Baltic Marine Environment Protection Commission

14 February 2017

Final summary report

Project activities
15.9.2015 - 14.12.2016

Baltic Sea project to boost regional coherence of marine strategies through improved data flow, assessments, and knowledge base for development of measures

Baltic BOOST

Co-funded by
the European Union

Contents

1. General Information

Programme concerned: Best practices for action plans to develop integrated, regional monitoring programmes, coordinated programmes of measures and addressing data and knowledge gaps in coastal and marine waters
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Title of the project: Baltic Sea project to boost regional coherence of marine strategies through improved data flow, assessments, and knowledge base for development of measures

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Name of partners in the project and abbreviations used:
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International Council for the Exploration of the Sea (ICES)
Johann Heinrich von Thünen-Institute, Federal Research Institute of Rural Areas, Forestry and Fisheries (TI)
Latvian Fund for Nature (LFN)
Leibniz Institute for Baltic Sea Research (IOW)
NIVA Denmark Water Research (NIVA Denmark)
University of Tartu (EMI)
Swedish University of Agricultural Sciences, Department of Aquatic Resources, Institute of Marine Research (SLU Aqua)[1]
Swedish Museum of Natural History (SMNH)
Totalförsvarets forskningsinstitut, Sweden (FOI)
Technical University of Denmark, National Institute of Aquatic Resources (DTU Aqua)

Sub-contractor: Aarhus University, Denmark (AAU)

Start date and end date of the reporting period: 15/09/2015 – 14/12/2016

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[1] the participation of SLU Aqua was co-financed by the Swedish Agency for Marine and Water Management.

2. Introduction to BalticBOOST project activities and outcomes

The BalticBOOST project was designed to boost planned and aspired HELCOM activities, in particular related to the long-term cooperation between HELCOM countries to produce joint assessments and agreements on measures to improve the state of the Baltic Sea. With the role of HELCOM as the coordination platform for the regional implementation of the Marine Strategy Framework Directive (MSFD) in the Baltic Sea region, the project has simultaneously contributed to improve the regional coherence in the implementation of the MSFD for EU Member States.

More specifically, the project has developed joint assessment approaches and set up data arrangements and databases to support indicator-based assessments of the state of the Baltic Sea. These activities have in particular focused on strengthening HELCOM work on biodiversity and hazardous substances. The project has furthermore increased the knowledge base on impacts of pressures affecting seabed habitats as well as impacts of underwater noise, thereby taking steps towards the development of joint environmental targets for such pressures. Finally, the project has developed a system to follow-up the activities and measures that have been agreed in HELCOM to reach a Baltic Sea in Good Environmental Status by 2021.

Several of the project deliverables will be directly used in the HELCOM HOLAS II project that is developing the 'State of the Baltic Sea' report by mid-2018. HOLAS II will assess progress towards reaching the objectives of HELCOM Baltic Sea Action Plan (BSAP), agreed in 2007, as well as provide the necessary requirements for EU Member States to report the initial assessment under Article 8 of Marine Strategy Framework Directive (MSFD) in 2018. A majority of project deliverables are also anticipated to be directly applicable or adjustable to other European Seas and the output of BalticBOOST can be presented to the MSFD CIS process as relevant.

The project has been coordinated by HELCOM and carried out by 10 partners from the HELCOM EU Member States and one international organisation (ICES).

Management structure

The project has been managed through technical and strategic guidance from relevant HELCOM Working Groups. Workshops, with participation of nominated representatives of the HELCOM countries, have guided the project implementation and have formed a key component of the BalticBOOST project. The project has also been guided by the "core team" of national representatives of the HOLAS II project as relevant. Through this integrated management structure, a majority of deliverables have already been endorsed and taken up by HELCOM during the lifetime of the project while a limited number of deliverables will form the basis for continued work. Section 7 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.

Final report

The final report is delivered according to 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 comprehensive deliverables (18) from the project e.g. reports, guidelines, inventories.
3) Workshop outcomes (Appendix 2); contains the outcome and recommendation of HELCOM BalticBOOST workshops (7) held to guide project components.
4) Supporting material (Appendix 3); contains additional material developed during the project i.e. case studies (6) that have supported the development of deliverables.

2.1 Theme 1: Biodiversity

Aims

The overarching objective of Theme 1 was to develop an operational tool for assessing the state of biodiversity and to improve data arrangements to cater for the indicators that feed into the assessment of biodiversity. Data improvements have focused on topics for which no systematic data reporting was available to HELCOM, namely fish, birds and seals. A separate study was carried out on how to align assessments of the status of seals under the MSFD and the EU Habitats Directive. The development of the tool as well as the pilot-study on seals have followed the evolving revision of the European Commission Decision on GES criteria (hereafter revised COM DEC) to ensure that the output from Theme 1 can also be used for purpose of MSFD reporting by EU Member States.

Working mode

The development of the biodiversity assessment tool was initiated by a review of existing methods for integrated assessment of biodiversity. Two workshops were organized to support the development of the assessment with the participation of national representatives (see section 5 and Appendix 2). On the basis of proposals developed by the project the workshops have made recommendations e.g. on the structure of the tools, the spatial resolution of the assessment and how to assess confidence of the assessment. The outcome of the workshops have been considered by the HELCOM HOLAS II core team and the State & Conservation Working Group.

The new databases for coastal fish, birds and seals have been reviewed by the relevant HELCOM expert bodies during the course of the project i.e. the ICES/OSPAR/HELCOM JWG Bird, FISH-PRO II project, and the Seal Expert Group, and the pilot study on the assessment of seals was discussed by the annual meeting of the Seal Expert Group in 2016.

HELCOM FISH, a dedicated HELCOM fish indicator workshop, and ICES WGBIFS have been involved in the development of data arrangements for fish indicators together with HELCOM experts that are developing the relevant indicators.

Main outcomes

WP 1.1 Development of a biodiversity assessment tool

WP1.1 had the task to develop a biodiversity assessment tool to be used in HOLAS II. The tool (BEAT 3.0, hereafter BEAT) was developed to fulfil MSFD and BSAP assessment needs and to make use of the HELCOM core indicators for biodiversity. The full description of BEAT is found in **Appendix 1, WP 1.1 Deliverable 1**.

BEAT is an indicator-based integrative assessment tool. It can handle different types of indicators and definitions of threshold value for the indicator: monotonic, unimodal, conditional and trend based. Shortly, BEAT normalizes the indicators based on the minimum and maximum values as well as the GES-boundary. BEAT follows the structure of MSFD ecosystem components laid out in the revised COM DEC (birds, mammals, fish, pelagic habitat and benthic habitat) and their division into species groups/broad habitat types and further to species and habitats.

The spatial structure follows the HELCOM Monitoring and Assessment Strategy and has four levels ranging from coastal water bodies sensu the EU Water Framework Directive to the level of the entire Baltic Sea. The indicators are assigned to an ecosystem component level, a spatial assessment unit and the associated MSFD GES criteria.

BEAT uses weighted averaging for integrating the indicators, apart for mammals where species are assessed based on the one-out-all-out rule according to the requirements of the revised COM DEC. Test cases formed the basis for agreeing on the structure and integrations rules in HELCOM.

In parallel to the biodiversity assessment, BEAT also conducts a confidence assessment of the results. The confidence of status classification, temporal data coverage over the assessment period, spatial representability of data as well as methodological confidence are evaluated for each indicator forming the confidence of the indicator result. The overall confidence also takes into account how well the indicators covers the ecosystem components and criteria of the MSFD GES Decision.

To display the results of the biodiversity assessment, a web-based visualization tool was developed. The visualization tool utilizes both the indicator results and BEAT results to display in a transparent way the biodiversity assessment results according to spatial assessment unit, ecosystem component or MSFD criteria.

BEAT is coded as an openly available R-script (https://github.com/NIVA-Denmark/BalticBOOST). The default settings of BEAT are designed for HELCOM purposes, but by changing the spatial structure the tool can also be used in other marine regions with region specific indicators.

The biodiversity assessment tool developed by BalticBOOST was agreed to be used in HOLAS II by HELCOM Heads of Delegation in December 2016 (HOD 51-2016). Minor modification to the deliverable can be expected in the implementation of the tool in HOLAS II in spring 2017. Any such changes can be followed through upcoming HELCOM meetings.

WP 1.2 Database and data arrangements for coastal fish, birds and seals

BalticBOOST WP1.2 developed together with relevant HELCOM expert groups data-arrangements for birds, coastal fish and seals. Data-arrangements consist of definition and agreement of common theme-specific data model, establishment of common database for storing collected monitoring data and an online web application to provide access to collected data. This arrangement provides access to underlying data and supports the indicator evaluations for following HELCOM core indicators:

Birds: (database web application accessible online at: http://bio.helcom.fi/birds)

- Abundance of waterbirds in the breeding season
- Abundance of waterbirds in the wintering season

Coastal fish: (database web application accessible online at http://bio.helcom.fi/coastalfish)

- Abundance of coastal fish key functional groups
- Abundance of key coastal fish species

Seals: (database web application accessible online at http://bio.helcom.fi/seals)

- Distribution of Baltic seals
- Population trends and abundance of seals

The data models were designed in order to provide required information for the use of related HELCOM core indicators. Full documentation of data models are contained in **Appendix 1, WP 1.2 Deliverable 1**.

The data bases are fully operational and data reporting for contribution to the HELCOM HOLAS II project is almost completed. The databases are hosted by HELCOM and will be made publically available at HELCOM web-site when the data has been approved by HELCOM countries (anticipated in February 2017).

WP 1.3 Data arrangements for fish indicators

HELCOM is developing two indicators that are based on data from trawl surveys; the core indicator 'Proportion of large fish in the community' (LFI) and the candidate indicator 'Mean maximum length (MML) of the fish community'. To cover the entire area of the Baltic, a combination of data from trawl and acoustic surveys are needed i.e. from Baltic International Trawl Surveys (BITS) and the Baltic International Acoustic Survey (BIAS).

The work package has developed data-flow-models, scoped the available data and defined specific issues that need to be further addressed. The data-arrangements have been developed for data hosted at ICES to be used in HELCOM for these indicators, however the specification of the data products are not defined. The proposed data flow principles are contained in **Appendix 1, WP 1.3 Deliverable 1**.

During the course of the project problems were encountered that has led to the WP 1.3 not being able to deliver according to the application. The HELCOM work to operationalize the core indicator 'Proportion of large fish in the community (LFI)' has not been completed. Since the indicator and its threshold values has not been agreed, it has not been possible to finalize the assessment protocol which would be needed to specify the parameters to be extracted from the BITS and BIAS data in an operationalized data-arrangement. It has also been recognized that the standardization and completeness of the data in the DATRAS database from the BITS survey is not sufficient for the identified large species that would drive the LFI, and before the data could be used in an assessment additional work to improve the data quality and harmonization by the countries submitting data is needed.

The work of BalticBOOST WP 1.3 has paved the way for an operational data-flow for the relevant HELCOM fish indicators in the future. Although it was not possible to deliver an operational system within the frame of the project, the continued HELCOM and ICES engagement in improving the data quality and developing data arrangements will be able to build on the outcome in coming future work.

WP 1.4 Pilot study on aligning the assessments of Good Environmental Status in the MSFD/BSAP with assessments of Favourable Conservation Status in the Habitats Directive regarding status of seal populations

The pilot study compared the GES criteria for assessing status of mammals according to the revised COM DEC with the criteria used to assess FCS under the HD. Furthermore the project has compared the results of HELCOM core indicators on "Population trends and abundance of seals" and "Distribution of seals in the Baltic Sea" with the results when applying the HD criteria for Favourable Reference Population (FRP) and Favourable Reference Range (FRR).

The BalticBOOST project finds that the revised COM DEC is consistent with the HELCOM frame work and the core indicators for seals, but in many cases contrasts with the Habitat Directive (HD) approach. The study furthermore shows that the assessment results in certain circumstances differ between the MSFD/HELCOM and HD frameworks.

Divergent assessment results between MSFD/HELCOM and HD approaches appear for two main reasons: the different scales of assessment and the different consideration of past abundances and distribution under the two frameworks. This can be exemplified by the assessment of grey seal abundance. Using the MSFD GES criteria and HELCOM core indicators grey seals, which are assessed at a Baltic-wide scale, are in GES with regard to population trends and abundance. However, when evaluated by the HD criteria, the required spatial scale is the national level. This causes the species to fail FRP in the countries which the

species has recently re-colonised; Denmark, Germany and Poland, where grey seals are still far from previous abundances. The status of grey seal abundance will furthermore fail in all countries if compared to pristine conditions as the abundance everywhere in the Baltic Sea is still below historic levels. In HELCOM the threshold values for the indicators are set to ensure viability of stocks and thus safeguarding their future as a viable part of the ecosystem. The HD on the other hand has a stronger focus on past abundances when defining a favourable reference population.

Harbour seals differ from grey seals in that they have a much more distinct population structure because of the more limited movements of this species. Thus, for harbour seals, the MSFD/HELCOM assessment, being based on appropriate management units, is carried out at a smaller scale compared to the national HD assessments. A result of this, harbour seals achieve FRP in their core countries, Sweden and Denmark, although only the Kattegat population lives up to the threshold values of the HELCOM core indicator for population trends and abundance.

While MSFD/HELCOM evaluations may be seen as more biologically relevant assessments given their use of biologically meaningful units and being based on viability of stocks, it must be stressed that in the cases where an MSFD/HELCOM evaluation is good status and a HD assessment is unfavourable, the negative HD assessment reflects a real and documented negative state compared to the pristine or ideal conditions, within the national borders that are, to a large extent, arbitrary in a biological sense. Such evaluations may still have merit, as the many of the wildlife management and legislative initiatives are still implemented on the national scale.

2.2 Theme 2: Hazardous substances

Aims

The overarching aim of Theme 2 was to develop an operational tool for assessing hazardous substances and to further develop data arrangements for the indicators that feed into the assessment of hazardous substances. The development of data arrangements has focussed on operationalizing the data-flow from the HELCOM COMBINE database to allow for automation in the indicator calculation steps, and has also explored the possibility of utilizing data stored in other regional databases for the assessment. The work under Theme 2 has followed the evolving revision of the European Commission Decision on GES criteria (hereafter MSFD GES Decision) to ensure that the output from Theme 2 can also be used for purpose of MSFD reporting by EU Member States.

Working mode

The development of the hazardous substances assessment tool was guided through two workshops with participation of national representatives (see **Section 5** and **Appendix 2**). On the basis of proposals developed by the project the workshops made recommendations e.g. on the compartments to include in the tool, the substances to include in the integrations and how to assess confidence. Testing of the tool has been carried out by the Lead partners based on data from HELCOM COMBINE and coastal data submitted by national representatives. The outcomes of the workshops have been considered by the HELCOM HOLAS II core team and the HELCOM State & Conservation Working Group.

The development of the data arrangements for hazardous substances has been guided by technical review of the HELCOM EN-HZ and also the two workshops arranged to guide the development of the assessment tool. Specifications of the parameters and formats have been developed by the Lead partner in communication with the national experts developing the core indicators.

Main outcomes

WP 2.1: Development of a tool for assessment of hazardous substances

WP2.1 had the task to develop a hazardous substances assessment tool to be used in HOLAS II. The tool (CHASE 3.0, hereafter CHASE) was developed to fulfil BSAP assessment needs and to be aligned with MSFD assessment requirements based on the HELCOM core indicators for hazardous substances. The full description of CHASE and test cases is found in **Appendix 1, WP 2.1 Deliverable 1**.

The hazardous substances integration tool CHASE has been developed further from previous versions of the tool by aligning the structure of the tool to the needs of the HOLAS II project and by converting the tool into an R-script which is openaly shared through GitHUB (https://github.com/NIVA-Denmark/CHASE). For users not familiar with the R programme environment the tool was also made available for testing online using ShinyApps (https://niva.shinyapps.io/CHASE_R/).

CHASE has been developed to integrate hazardous substances indicators in compartments based on the matrix used as a basis for the threshold value. The structure integrates indicators in the compartments biota, sediment and water. The tool development included work to explore different ways of aggregating indicators and also resulted in several test cases of applying the integration tool approach to offshore and coastal assessment units. The test cases enabled a comparison of the assessment outcome when the tool is applied compared to when a one-out-all-out approach is made (OOAO). These test results allows for an

evaluation of the applicability of the tool approach in coastal- and territorial waters that are also assessed nationally through the EU WFD.

Based on the outcome of State & Conservation 5-2016 the use of the hazardous substance assessment tool in HOLAS II was agreed at 51th meeting of HELCOM Heads of Delegation in December 2016. Any further modification to the deliverable during the implementation of the tool in HOLAS II in spring 2017 can be followed through upcoming HELCOM meetings.

WP 2.2: Improved data labelling and data flow for hazardous substance

The work package has developed hazardous substances data-flow-models, indicator defined extraction tables, explored the spatial distribution of available indicator relevant data, developed structures and tools for automated data processing and extraction (cf. data-views) and carried out comparisons of the data structure in the HELCOM COMBINE database compared to EIONET database data **Appendix 1, WP 2.2 Deliverable 1**.

Several components needed for an operational hazardous substances assessment system have been developed in the workpackage. A data-model has been developed, automated views to the COMBINE accessions and a widget allowing for a visual view of the assessment database, as well as an extraction table for data used in the indicators. The accessions of data to the HELCOM COMBINE database hosted by ICES are linked through a service to a HELCOM workspace where national representatives are able to review the submitted data. The data to be used for indicator evaluations in HOLAS II was extracted from the COMBINE database using the developed extraction table and displayed spatially using an online widget (http://gis.ices.dk/sf/index.html?widget=boost).

The comparison of COMBINE and EIONET databases found that there are some critical metadata fields not required for data reported through EIONET and thus countries should strive to report data for HELCOM assessments through COMBINE and meet the stricter metadata requirements. The metadata fields required in the COMBINE data format are needed for the core indicator calculation. It was not seen as relevant to import and flag data from EIONET into COMBINE as the restructuring of the data would require significant work inputs and the comparison seemed to indicate that the majority of data in EIONET is already included in COMBINE.

2.3 Theme 3: Physical loss and damage to seabed habitats

Aims

The overarching objectives of Theme 3 was to develop joint HELCOM principles and good practices to define environmental targets for the anthropogenic pressures affecting seabed habitats. The development of environmental targets is challenging and requires determination of how much disturbance benthic habitats can tolerate from different activities while remaining in Good Environmental Status (GES). This development also requires improving access to high quality data and improvement of this data by developing spatial and temporal aggregation rules and assigning spatial extents and recovery times for the data layers.

Guidelines to define environmental targets for benthic habitats were addressed under the WP 3.1. To base this work on a solid ground the WP reviewed, analyzed and synthesized pressures and impacts of human activities on the sea floor. The WP 3.2 provided an overview of the impacts of fisheries with mobile bottom contacting gears on benthic species and habitats and synthesized this data in a Fisheries Impact Evaluation Tool that can be used for management purposes. In the WP 3.3, data on pressures affecting sea-bed habitats was collected, activities and pressures were linked to each other through a linkage framework. This allows the activity data layers to be transposed to pressure layers and these GIS layers were aligned to relevant international or European data format making the resultant spatial data products (indicator maps) available as INSPIRE compliant (OGC WMS/WFS) web map services.

Working mode

The Theme utilized a broad range of methods in order to deliver the results set out in the application, and they were largely data and information-driven. The scientific and grey literature (especially environmental impact assessments) was surveyed to draw as much of the available information on the linkages between pressure, impacts and status as possible. Where literature was not available, case-studies were utilized to seek a definition of the linkage and threshold levels. Results stemming from the project were considered by HELCOM GEAR (environmental targets) and FISH Group (fisheries impact tool) for evaluation and guidance during the project duration.

Under the project, two specific Theme 3 workshops were organized and carried out to support the development of the deliverables (**section 5 and Appendix 2**).

Main outcomes

WP 3.1 Development of joint principles to define environmental targets for pressures affecting the seabed habitats

The WP 3.1 carried out a literature review which resulted in a catalogue of impacts on the seafloor from human activities (**Appendix 1, WP 3.1 Deliverable 1**). The literature review also produced information on spatial extents of pressures from activities, recovery potential of benthic features (supporting the guidelines for environmental targets) as well as relative significance of human activities in causing pressures (so called 'ranking' which supported the aggregation of GIS layers as layers of the physical pressures). The literature review also visualized relationships between pressures and impacts and looked for any obvious threshold values. These findings are discussed in the guidelines for the environmental targets (**Appendix 1, WP 3.1 Deliverable 2**).

Specific case studies were used to explore the extent of some activities and to collect novel information on fisheries and non-fisheries related impacts in the Baltic Sea (**see Appendix 3, Supporting material 1-6**). This work supported the literature review in confirming impacts on benthic features and in finding statistical linkages between pressures and activities. The case studies were also used to rank specific activities on the basis of their pressures and impacts.

Based on the synthesis of the results from case studies and the catalogue of impacts from the scientific literature, WP 3.1 delivered a set of guidelines which can be used to define environmental targets (**Appendix 1, WP 3.1 Deliverable 2**). These guidelines are in the form of steps which give a general framework for setting environmental targets for benthic habitats but do not, as such, include proposals for any pressure thresholds or any activity-specific details. The guidelines report also discusses the various ways of defining environmental targets. This includes the concepts of 'maximum allowable pressure' and 'maximum allowable pressure extent'.

The Gear Group has agreed to consider the further development of the guidelines for setting environmental targets at the next meeting (23-24 May 2017). The guidelines in their current form thus represents an intermediate product that will be further developed in HELCOM. The synthesis of impacts on the benthic habitats is expected to form an important basis for continued HELCOM work on defining threshold values for benthic habitats.

WP 3.2: Development of a tool to assess the impact of fisheries on seabed habitats

The WP 3.2 delivered a BalticBOOST Fisheries Impact Evaluation Tool (**Appendix 1, WP 3.2 Deliverable 1**), which allows users to:

- Calculate pressure arising from fishing activities with bottom-contacting gear,
- Assess the sensitivity of the ecological component of the seafloor, based on among other the longevity of the organisms composing the community,
- Obtain an evaluation of the impact from fisheries (or its reciprocal, an integrity index),
- Identify areas of high fish landings to guide management decisions on spatial fishery restrictions based on trade-offs between conservation objectives and socio-economic considerations.

To develop this Tool, BalticBOOST reviewed the preliminary version of a management tool developed under the BALTFIMPA project in HELCOM. The BALTFIMPA tool consisted of a matrix of gear/habitat interactions, derived from expert knowledge and literature, and was deemed insufficient and difficult to further implement according to the most recent developments in assessing sensitivity of seafloor.

The Fisheries Impact Evaluation Tool is based on defining the sensitivity of the seafloor. BalticBOOST decided during the first Theme 3 workshop (BalticBOOST Theme 3 WS 1-2016) and after recommendations from ICES WKFBI to use a quantitative approach rather than a categorical one. The Workshop furthermore decided to use the EU FP7 BENTHIS sensitivity approach to provide a quantitative estimate based on longevity. This approach was further implemented and applied in the BalticBOOST project.

The sensitivity of the seabed habitats was estimated for the Western Baltic using among other the longevity approach developed in BENTHIS WP2 for the organisms characteristic of the communities living in EUNIS habitats. The main principle of the approach is that if the reciprocal of the trawling intensity, which reflects the average time interval between two successive trawling events, is less than the life span of an organism, the fishing pressure compromises the survival of the organism. In the Tool, sensitivity could be set using values from the Baltic Sea derived from a recent publication (see **Appendix 1, WP 3.2, Deliverable 1**).

The tool itself is available in the form of a set of R routines hosted by a specific github repository online (https://github.com/frabas/FisheriesImpactTool) that can be applied to new sets of fisheries and habitat data to quantitatively estimate the fishing pressure on the seafloor.

In addition to the development of the tool the project has:

- within the Tool development, produced test maps for the Western Baltic and presented results of the seabed integrity index (SBI) a proposed measure of the impact of fishing pressure on seabed habitats (**Appendix 1, WP 3.2, Deliverable 1**),
- evaluated possible alternative scenarios for the reduction of fishing pressure at the national spatial scale, based on benthic community life history traits (**Appendix 3, Supporting material 6**).

The methodology derived from the Tool to calculate fishing intensity (pressure) was among others also used by all test cases to estimate fishing pressure (**Appendix 3, Supporting material 4-6**). A summary of the development and use of the Tool is provided as **Appendix 1, WP 3.2 Deliverable 2**).

The Fisheries Impact Evaluation Tool has been reviewed under BalticBOOST project by ICES as presented in **Appendix 1, WP 3.2 Deliverable 3**.

WP 3.3: Defining information needs on pressures and activities that affect the seabed habitats

WP 3.3 has built a linkage framework between the physical pressures and human activities (included as **Annex 1 of Appendix 1, WP 3.1 Deliverable 1**). Om BalticBOOST the focus has been on activities and pressures affecting benthic habitats.The linkage framework is a prerequisite in order to identify the required human activity data for the physical pressure layers. Other required information, such as spatial pressure extents and weighting of source data was done under WP 3.1 and in the near future this material can be used to produce the aggregated physical pressure layers for HOLAS II purposes.

The work package also further developed the current version of HELCOM Map and Data service including a component for adding datasets from OGC WMS services to the HELCOM Map and Data service (**Appendix 1, WP 3.3 Deliverable 1**). The work package piloted the INSPIRE compliant OGC WMS interfaces with relevant pressure and human activities datasets available from HELCOM Contracting Parties. However, since most HELCOM Contracting Parties lack functional and relevant vector data interfaces (WFS), the tool can in most be used for comparing and quality assuring the human activities and pressure data available from WMS and collected by HELCOM in traditional means by file submissions.

The work package also collected a catalogue of human activities datasets that are used as input data for pressure map layers to be used in HOLAS II. The catalogue was constructed as a Sharepoint workspace available at the HELCOM Meeting portal. The workspace contains dynamic map viewer and metadata documentation of each map layer (**Appendix 1, WP 3.3 Deliverable 1**). Currently the workspace is used by HELCOM Contracting Parties for national review and quality assurance of human activities datasets. During the review the workspace is restricted and access given only to nominated members doing the national data review process. When the review process has been finalized and pressure maps completed for HOLAS II report, the catalogue and all datasets will be published using the HELCOM Map and Data service.

2.4 Theme 4: Underwater noise

Aims

HELCOM has agreed, through the 2013 HELCOM Copenhagen Ministerial Declaration, to take efforts to increase knowledge on occurrence and impacts of underwater noise in the Baltic Sea as well as to consider possible mitigation measures.

It was initially planned that Theme 4 and its WP 4.1 should develop a roadmap to facilitate the production of a comprehensive regional action plan on underwater noise that was lacking in the Baltic Sea area at the time of writing the project application. However, such a roadmap was developed under regular HELCOM activities (Annex 3 of the Outcome of HELCOM 37-2016) aiming at guiding HELCOM work on underwater noise during 2015-2017. With the roadmap developed, WP 4.1 has focussed on the contribution to the fulfilment of the 2013 ministerial commitments and the roadmap by:

- drafting reporting requirements for the development of a regional registry of impulsive events,
- drafting a proposal for a regional monitoring programme of continuous noise,
- reviewing existing knowledge on impact of noise in the Baltic Sea,
- exploring ways for defining environmental targets for underwater noise,
- surveying possible measures to manage and mitigate relevant impacts of underwater noise in the Baltic Sea.

Working mode

The work has been carried out by the Theme 4 partners with additional contribution from the HELCOM Expert Network on Underwater Noise (HELCOM EN-Noise) and the HELCOM Working Groups Pressure, Maritime, State & Conservation and Gear. The feedback provided served to improve the outcomes of this Theme.

One HELCOM workshop was held under the BalticBOOST project (see section 5 and **Appendix 2**), particularly aimed at recommending principles for defining levels of underwater noise that are consistent with GES for noise-sensitive species.

Main outcomes

Reporting requirements for the development of a regional registry of impulsive events

The reporting requirements for the regional registry of impulsive events were defined in cooperation with the HELCOM EN-Noise, OSPAR and ICES (who is hosting the registry) (**Appendix 1, WP 4.1 Deliverable 1**). The HELCOM/OSPAR regional registry contains information on licenced events such as pile driving, controlled explosions from naval operations and other activities that release energy from the Baltic Sea and the North East Atlantic. The registry is fully operational and countries are in the process of reporting their national data according to the agreed reporting format.

Proposal for a regional monitoring programme of continuous noise

A proposal for a regional monitoring programme of continuous noise was drafted during the project period. It proposes to combine a yearly minor assessment in a few prioritized locations (11 stations) and a major assessment every e.g. six years (38 stations) (**Appendix 1, WP 4.1 Deliverable 2**). Further work in HELCOM on the regional monitoring programme is envisaged for 2017-2018 including i.e. final agreement on location of stations, as part of the Work Plan for State & Conservation Working Group for 2017-2018.

Review of existing knowledge on impact of noise in the Baltic Sea

A report on noise sensitivity of aquatic animals in the Baltic Sea was prepared. It compiles and reviews the available knowledge on impact of anthropogenic noise in the Baltic Sea in the dedicated chapter entitled 'Impact of noise on marine animals' (**Appendix 1, WP 4.1 Deliverable 3**). It further identifies a list of priority noise sensitive species for the Baltic Sea based on the following criteria: hearing sensitivity, impact of noise, threat status, commercial value, and data availability. Harbour porpoise, harbour seal, ringed seal, grey seal, cod, herring and sprat were identified as priority species. The report also compiles available biologically important spatio-temporal information for the identified priority noise sensitive species in the

Baltic Sea. The report is to be published in the Baltic Sea Environment Proceedings series as agreed by HELCOM HOD in December 2016.

Principles for defining levels of underwater noise consistent with GES

The HELCOM BalticBOOST Workshop on Underwater Noise was held in Copenhagen, Denmark, on 5-6 October 2016. With basis in a draft document prepared by BalticBOOST the workshop developed principles for defining levels of underwater noise consistent with GES that were further amended based on recommendations by the Pressure and Gear Groups. The final resulting principles will be presented for adoption at the annual meeting of the Helsinki Commission in 2017 (HELCOM 38-2017) (**Appendix 1, WP 4.1 Deliverable 4**).

The principles are meant to facilitate a coherent approach among the countries, and outline what would be considered good environmental status in relation to noise. They are to be used in discussing and subsequently developing guidance levels or thresholds of noise consistent with good environmental status for the individual species. The principles can be used to seek synergies with the work of OSPAR and EU TG Noise. Also the international framework provided by the IMO (in relation to continuous noise) could be built upon when utilizing the proposed principles for further work.

Decision support trees for establishing environmental targets for impulsive noise and continuous noise were also developed. The risk-based decision support trees are meant as a tool for identifying areas/situations where a reduction in pressure is needed. For full implementation, guidance levels should be defined next. Continued work will be taken forward by the HELCOM EN-Noise.

Possible measures to manage and mitigate relevant impacts of underwater noise on the Baltic Sea

A document compiling the reviews of internationally available mitigation measures and country specific information (based on a questionnaire filled in by Denmark, Finland, Germany, Lithuania, Russia and Sweden) was prepared by the project. It focusses on general mitigation measures as well as measures to mitigate piling, seismic surveys and shipping and recreational boating in detail, as well as some possible mitigation measures for naval sonars, high frequency impulsive sources, marine aggregate dredging operations, and explosives. An analyses of the national feedback received is also provided (**Appendix 1, WP 4.1 Deliverable 5**).

2.5 Theme 5: Programmes of Measure

Aim

In 2015-2016 HELCOM developed a Joint document on regional coordination of Programmes of Measures (PoMs) under the HELCOM GEAR group. The Baltic Sea Action Plan, commitments resulting from HELCOM Ministerial Meetings, and HELCOM Recommendations reflect the HELCOM acquis and form the foundation for the development of regionally coordinated PoMs.

A central component of the joint documentation will be to follow-up the implementation of the HELCOM acquis. For this purpose a follow-up system was developed to facilitate reporting and assessment of implementation progress and thus identify gaps and areas where actions need to be strengthened. The regular follow-up of actions enabled through such system will also help identify gaps and areas where actions need to be strengthened, and also provides a basis to communicate management actions to the general public.

Working mode

In the BalticBOOST application, three tasks are outlined under WP 5.1:

1) contribute to the development of the joint document on Programmes of Measures,
2) support the development of plans towards joint regional actions as found appropriate by HELCOM,
3) develop and implement by end of 2015 a simple revised follow-up of HELCOM Aquis.

The three tasks under theme 5 have been undertaken through HELCOM regular activities and guided by HELCOM Working Groups. Activities under BalticBOOST project have contributed significantly to the development of the follow-up system for HELCOM Acquis (task 3) while the finalization on the joint documentation on PoMs (task 1) and development of further actions for consideration (task 2) have benefited from the project through supporting activities by the HELCOM Secretariat under the BalticBOOST project.

Main outcomes

Contribute to the development of the joint document on Programmes of Measures.

HELCOM has prepared a 'Joint documentation of regional coordination of Programmes of Measures (PoMs)', under the HELCOM GEAR group. The report was finalized and made available to the Contracting Parties also being EU Member States by 31 March 2016. The report summarizes the new measures planned by EU Member States under MSFD Article 13 and also existing HELCOM commitments through the Baltic Sea Action Plan (BSAP), HELCOM Ministerial Meetings, and Recommendations i.e. the HELCOM aquis. The report addresses 10 topics that primarily focus on pressures and measures directed towards these pressures while also being complemented with measures that aim to protect and restore biodiversity without targeting specific pressures (e.g. spatial protection, restoration).

BalticBOOST contributed to the finalization of the Joint documentation.

Support the development of plans towards joint regional actions as found appropriate by HELCOM

Through the regional coordination effort on measures carried out by HELCOM in 2015-2016, a number of new actions have been agreed (HOD 49-2015). The proposal on new joint actions stem from HELCOM Working Groups, Contracting Parties through the HELCOM Intersessional Group on PoMs (IG PoM), and through an IG PoM workshop held 28-29 October 2015, Warsaw, Poland. The implementation of the agreed further actions are taken forward by HELCOM Working Groups in the work plans for 2017-2018.

BalticBOOST supported the coordination to develop new actions from HELCOM Working Groups, and in the preparation and organization of the IG PoM workshop.

Develop and implement by end of 2015 a simple revised follow-up of HELCOM Aquis

Previous follow-up of the HELCOM acquis has been based on a narrative interpretation of reporting from HELCOM Contracting Parties and a subsequent designation of a status of accomplishment of agreed actions based on three levels. However, there was no agreed reporting format and no agreed criteria for assessing the status of accomplishment, thus leaving room for subjectivity in the evaluation. Through activities carried out before and under the BalticBOOST project, all HELCOM actions have been categorized to enable sorting by thematic areas, according to mode of implementation, and more. “Rules” for how to assess accomplishment at regional level has been agreed by the relevant HELCOM Working Groups.

BalticBOOST has specifically:

- developed questionnaires for countries to report on achievement of national actions,
- developed a database for storing responses,
- defined the specifications for the development of a web-based platform where the responses are visualized and can be easily sorted and extracted– the HELCOM Explorer.

The follow-up of HELCOM Aquis builds on the same 10 topics addressed in the Joint documentation. The follow up system will be of use for regional coordination in the MSFD context by facilitating for the Gear Group to identify coordination needs for implementation and for EU Member States to clearly follow up on HELCOM actions and measures.

The follow-up system was agreed by HOD 49-2015. The HELCOM Explorer was technically developed through resources external to BalticBOOST while the project contributed with specifications. The HELCOM Explorer is available for the general public since May 2016 at http://www.helcom.fi/baltic-sea-action-plan/follow-up/ and represents the deliverable from the WP. Refinement of the HELCOM Explorer (e.g. improved visualization of results) and updates of implementation of actions will continue by HELCOM as needed.

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

Theme 1: Biodiversity

WP 1.1: Development of a biodiversity assessment tool

Task	Activity under the reporting period	Partners	Status
Planning: 1) Review of methods to integrate indicators	The review of 1) integration methods was presented at the first BalticBOOST biodiversity assessment workshop (see also task 4).	SYKE, EMI, NIVA Denmark	Completed
2) Technical requirements to include HELCOM core indicators in the tool	Technical requirements of HELCOM core indicators was clarified and presented at the first BalticBOOST biodiversity assessment workshop (see also task 4).		
3)Technical solutions considering transparency of assessment	A visualization tool was developed to allow transparent examination of the assessment results (presented in **Appendix 1, WP 1.1 Deliverable 1**).	SYKE, EMI, NIVA Denmark	Completed
4) Carry out 2 workshops	The first workshop (HELCOM BalticBOOST Biodiv WS 1-2016) was held 11-12 February 2016, Copenhagen. The second workshop (HELCOM BalticBOOST Biodiv WS 2-2016) was held 14-15 September 2016, Copenhagen. The outcome from the workshops is available in **Appendix 2.**		
Development: 5) Develop principles to define and quantify uncertainty	Principles to define and quantify uncertainty have been developed and are presented as part of the biodiversity assessment tool.	SYKE, EMI, NIVA Denmark	Completed
6) Develop a tool to assess biodiversity	The tool was endorsed by State and Conservation 5-2016 and agreed for use in HOLAS II by HOD 51-2016. It is available at: https://github.com/NIVA-Denmark/BalticBOOST	SYKE, EMI, NIVA Denmark	Completed
Validation: 7) Validate the tool based on desk study cases	Tests were carried out regarding e.g. number of indicators used, spatial aggregations and integration rules and presented at the 2nd workshop and used as basis to agree on the structure of the tool.	SYKE, EMI, NIVA Denmark	Completed
Dissemination: 8) Final report	This report and **Appendix 1, WP 1.1 Deliverable 1.**	SYKE, EMI, NIVA Denmark	Completed

WP 1.2: Database and data arrangements for coastal fish, birds and seals

Task	Activity under the reporting period	Partners	Status
Birds: 1) Carry out a workshop with experts from HELCOM Contracting Parties to agree on a common data format and data arrangements	The data model development (extending ESAS data model) was discussed at a session on the OSPAR-HELCOM-ICES JWG Bird Meeting in November 2015. The data model was agreed in OSPAR-HELCOM-ICES JWG Bird meeting in October 2016.	HELCOM, LFN.	Completed
2) Analyze the BALSAM output (metadatabase) and recommend on whether to have a distributed or centralized database solution, taking into account other international data reporting activities	In absence of complete open access to national data, a decision was taken for a centralized solution with a data call for reporting coastal data. Data availability was explored for coastal data in Wetlands International IWC database and for offshore data ESAS data holding were explored.		Completed
3) Develop a database format (reporting guidelines) and a data input tool	A database has been established based on agreed data model which was outlined based on Wetlands International (coastal) and ESAS data model (offshore).		Completed
Coastal fish: 1) Develop a database format to be agreed at a relevant aggregation level required for indicator processing in cooperation with FISH-PRO II group.	A data model was developed based on data needs for the applicable HELCOM core indicators. Database development plans was presented and discussed at HELCOM FISH-PRO II 3-2016 meeting in February 2016.	HELCOM, SLU	Completed
2) Develop a data reporting tool	Data reporting procedure was developed. The imported values can be edited by users after login.		
3) Develop a system for regular data product extraction of core indicator to the HELCOM Data and Map Service	Data product extraction was generated based on spatial parameters of tabular data and displayed in web application “Map” window.		
Seals: 1) Develop a database format and data entry tool in cooperation with HELCOM SEAL EG	Database was established based on the final data model, taking into account all possible harmonisation with OSPAR data model. Database development plans were presented and discussed at HELCOM SEAL EG 10-2016.	HELCOM, SMNH, Aarhus University	Completed
2) Develop a system for regular data product extraction of core indicator to the HELCOM Data and Map Service	Data product extraction was generated based on spatial parameters of tabular data and displayed in web application “Map” window.		Completed

WP 1.3: Data arrangements for fish indicators

Task	Activity under the reporting period	Partners	Status
1) Develop the required output data-flow for the LFI and MML indicators for demersal fish communities from BITS trawl surveys, involving ICES WG BIFS in defining methods for appropriate processing of the data and output products	For the demersal fish community covered by the Baltic International Trawl Survey (BITS) the data-model has been developed, and the available data has been scoped (**Appendix 1, WP 1.3 Deliverable 1**). However it has not been possible to implement the model in practice and it has been noted that the data requires standardization.	ICES	Partially completed
2) Explore possibilities to retrieve aggregated data from HELCOM Contracting Parties from BIAS surveys and define a mechanism for data arrangements for acoustic surveys to regularly update the calculations for mentioned indicators as part of the ongoing work in ICES	A common format/approach for the processing has been developed for all acoustic surveys under Horizon 2020 AtlantOS, and an international metadata standard is being updated. The Baltic acoustic experts were involved in this development and the next step is to convert their existing datasets using the common standard. However it has not been possible to implement the format on the relevant data in practice.	ICES	Partially completed
3) Define a method to process acoustic survey derived data into standard products for HELCOM core indicators	The relevant core indicator has not been operationalized in HELCOM, and thus there is no agreed assessment protocol which would define the needed parameters for the data processing.	ICES	Not completed

WP 1.4 Pilot study on aligning the assessments of Good Environmental Status in the MSFD/BSAP with assessments of Favourable Conservation Status in the Habitats Directive regarding status of seal populations

Task	Activity under the reporting period	Partners	Status
1) Make an initial comparative analysis of the practical requirements and definition of good/favourable status in the two directives as they concern Baltic seal species	The initial comparative analysis has been carried out and is included as a component of the interim report (see **Annex 1, Document 1** to the interim report of BalticBOOST**).**	NRM, AAU	Completed

Task	Activity under the reporting period	Partners	Status
2) Document the different approaches reported by HELCOM EU Member States in the MSFD 2012 reporting and analyse where the greatest differences and similarities can be found from the perspective of possibly aligning FCS assessments with GES assessments	Information from EU Member States gathered by circulation of final report, where Contracting Parties stated their approaches.	NRM, AAU	Completed
3) Provide case study examples on how the use of the different approaches of the MSFD/BSAP and HD influence the outcome of status assessment when based on the same data e.g. seal abundance and distribution	Detailed case studies have been carried out for MSFD/HELCOM BSAP reporting of all seal management units in the HELCOM area according to the HELCOM core indicator 'Population trends and abundance in seals'., as well as for the core indicator "Distribution of Baltic Seals. Likewise detailed HD assessments have been simulated for harbour seals and grey seals in Denmark, while briefer assessments have been made for ringed seals, harbour seals and grey seals in Sweden and grey and ringed seals in Finland and Estonia and Sweden. The case studies are included in the final report (**Appendix 1, WP 1.4 Deliverable 1)**.	NRM, AAU	Completed
4) Clarify how aggregation of regional data can be used to support the reporting requirements of the two Directives.	Aggregation of regional data is proposed to take place as used in HELCOM. An analysis of regional differences in data coverage and possibilities to enhance and augment data has been accomplished.	NRM, AAU	Completed
5) Prepare a background documentation for a workshop with expert participation from HELCOM Contracting Parties	A session based on the interim BalticBOOST report was held HELCOM SEAL Expert Group (SEAL EG 10-2016, 7-10 October 2016). This task was complicated by the revision of the Commission Decision on GES criteria that was made available just before the workshop. Seal experts were not able to evaluate consequences of the guidelines at such short notice.	NRM, AAU	Partly completed
6) Prepare a concluding report, including proposals for how the assessment of seals can be aligned between the two Directives	This report and **Appendix 1, WP 1.4 Deliverable 1.**	NRM, AAU	Completed

Theme 2: Hazardous substances

WP 2.1: Development of a tool for assessment of hazardous substances

Task	Activity under the reporting period	Partners	Status
1) Identify features and calculation principles/processes in the existing versions of the CHASE tool which should be further developed	The features for the CHASE tool were presented to HELCOM HOLAS II 4-2015 and the HELCOM BalticBOOST workshop on the HOLAS II hazardous substance assessment. The workshop recommended to carry out a set of test assessments using the tool.	Niva Denmark, HELCOM	Completed
2) Carry out a workshop with participation of experts from HELCOM Contracting Parties, under the HOLAS II project, for guidance and knowledge input for updating of the existing tool	The HELCOM BalticBOOST workshop on the HOLAS II hazardous substance assessment was held -2-4 February 2016 (see **section 5** and **Appendix 2**). A second HELCOM BalticBOOST workshop on the HOLAS II hazardous substances assessment was held 13-14 September 2016 (see **section 5** and **Appendix 2**).	Niva Denmark, HELCOM	Completed
3) Develop (coding) and test the HELCOM Chemical Status Assessment Tool	Coding of the tool in R has been completed. The code is available for download from GitHUB (https://github.com/NIVA-Denmark/CHASE)	Niva-Denmark	Completed
4) Validate the updated tool in a desk study based on data from HOLAS I in selected offshore areas (n = 9-17)	The tool was tested using data from the COMBINE database for the offshore assessment units Kiel Bay, Arkona Basin and East Gotland Basin. The tool was additionally tested in coastal areas of Estonia, Germany, Poland and Denmark. The assessment results using the tool were compared to the national chemical status assessment results from the WFD reporting (which uses the one-out-all-out approach between substances).	Niva-Denmark	Completed
5) Produce a final report that together with the test results and the tool itself (e.g. coded in R and backed by either a data format or a 'reader'), will be delivered as a component in the implementation of the HELCOM HOLAS II project	This report and **Appendix 1, WP 2.1 Deliverable 1.**	Niva Denmark, HELCOM	Completed

WP 2.2: Improved data labelling and data flow for hazardous substance

Task	Activity under the reporting period	Partners	Status
1) Inclusion of EIONET derived data in the COMBINE database with duplicates check and removal	Work on comparing the major fields of hazardous substance data reported through COMBINE and EIONET has been completed (**Appendix 1, WP 2.2 Deliverable 1.**).	ICES	Completed
2) Revision of reporting format together with WP 2.1 and relevant HELCOM experts working with indicator assessments	The simplified reporting format has been developed and communicated to the hazardous substance experts as an option for easier data submission.	ICES	Completed
3) Roll out 'automated submission/resubmission' facility to data providers	The auto resubmission facility is currently being used by Estonia, Sweden, Denmark, Poland and Germany. The facility will be extended with auto submission capabilities, planned for the summer 2017.	ICES	Partly completed
4) Labelling of data per HELCOM Assessment units as in the HELCOM M&A Strategy (2013)	The monitoring stations as defined in the ICES station dictionary have been assigned to the HELCOM assessment units.	ICES	Completed
5) Data product extraction from database, including e.g. calculation of averages as defined by CORESET experts (to be described in detail in the assessment process)	An extraction table for the indicator relevant parameters has been developed. Based on the extracted data simple calculations of averages can be carried out. In addition to the original aims, the first steps of implementation of an R-script to pre-process the data and also to fully calculate the indicators has been carried out.	ICES	Completed
6) Data product outputs catalogue to be available online with possibility of referencing through unique identifier (DOI/URI)	ICES has implemented a system to allocate DOI identifiers though DataCite (https://www.datacite.org). The Data product outputs and metadata will later be available online through the ICES publications library (http://ices.dk/publications/library/Pages/default.aspx).	ICES	Completed

Theme 3: Physical loss and damage to seabed habitats

WP 3.1: Development of joint principles to define environmental targets for pressures affecting the seabed habitats

Task	Activity under the reporting period	Partners	Status
1) Identify pressures on seabed habitats for which environmental targets are relevant	Pressure lists were compiled based on several data sources (HELCOM, OSPAR, EU, FP7 ODEMM project, Harmony project), also used as input to the HELCOM coordinated EU co-financed TAPAS project (see e.g. TAPAS Pressure Index WS 1-2016).	SYKE, IOW, DTU Aqua, SLU Aqua, ICES	Completed
2) Identify activities linked to the pressures	Activity lists were compiled based on several data sources (HELCOM, OSPAR, EU, FP7 ODEMM project, Harmony project) also used as input to the HELCOM coordinated EU co-financed TAPAS project (see e.g. TAPAS Pressure Index WS 1-2016).	SYKE, IOW, DTU Aqua, SLU Aqua, ICES	Completed
3) Explore ways to determine how much disturbance the seafloor can tolerate while remaining in GES	Relations between activities, pressures and impacts on marine species and other features have been recorded on a template with the aim to establish links between GES and pressures. A synthesis of the impact recordings has been created (**Appendix 1, WP 3.1 Deliverable 1**). A general framework for defining environmental targets for pressures affecting the seafloor was presented to GEAR 14-2016 and further developed (**Appendix 1, WP 3.1 Deliverable 2).**	SYKE, IOW, DTU Aqua, SLU Aqua, ICES	Completed
4) Test relationships between GES and pressures	Case studies have been carried out as presented in **Appendix 3**.	SYKE, IOW, DTU Aqua, SLU Aqua, ICES	Completed
5) Prepare background documents and carry out 2 workshops	Background documents were prepared for the workshops held jointly with WP 3.2 on 2-3 June 2016 (BalticBOOST Theme 3 WS 1-2016) and on 28-29 November 2016 (BalticBOOST Theme 3 WS 2-2016) (see section 5 and for outcome of the workshop **Appendix 2**)	SYKE, IOW, DTU Aqua, SLU Aqua, ICES	Completed
6) Final report	This report and **Appendix 1, WP 3.1 Deliverable 1 and 2.**	SYKE, IOW, DTU Aqua, SLU Aqua	Completed

WP 3.2: Development of a tool to assess the impact of fisheries on seabed habitats

Task	Activity under the reporting period	Partners	Status
1) Close knowledge gaps identified in the development of the preliminary version of the Generic Tool covering and detailing benthic habitats and biotic groups of the Baltic Sea, based on literature	A literature review has been carried out by DTU Aqua and the scientific papers collected have been shared with the other partners of Theme 3 within the BalticBOOST online workspace. The same literature has been the major background, basis and foundation for developing the benthic fisheries impact tool (FIT) under WP3.2 which is adopted from the EU FP7 BENTHIS Project and the literature review and compilation hereunder.	DTU Aqua	Completed
2) Revise the existing Generic Tool to evaluate impacts of fishing with mobile bottom contacting gear and fishing coverage/intensity on an appropriately detailed level of habitats types	The existing HELCOM tool has been reviewed and deemed insufficiently detailed for further development. During the first joint Theme 3 workshop (2-3 June 2016) it was agreed to further expand on the EU FP7 BENTHIS developed methodologies to build the Tool (BalticBOOST Theme 3 WS 1-2016).	DTU Aqua, SLU-Aqua, TI	Completed
3) Compile spatial data on test cases to verify the effects of fisheries (in cooperation with WP 3.1).	Two case studies (Femern Belt and Swedish sea areas) analyzed specifically fisheries impacts to explore links between benthic state parameters and fishing intensity (**Appendix 3**). Spatial data has been compiled both on case specific basis and pan-Baltic scale on fishing intensity.	DTU Aqua, SLU-Aqua	Completed
4) Carry out expert workshops with experts from HELCOM Contracting Parties to discuss results, fill specific knowledge gaps and agree on the transferability of results from other sea areas	The first joint workshop for Theme 3 was held on 2-3 June 2016 at the premises of the ICES Secretariat, Copenhagen. A second joint Theme 3 workshop was carried out on 28-29 November 2016 at the premises of the HELCOM Secretariat, Helsinki. For outcome of the meetings see section 5 and **Appendix 2**.	HELCOM , DTU Aqua, SLU-Aqua, TI	Completed
5) Based on 1-4, deliver an operational HELCOM Generic Tool to assess the effects of fishing with mobile bottom contacting gear on benthic species and habitats in the Baltic Sea	The first draft version of the Tool was submitted to the HELCOM FISH 5-2016 meeting and to ICES external expert review at the end of October 2016. The tool is presented in **Appendix 1, WP 3.2 Deliverable 1**. The development and use of the tool in BalticBOOST is presented in **Appendix 1, WP 3.2 Deliverable 2**.	DTU Aqua,	Completed
6) Review of the Tool by ICES, to be delivered in time to enable revision of the Tool, to the extent possible	The draft Tool was review by ICES external experts and the result was delivered November 18 2016 (**Appendix 1, WP 3.2 Deliverable 3**). The output of the review was used to fine tune the Tool before final delivery, as allowed by time and resource constraints.	ICES, DTU Aqua	Completed

WP 3.3: Defining information needs on pressures and activities that affect the seabed habitats

Task	Activity under the reporting period	Partners	Status
1) Define pressures on the Baltic marine environment that are generated by human activities	Activity lists were compiled based on several data sources (HELCOM, OSPAR, EU, FP7 ODEMM project, Harmony project) (see e.g. TAPAS Pressure Index WS 1-2016, Annex to Document 4)	HELCOM, SYKE	Completed
2) Determine parameters, units and data formats for the pressures in order to prepare the data into for e.g. Baltic Sea Pressures Index (BSPI) and the Baltic Sea Impact Index (BSII) and other needs for data on pressures and activities	Lists of human activities and pressures were produced with attribute information of units, parameters and data formats. These were discussed in the HELCOM TAPAS WS1 in 27-28 January 2016.	HELCOM, SYKE	Completed
3) Identify data sources for the pressure parameters and contact data holders	Data sources have been identified and national contact points have been defined in the Contracting Parties. Data has been harvested from available data sources.	HELCOM, SYKE	Completed
4) Explore connections to databases with pressures data (e.g. national focal points) and means of displaying decentralized pressure data in the HELCOM Map and Data Service	HELCOM has implemented a tool to add spatial datasets from national focal points to HELCOM Map service via WMS Services. The tool is available in the current version of HELCOM Map and Data Service under Utilities menu → "Add WMS Service". In addition to predefined list of databases (BSH CONTIS, ICES Spatial facility) any other WMS data source can be added.	HELCOM	Completed
5) Prepare a catalogue of the data layers, including technical specifications and possible access arrangements with data holders	A fact sheet template for the presentation of the data in the map service and the holistic assessment has been decided and filled for human activities datasets.	HELCOM, SYKE	Completed

Theme 4: Noise

WP 4.1: Development of a roadmap for further work on underwater noise in the HELCOM area

Task	Activity under the reporting period	Partners	Status
1a) Reporting requirements for the development of a regional registry of impulsive activities 2b) Identify mechanisms needed to develop a regional monitoring of continuous noise	a) The reporting requirements for the regional registry of impulsive activities were defined in cooperation with the HELCOM EN-Noise, OSPAR and ICES (**Appendix 1, WP 4.1 Deliverable 1)**. b) A proposal for a regional monitoring programme of continuous noise was drafted and presented to State and Conservation 4-2016 (**Appendix 1, WP 4.1 Deliverable 2**).	a) HELCOM b) FOI	Completed
2) Identify spatial and temporal distribution of sound sensitive species and habitats in the HELCOM area and subsequent development of a synthesized spatial-temporal biological calendar for the identified species, including sensitive biological areas	The report on noise sensitivity of animals in the Baltic Sea is to be published in the Baltic Sea Environment Proceedings series. The report is contained in **Appendix 1, WP 4.1 Deliverable 3.**	HELCOM & FOI	Completed
3) Explore and recommend principles for defining environmental targets for noise	The principles as well as decision support trees for establishing environmental targets for ambient and impulsive noise were drafted during the workshop organized under Task 6, (HELCOM Baltic BOOST Noise WS 1-2016) held on 5-6 October 2016. The principles and decision support trees were presented to PRESSURE 5-2016 and GEAR 15-2016. The revised version is presented as **Appendix 1, WP 4.1 Deliverable 4.**	HELCOM & FOI	Completed
4) Survey possible measures to manage and mitigate relevant impacts in the Baltic Sea	A draft review of internationally available mitigation measures and country specific information was presented to PRESSURE 4-2016 and MARITIME 16-2016. Based on the feedback received, the report was further improved (**Appendix 1, WP 4.1 Deliverable 5**).	HELCOM & FOI	Completed
5) Draft a roadmap on underwater noise for the Baltic Sea	A roadmap on underwater noise for the Baltic Sea was developed under regular HELCOM activities and adopted at HELCOM 37-2016 (Outcome of HELCOM 37-2016, Annex 3). The resources to conduct this task under BalticBOOST were transferred to Task 6 as agreed at delivery of the BalticBOOST interim report.	HELCOM	Completed
6) Carry out a workshop with all HELCOM Contracting Parties to discuss the draft Roadmap	The workshop (**Appendix 2**) was used to explore and recommend principles for defining good environmental status and environmental targets in relation to noise as agreed with the EC.	HELCOM & FOI	Completed

Theme 5: Programmes of Measure

WP 5.1: Support for joint documentation of Programmes of Measures

Task	Activity under the reporting period	Partners	Status
1) Contribute to the development of the joint document on Programmes of Measures	HELCOM has prepared a 'Joint documentation of regional coordination of Programmes of Measures (PoMs)', under the HELCOM GEAR group. The report was finalized and made available for Contracting Parties also being EU Member State by 31 March 2016.	HELCOM	Completed
2) Support the development of plans towards joint regional actions as found appropriate by HELCOM	A number of further actions to be considered have been agreed by HOD 49-2015 and their implementation is currently planned by HELCOM Working Groups.	HELCOM	Completed
3) Develop and implement by end of 2015 a simple revised follow-up of HELCOM Aquis	A system for follow-up of HELCOM agreements (BSAP, Ministerial Declarations, HELCOM Recommendations) has been developed. Through additional resources external to BalticBOOST a web-based platform – HELCOM Explorer - to make the results available to the general public was launched in May 2016 (this report and **BalticBOOST interim report, Annex 1, Document 4**).	HELCOM	Completed

4. List of deliverables

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

Work package	Number and name of Deliverable
WP 1.1	Deliverable 1: A tool for assessing biodiversity. R-script at: https://github.com/NIVA-Denmark/BalticBOOST (temporary)
WP 1.2	Deliverable 1: Databases coastal fish, birds and seals. Electronic deliverables available at: http://bio.helcom.fi/birds http://bio.helcom.fi/coastalfish http://bio.helcom.fi/seals
WP 1.3	Deliverable 1: Data flow principles for trawl survey data
WP 1.4	Deliverable 1: Aligning the assessments of Good Environmental Status in the MSFD/BSAP with assessments of Favourable Conservation Status in the Habitats Directive regarding status of seal populations
WP 2.1	Deliverable 1: A tool for assessing hazardous substances. R-script at: https://github.com/NIVA-Denmark/CHASE (temporary)
WP 2.2	Deliverable 1: A data flow for HELCOM hazardous substance assessment
WP 3.1	Deliverable 1: Estimating physical disturbance on seabed
WP 3.1	Deliverable 2: Guidelines to define environmental targets for pressures affecting the seabed habitats
WP 3.2	Deliverable 1: Fisheries Impact Evaluation Tool. R-script at: https://github.com/frabas/FisheriesImpactTool (temporary)
WP 3.2	Deliverable 2: Development and use of the Fisheries Impact Evaluation Tool in BalticBOOST
WP 3.2	Deliverable 3: Technical review of the Fisheries Impact Evaluation Tool
WP 3.3	Deliverable 1: Spatial data sets on human activities and pressures acting on seabed habitats. Deliverables are electronic
WP 4.1	Deliverable 1: Reporting format registry of impulsive events
WP 4.1	Deliverable 2: Proposal for a regional monitoring programme of continuous noise
WP 4.1	Deliverable 3: Report on noise sensitivity of animals in the Baltic Sea
WP 4.1	Deliverable 4: Principles for defining levels of underwater noise consistent with good environmental status as well as decision support trees for establishing environmental targets for ambient and impulsive noise
WP 4.1	Deliverable 5: Compilation report on internationally available mitigation measures and Baltic Sea country specific information
WP 5.1	Deliverables 5: System for follow-up of HELCOM acquis. Final report provided in BalticBOOST interim report, Annex 1, Document 4. HELCOM Explorer available at: http://www.helcom.fi/baltic-sea-action-plan/follow-up/

5. List of workshops

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

Work package and workshop	Purpose of the meeting	Location	Dates
WP 1.1, task 4 1st HELCOM BalticBOOST Workshop on the HOLAS II Biodiversity assessment tool	- evaluate proposed features of the tool and its planned assessment outputs, - detail how the development needs could build on the results from HOLAS 2010, and the DEVOTES and Marmoni projects, - consider how to include information on uncertainty and confidence in the assessment, - consider the biodiversity related HELCOM core indicators and how to include them in the assessment.	Copenhagen, Denmark	11-12 February 2016
WP 1.1, task 4 2nd HELCOM BalticBOOST Workshop on the HOLAS II Biodiversity assessment tool	- evaluate the outcome of testing different structures of the tool, - consider the indicators to be included in the assessment, - detail the needed remaining steps to operationalize the biodiversity assessment tool, - consider outputs from the tool and how to include information on uncertainty and confidence in the assessment.	Copenhagen Denmark	14-15 September 2016
WP 2.1, task 2 1st HELCOM BalticBOOST workshop on the HOLAS II hazardous substance assessment	- consider the metadata requirements for the core indicators and the feasibility to include data reported though EIONet in the hazardous substance assessment, - guide the work on data-arrangements for indicators to be developed through the BalticBOOST WP 2.2, - propose principles for how to carry out the assessment of hazardous substances based on core indicators.	Copenhagen, Denmark	2-4 February 2016
WP 2.1, task 2 2nd HELCOM BalticBOOST workshop on the HOLAS II hazardous substance assessment	- evaluate the findings of the so called five test outputs as defined during BalticBOOST HZ WS 1-2016, - detail the needed remaining steps to operationalize the hazardous substance assessment tool, - consider outputs from the tool and how to include information on uncertainty and confidence in the assessment.	Copenhagen, Denmark	13-14 September 2016
WP 3.1 task 5 and WP 3.2 task 4 1st HELCOM BalticBOOST workshop on Theme 3	- develop protocols for fisheries and non-fisheries impacts evaluation, - develop methods for their integration in assessments of multiple pressures, - discuss principles for defining environmental target for pressures on seabed habitats.	Copenhagen, Denmark	2-3 June 2016

WP 3.1 task 5 and WP 3.2 task 4 2nd HELCOM BalticBOOST workshop on Theme 3 (Outcome of workshop: **Appendix 2**).	- evaluate the results of the project test cases on effects of different human activities and pressures on benthic habitats, - consider and further develop the draft guidelines for setting environmental targets for pressures affecting benthic habitats.	Helsinki, Finland	28-29 November, 2016
WP 4.1, task 6 HELCOM BalticBOOST Workshop on Underwater Noise (Outcome of workshop: **Appendix 2**).	- discuss the possibility to use information on species specific tolerance to define noise levels that are consistent with GES, - discuss for which noise sources can such levels be set, - identify possible canary/umbrella species in relation to noise in different parts of the Baltic Sea, - discuss how information on status at the population level should be considered when defining the need to develop environmental targets for noise, - discuss the use of a risk-based approach to identify areas and activities for which environmental targets for noise could be defined, also in the absence of a clear definition of GES.	Copenhagen, Denmark	5-6 October 2016

6. List of supporting material

Associated reports and documents are provide in **Appendix 3**.

WP 3.1	Case study 1: Gulf of Finland Impacts of Vuosaari harbor construction works on the coastal ecological status east of Helsinki
WP 3.1	Case study 2: Mecklenburg Bight
WP 3.1	Case study 3: Plantagenet Ground
WP 3.1 and 3.2	Case study 4: Femern Belt Influence of fishing pressure on benthic invertebrate species diversity and density in the Western Baltic Sea and evaluation of robust indicators for this taking into consideration hydrographical and physical habitat characteristics (initial results)
WP 3.1 and 3.2	Case study 5: Swedish coastal areas Fishing intensity and effects on benthos in Swedish areas of the Baltic Sea
WP 3.1 and 3.2	Case study 6: Entire Baltic Sea A quantitative assessment of benthic impact from fishing disturbance in the Baltic Sea using a biological-traits approach

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

HELCOM/Groups/Working Groups:

FISH Group: 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.

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.

MARITIME: Maritime Working Group, works to ensure clean and safe shipping in the Baltic Sea and enables regional pre-negotiations on IMO matters.

PRESSURE: Working Group on Reduction of Pressures from the Baltic Sea Catchment Area, provides the necessary technical basis to the 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.

Projects, expert groups and intersessional activities:

EN-HZ: Expert Network on hazardous substances.

EN-Noise: HELCOM Experts Network on Underwater Noise, works towards the implementation of commitments of the 2013 Ministerial Declaration related to underwater noise.

FISH-PRO II: Project for Baltic-wide assessment of coastal fish communities in support of an ecosystem-based management (2013-2018)

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.

IG PoM: Intersessional Group on Programmes of Measures (temporary task group under GEAR)

JWG Bird: ICES/OSPAR/HELCOM Joint Working Group on Birds

SEAL EG: HELCOM *ad hoc* Seal Expert Group