economic and Social Analysis (WG POMESA) in 2016. In March 2017, the results of the work were presented and discussed in the [HOLAS II ESA WS 2-2017](#) workshop.

Main outcomes

The framework developed in Theme 3 includes the two types of analyses requested by the MSFD Initial Assessment: the use of marine waters and cost of degradation. The approach developed for the use of marine waters analysis relies mainly on the water accounts approach and statistics to collect economic indicators for the sectors and activities present in the marine environment. These statistics are complemented with information on the non-market value of marine and coastal recreation, in the line with the ecosystem services approach. To illustrate the framework in practice, data were collected for the following sectors/activities: fish and shellfish harvesting, aquaculture, tourism and leisure, energy production and transport. The report presents economic indicators, including gross value added, consumer surplus and employment for these activities for Estonia and Finland. The results of the analysis describe the economic and social impacts from the use of the Baltic Sea.

The approach developed for the cost of degradation analysis employs a mix of the thematic and ecosystem services approaches. Estimates of cost of degradation rely on economic valuation studies on the welfare effects of changes in the state of the marine environment with regard to relevant descriptors of good environmental status and ecosystem services. Baltic Sea wide studies, providing value estimates for each coastal country, are preferred when they are available. This is the case for cost of degradation related to eutrophication and recreation. For other descriptors and ecosystem services, such as biodiversity and foodwebs, the framework suggests using value transfer, where cost of degradation figures estimated in some of the Baltic Sea countries are transferred to those countries where estimates do not exist. The report presents regional estimates of cost of degradation for eutrophication and recreation (ecosystem service). The cost of degradation analysis illustrates what are the economic losses if the Baltic Sea marine environment does not achieve a good environmental status.

Outcomes in 2017

SEI Tallinn experts continued work on the economic and social analyses in 2017. The work contributed mainly to the following activities:

- 1) Continuing the work on the use of marine waters analysis, including additional data collection and analysis for the relevant sectors (fish and shellfish harvesting, aquaculture, tourism and leisure, energy production and transport), and assessing the possibilities and limitations of the analysis.
- 2) Contributing to the first version of the HOLAS II 'State of the Baltic Sea' [summary report](#) and the ESA [supplementary report](#). SEI Tallinn was mainly involved in the use of marine waters analysis, including the figures, data sources and overall text.
- 3) Preparing for and participating to the HELCOM workshop to support the HOLAS II assessment of economic and social analyses ([HOLAS II ESA WS 2-2017](#)) that was held on 31 March 2017 at the premises of the Baltic Sea Centre, Stockholm University, Sweden.

As a whole, SEI Tallinn's work supported the economic and social analyses in the HELCOM 'State of the Baltic Sea report', published in 2017.

Theme 4: Workspaces for data and information access

Aims

The HELCOM Secretariat has developed and hosts the HELCOM Map and Data service to fulfill the requirement outlined in the [HELCOM Monitoring and Assessment Strategy](#) to provide open access to the general public to environmental information collected within HELCOM monitoring programmes. The Data and Map service is used to display assessment results and underlying spatial data sets, which are openly accessible and downloadable. The data can be also accessed as service interfaces (OGC WMS, ArcGIS rest) enabling national use of HELCOM datasets as direct machine-to-machine interface.

In the TAPAS project, electronic workspace sites to prepare the tabular spreadsheet datasets for assessment product approval have been established for ecosystem components, human activities and all core indicators (for hazardous substances and biodiversity related). The content of the workspaces, together with interactive assessment product maps was made publicly available when HOLAS II report was published in July 2017. The final approved spatial datasets was stored and made publicly available using the tools developed in TAPAS project, namely the new version of HELCOM Map and Data service (<http://maps.helcom.fi>) and completely new HELCOM metadata catalogue (<https://metadata.helcom.fi>), following INSPIRE recommendations on developing access, view and download services.

Working mode

The designing of the work plan related to HELCOM Map and Data service development was carried out by HELCOM Secretariat with close cooperation with relevant partner organisations, namely ICES, to enable integration to WISE-Marine and use of technologies that are compliant and provide interoperability between different platforms. The practical implementation of the tool development was done by the HELCOM Secretariat.

A joint online meeting was organized between HELCOM and ICES to sort out strengths and weaknesses of the current solution in light of interoperability with other platforms and WISE-Marine. The meeting also discussed and provided guidance on suitable technology for components used in the HELCOM Map and Data service. ICES data center acted as an advisor to HELCOM secretariat related to technical implementation of the selected metadata solution (Geonetwork) and provided continuous support regarding installation and configuration via correspondence.

Practical implementation of the workspaces for assessment data result and review was carried out by HELCOM Secretariat based on requirements stemming from indicator review process.

Main outcomes

Set of workspaces with embedded dynamic map viewer was established (Human activities spatial data, Ecosystem components spatial data, Core indicator tabular data and spatial data) in the HELCOM meeting portal to gather data quality assurance and review responses provided by Contracting Parties and tracked version history of dataset approval for documentation purposes. The workspace worked as a temporary password-protected platform to review the data and correct it before making it publicly available using the HELCOM Map and Data service and HELCOM metadata catalogue.

HELCOM Metadata catalogue was installed, configured and taken into production use in June 2017 by the HELCOM Secretariat. The created test metadata entry was tested to be 100 % INSPIRE compliant. All old content was migrated from existing database to the new metadata solution and new metadata was created for new datasets developed e.g. under Theme 2 of TAPAS project.

New version of HELCOM Map and Data service, developed from scratch using ESRI Javascript API was created and customized by HELCOM Secretariat and released in June 2016. The new graphical user interface is faster

than the old version and enables seamless interaction between the map viewer section and metadata entry. The source code of the map service was made available via the HELCOM Github account: <https://github.com/helcomsecretariat>

ICES's recent experience in developing new online tools for sharing and publishing GIS products, metadata and services proved to be useful to HELCOM's efforts in further developing new online GIS infrastructure. ICES's knowledge exchange and advice, provided a good starting point for producing a functional and user friendly GIS portal that will make it easier to interface to other information systems, such as WISE-Marine.

3. Tasks undertaken according to the application and state of completion

Theme 1: Baltic Sea pressure and impact indices (BSPI/BSII)

Task	Activity under the reporting period	Partners	Status
<p>1. Workshop 1 with participation of national experts to:</p> <ul style="list-style-type: none"> - Identify and agree on the data sets of pressures, human activities and ecosystem components - Identify requirements to improve the BSPI and BSPII, including the impact weight scores and spatial and temporal aspects of pressures and impacts. 	<p>The workshop was held in Helsinki, 28-29 January 2016. Background documents prepared to the workshop are available through the HELCOM meeting portal.</p>	<p>SYKE, NIVA</p>	<p>Completed</p>
<p>2. Produce Baltic Sea impact weight scores for specific ecosystem components, including to develop and carry out an online survey addressing experts to include information from peer-reviewed publications and to test the inclusion of uncertainties/probabilities to the weight scores;</p>	<p>The expert survey was developed and circulated through HELCOM contact points and working groups. It was not made online due to the wish of the Contracting Parties to have a focused survey. The responses were received later than originally anticipated and hence the analysis continued in 2017. This analysis includes support from literature, e.g. from the literature review under the BalticBOOST project as well as other sources. The expert survey included confidence estimates which are tested against the survey results.</p>	<p>NIVA, SYKE</p>	<p>Completed</p>
<p>3. Technical development of the BSPI and BSII indices to include consideration of temporal and spatial aspects of the pressures and impacts;</p>	<p>The BSPI and BSII methods have been presented to the 5th meeting of the HELCOM State and Conservation group and HELCOM HOD 51-2016 that agreed on the method for HOLAS II purposes. The method is described in the deliverable 1 of Theme 1 (Appendix 1).</p>	<p>SYKE</p>	<p>Completed</p>
<p>4. Carry out a test application of the indices and evaluate the outcome based on the most recent available data sets in HELCOM;</p>	<p>The BSII method was tested before the 2nd TAPAS Theme 1 workshop with the data which was available at that time.</p>	<p>SYKE</p>	<p>Completed</p>

Task	Activity under the reporting period	Partners	Status
5. Workshop 2 with participation of national experts to: <ul style="list-style-type: none"> - Present the test results at a workshop - Fine-tune the approach based on guidance from the workshop. 	The workshop was held in Helsinki, 6-7 September 2016. Background documents prepared to the workshop are available through the HELCOM meeting portal .	SYKE, NIVA	Completed
6. A report on how the impact weight scores have been derived and a data base with the results of the surveys (expert survey and literature survey);	Theme 1, Deliverable 1 is completed and a report has been produced.	NIVA, SYKE	Completed
7. A protocol for application of the BSPI/ BSII together with the test results, including a step-wise guidance how to calculate the indices.	Theme 1 Deliverable 1 is finalized and a report has been produced.	SYKE, NIVA	Completed

Theme 2: Spatial information on ecosystem components

Task	Activity under the reporting period	Partners	Status
1. Define a set of key ecosystem components for which Baltic wide maps are to be used in the holistic assessment.	For benthic species and biotopes, information from countries through data request from State and Conservation WG will be used as a starting point.	HELCOM	Completed
2. Select a number of case study areas, and key habitat forming species in these areas, to carry out further the development of the HELCOM indicator on distribution, pattern and extent of benthic biotopes.	Case studies in Estonian sea areas and in sea areas of other HELCOM Contracting Parties have been carried out and are currently being reported at the national level. Combined discussion of these studies will be initiated by reporting of the updated indicator to HELCOM State and Conservation 7-2017 and be convening of the HELCOM IN-BENTHIC Group.	EMI	Studies carried out – National reporting underway.
3. Compile and document georeferenced Baltic wide maps for the selected set of ecosystem components.	36 Baltic wide maps have been compiled/modelled. Draft maps and associated fact sheets are included in Theme 2, deliverable 1 (Appendix 1).	HELCOM	Completed
4. Explore different methodologies and develop GES-boundaries for selected key benthic habitat forming species in a number the selected case study areas	Updated methodologies and threshold setting has been developed based on test studies and national and expert discussion at HELCOM State and Conservation and HELCOM IN-BENTHIC meetings. This will be reported at HELCOM State and Conservation 7-2017.	EMI	First draft completed
5. Develop a proposed assessment protocol, including monitoring strategies and processing of monitoring data to assess the status of the indicator on distribution, pattern and extent of benthic biotopes.	Proposal for assessment protocol updated based on expert discussion at HELCOM State and Conservation and HELCOM IN-BENTHIC meetings. This will be reported at HELCOM State and Conservation 7-2017.	EMI	New proposals developed
6. Workshop 1 with participation of national experts to: Present the results from the case study areas and the proposed monitoring and assessment and fine-tune the approach based on guidance from the workshop.	The workshop was held in Tallinn, 28-29 September 2016. Background documents prepared to the workshop are available through the HELCOM meeting portal .	EMI HELCOM	New proposals developed
7. Georeferenced Baltic wide maps for the selected set of ecosystem components.	36 Baltic wide maps have been compiled/modelled. Draft maps and associated fact sheets are included in Theme 2, deliverable 1 (Appendix 1).	HELCOM	Completed

<p>8. Guidelines for a harmonized approach to define GES-boundaries for the indicator on distribution, pattern and extent of benthic biotopes, and guidelines for monitoring and assessment protocol for the indicator.</p>	<p>Case studies, particularly those of HELCOM Contracting Parties have highlighted several new hurdles with this process. Proposals to address these issues have been made and will be further developed within HELCOM IN-BENTHIC. Via this forum national harmonisation and consultations will be further developed.</p>	<p>EMI</p>	<p>Advanced</p>
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Theme 3: Framework for economic and social analyses (ESA) in the Baltic Sea region

Task	Activity under the reporting period	Partners	Status
1. The first step of the planning and of the ESA framework took place as part of the planned HOLAS II workshop 30 September - 1 October 2015.	The workshop was organized in Helsinki, 30 September - 1 October 2015. The outcome, report and presentations can be found on the workshop site in the HELCOM meeting portal.	SYKE SEI Tallinn HELCOM	Completed
2. Consultation with the other building blocks of the HOLAS II project and the HOLAS II core team in order to identify a set of status indicators to provide the natural scientific basis for the ESA.	This task was carried out throughout 2016 to ensure comparability with the HOLAS II process. The framework and findings were presented in the two HOLAS II meetings arranged in 2016, with documents available through the HELCOM meeting portal (HOLAS II 5-2016 and HOLAS II 6-2016).	SYKE SEI Tallinn HELCOM	Completed
3. Review existing economic data and environmental economic accounts systems in Finland and Estonia, and other countries' examples as appropriate or available, identify differences and data gaps	Existing economic data on use of marine waters were reviewed in Finland and Estonia, and cost of degradation estimates were collected for eutrophication and recreation for all Baltic Sea region countries. The availability of addition data was also assessed.	SYKE SEI Tallinn HELCOM	Completed
4. Workshop to discuss the findings	The workshop was held in Helsinki, 11-12 May 2016. Background documents prepared to the workshop are available through the HELCOM meeting portal .	SYKE SEI Tallinn HELCOM	Completed
5. Continue data collection and framework development	The development of the framework and data collection was continued after the first workshop based on the feedback and discussions in the workshop.	SYKE SEI Tallinn HELCOM	Completed
6. Workshop to discuss the findings	The workshop was held in Tallinn, 8-9 September 2016. Background documents prepared to the workshop are available through the HELCOM meeting portal .	SYKE SEI Tallinn HELCOM	Completed
7. A proposition on how to conduct regional ESA to support the MSFD Initial Assessment reporting in 2018, including advice on a common data collection format.	The proposed framework for regional economic and social analyses on the use of marine waters and cost of degradation and the data collected are presented in detail in the deliverable for Theme 3 (Appendix 1). The report also includes recommendations and lessons learnt. The project also contributed to the HOLAS II supplementary report on economic and social analyses (See Appendix 1 theme 3 deliverable).	SYKE SEI Tallinn HELCOM	Completed

Theme 4: Workspaces for data and information access

Task	Activity under the reporting period	Partners	Status
1. Consider the agreed MSFD 2018 reporting requirements as soon as they are available	<ul style="list-style-type: none"> - Initial planning of indicator template utilization at HELCOM to be harvested to the prefilled information in MSFD reporting - Planning stable URLs for underlying metadata and datasets 	HELCOM	Completed
2. Initial mapping of relevant INSPIRE service specifications and recommendations of the INSPIRE Marine Pilot project	<ul style="list-style-type: none"> - Mapping HELCOM (ArcGIS) metadata against INSPIRE metadata scheme - Research best option for metadata system in HELCOM → Decision to take into use Geonetwork platform to store metadata of all HELCOM GIS data 	HELCOM, ICES	Completed
3. Rate current HELCOM Map and Data service delivery in terms of INSPIRE compatibility e.g. based on feedback by ICES and from selected expert users from RSCs (OSPAR), EEA and possibly other international organizations with similar systems.	<ul style="list-style-type: none"> - Online meeting with ICES data center regarding: <ul style="list-style-type: none"> o Selection of best platform for accessing data o Selection of best platform for accessing metadata o Initial plans for indicator information harvesting - Taking part in EEA WISE-Marine workshop in order to discuss data sharing strategy, interfaces and possible technical solutions regarding interfaces etc. 	HELCOM, ICES	Completed
4. Develop the already identifiable technical improvements and needs such as searchable metadata component: INSPIRE compatible metadata catalogue with relevant MSFD and HELCOM keywords, and improved query tool for subsetting a specific dataset by parameter, Develop some other selected INSPIRE compatible components that are not currently compatible as will be identified in Task 1	<ul style="list-style-type: none"> - Installing and configuring Geonetwork - Configuring geonetwork to be INSPIRE compliant - Starting metadata import from old system to new (~500 metadata records, currently ~400 complete) - Metadata validation against INSPIRE validator to ensure 100% INSPIRE compliance of metadata 	HELCOM, ICES	Completed

Task	Activity under the reporting period	Partners	Status
5. Establish of workspace sites to prepare and disseminate pre-defined tabular dataset (underlying non-spatial data) for the three identified themes	Set of workspaces was established: <ul style="list-style-type: none"> - Human activities spatial data - Ecosystem components spatial data - Core indicator tabular data and spatial data All the workspaces contained functionalities to access the data via interactive map viewer, data download and spreadsheet via for non-spatial data. Workspace also contain review responses provided by countries and tracked version history of dataset approval.	HELCOM	Completed
6. Selected tools developed and published in the HELCOM Map and Data service	<ul style="list-style-type: none"> - New version of HELCOM Map and Data service published - New ArcGIS Server was installed. - Using the new platform, all functionalities were developed using ESRI Javascript API. 	HELCOM	Completed
7. Workspace sites displaying assessment data process down to data product openly available	Content of workspace sites (spatial data) was made publicly available in the process of publishing HOLAS II report as underlying documentation and versioning of datasets.	HELCOM	Completed
8. Set of recommendations for further necessary improvements so it is possible to make the HOLAS II underlying data and information accessible according to MSFD Art. 19(3). The recommendations will take into account the evolving WISE-Marine and its needs	Building knowledge base by taking part in WISE-Marine Workshop, MSFD WG DIKE and INSPIRE Marine Pilot workshop at JRC. Data access and view services (metadata records based on csw and data view service (OGC WMS) are foreseen to fulfil the data feed to WISE-Marine.	HELCOM, ICES	Completed

4. List of deliverables

Associated reports and documents are provide in **Appendix 1**.

Theme	Name and nr of Deliverable
1	Development of the Baltic Sea Pressure and Impact Index
2	Deliverable 1: Ecosystem component maps
2	Deliverable 2: Development and testing of a HELCOM indicator on the condition of benthic habitats
3	A report on the framework for economic and social analyses in the Baltic Sea region, interim deliverable 1. Contribution to the HOLAS II 'State of the Baltic Sea' supplementary report on economic and social analyses (Appendix 1, Theme 3 deliverable 2).
4	Workspaces for data and information access

5. List of workshops

Outcome of workshops and participant lists and are provided in **Appendix 2**.

Theme and workshop	Purpose of the meeting	Location	Dates
Theme 1, Task 1 First HELCOM TAPAS Workshop on the HOLAS II Pressure and Impact Index	<ul style="list-style-type: none"> - follow up on and support the collation of datasets to use in the assessment, including the preparation of metadata information and spatial data set fact sheets - consider how to aggregate the datasets on human activities, pressures and ecosystem components into ecologically relevant units - -consider anthropogenic pressures to be supported by literature information for setting impacts scores - -detail the planned expert questionnaire to obtain information for setting the impact scores 	Helsinki	28-29 January 2016
Theme 1, Task 5 2nd HELCOM TAPAS Workshop to support the development of the Baltic Sea Pressure and Impact index	<ul style="list-style-type: none"> - consider the proposed methodological approaches to treat the spatial data sets that will be included; - -follow up on the progress of setting the sensitivity scores, including the expert survey and literature based information; and - provide final feedback on the planned methodological developments of the BSII. 	Helsinki	6-7 September 2016
Theme 2, Task 6 HELCOM TAPAS benthic habitat indicator workshop	<ul style="list-style-type: none"> - discuss the results of the development work on the indicator that is carried out under the TAPAS project. - discuss other benthic indicators under development in HELCOM (Cumulative impact on 	Tallinn	27-28 September 2016

	benthic biotopes, State of the soft-bottom macrofauna community.		
Theme 3, Task 4 First HELCOM TAPAS Workshop to develop the economic and social analyses of HOLAS II	<ul style="list-style-type: none"> - Propose economic sectors to be included in a regional assessment based on regional relevance and data availability - Elaborate on how to account for non-market values in the use of marine waters analysis - Outline more specifically the proposed analyses of the use of marine waters and its potential linkages to the assessment of human activities and pressures 	Helsinki	11-12 May 2016
Theme 3, Task 6	<ul style="list-style-type: none"> - Propose a use of marine waters approach for TAPAS and HOLAS II purposes. - Share information and discuss ongoing national work relating to analyses of cost of degradation. - Discuss baseline scenarios for the cost of degradation analysis. - Propose a cost of degradation approach for TAPAS and HOLAS II purposes. 	Tallinn	8-9 September 2016

6. Abbreviations of HELCOM groups and projects mentioned in the report

HELCOM/Groups/Working Groups:

HELCOM: Helsinki Commission. Meets annually, with the Heads of Delegation (HOD) representing the Contracting Parties: Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

HOD: Heads of Delegation. Representatives of the Contracting Parties. Heads of Delegation are the people representing their respective party. In addition to the annual Commission meetings, the Heads of Delegation meet at least twice a year.

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.

Projects, expert groups and intersessional activities:

HOLAS II: Project for the development of the Second holistic assessment of Ecosystem Health of the Baltic Sea (2014-2018). The project is led by a “core team” with representatives from the Contracting Parties.

IN BENTHIC: HELCOM Intersessional Network on benthic habitat monitoring. The aim of the group is to support the regional development of monitoring methods and indicators for benthic habitats.