



Document title	Progress in mapping of HELCOM agreements according to activity-pressure linkages
Code	2-4
Category	INF
Agenda Item	2- Update of the Baltic Sea Action Plan
Submission date	13.02.2019
Submitted by	Executive Secretary
Reference	

Background

HOD 55-2018 considered how the updated BSAP could be structured and agreed on two key steps to support the further development of structure and content of the updated BSAP:

- to clarify how activities and pressures are linked to the different segments of the Baltic Sea Action Plan by mapping pressures and biodiversity aspects against clusters of human activities,
- to map existing HELCOM agreements and indicators for pressures and status according to action areas, management objectives and ecological objectives.

Together these mapping activities will support the identification of gaps in current HELCOM actions and indicator and assessment structure. The results can also provide insights to the agreement on the choice of segments in the updated BSAP, a decision which is aimed for at the annual HELCOM meeting in 2020. This document presents the further development of these activities.

Activity-Pressure mapping

The starting point for the activity-pressure mapping is the linkage framework developed in the HELCOM EU co-funded TAPAS project and further used in the HOLAS II project. To prepare an example of how the mapping could take place a simplification of the TAPAS matrix was made as outlined in this document.

Mapping of HELCOM agreements, targets and indicators

For each activity-pressure linkage, existing HELCOM agreements have been mapped as well as management and ecological objectives and associated indicators. Furthermore, restrictions or limit values have been collated from e.g. HELCOM Recommendations. The mapping is in this document presented as a text-file for two examples: 'Physical loss and disturbance to the seabed' and 'Input of nutrients'. In the further development of the HELCOM Explorer (BSAP follow up tool) the mapping will be an integral part of a database with associated visual presentations.

Way forward

The simplified TAPAS matrix is here used as an example to test the mapping of HELCOM agreements. The continued mapping will be aligned to the approach agreed to identify activity-pressure linkages for the analysis of sufficiency of measures under the SOM Platform and the HELCOM ACTION project. Through the mapping it will become clear if there are some activity-pressure linkages for which there is no corresponding HELCOM agreements.

The mapping of management and ecological objectives and associated pressure targets and threshold values can be used to identify issues in need of further development work to support regular assessments of achieving the HELCOM goals and objectives. As agreed by HOD 55-2018, HELCOM Working Groups will

be requested to review existing objectives and propose new ecological and management objectives for marine litter, underwater noise and physical loss and disturbance to the seabed. Working Groups will also be requested to prepare proposals on how indicators, pressures targets and threshold values could be further developed where this is missing.

Attachment 1 to this document include the full and simplified TAPAS matrix of activity-pressure linkages and Annex 1 includes the two examples of mapping of HELCOM agreements.

Note that the matrix and the examples of mapping included in this document is a tool for identifying gaps in existing agreements. It is not intended to infer how the updated BSAP could be structured. It may be noted, however, that the matrix shows that the same pressures originate from both land-based and sea-based activities and many activities are causing the same pressure. This means there will be inevitable overlaps in the BSAP structure whichever structure is chosen.

Action requested

The Meeting is invited to:

- take note of the progress in the work by the Secretariat to make use of an activity-pressure matrix for the purposes of the BSAP update, in line with the HOD 55 request,
- take note that further work on the mapping of HELCOM agreements will be aligned to the approach used for analysing sufficiency of measures.

Mapping of activity-pressure linkages

The HELCOM TAPAS matrix was developed in the EU co-financed project 'Development of HELCOM tools and approaches for the Second Holistic Assessment of the Ecosystem Health of the Baltic Sea (TAPAS)'. It is based on combining information from five other projects, including the HELCOM HASPS project (Horizontal Action Spatial Planning Support). In the matrix, activities and pressures are categorized under themes as applied in the HELCOM 'State of the Baltic Sea' report and also used in Annex III of the EU Marine Strategy Framework Directive.

The matrix contains all potential linkages between activities and pressures that have been identified and does not make any distinction between expected high or low impacts on the environment, resulting in over 360 activity-pressure linkages, several with possible low impact in the Baltic Sea environment. Numerous linkages between pressures and activities have in particular been identified for physical loss and disturbance to the seabed, continuous noise, and hazardous substances. In order to test the mapping of HELCOM agreements the matrix was therefore initially simplified according to the below steps. The full and simplified matrix are included in Attachment 1 to this document. Note that the TAPAS matrix only serves as an example and that the continued mapping will be aligned with the approach agreed for analysing sufficiency of measures to support the BSAP update where the application of activity-pressure linkages is also required.

Simplifications made to TAPAS matrix

- Pressures of low concern according to the results of the Baltic Sea Impact Index, as presented in the 'State of the Baltic Sea' report 2018, were excluded i.e. input of other forms of energy than noise, and also issues currently not considered in HELCOM monitoring and assessments i.e. microbial pathogens and GMOs, changes to hydrological conditions¹.
- The original matrix used three categories of activities; 1) themes, 2) activities, 3) specification of activities. The simplified matrix only includes the two first categories while the most important specific activities are specified as relevant.
- For physical loss and disturbance, the simplified matrix still included 18 and 19 activity-pressure linkages respectively. A prioritization of linkages was made based on the ranking of impacts of activities carried out in the BalticBOOST project and applied in the Baltic Sea Impact Index (for further information see Annex 1). Linkages with high to moderate impacts are indicated in the simplified matrix and was used as the basis for testing the mapping of agreements.

Additional changes made to the TAPAS matrix:

The activities have been sorted by 'Land-based' and 'Sea-based' activities as proposed at HOD 55-2018. Some linkages perceived as obviously missing have been added:

- Shipping as an activity contributing to input of nutrients
- Security/Defence and Education/Research as contributors to input of impulsive noise (explosions, seismic surveys)
- Agriculture as contributor to input of hazardous substances
- Agriculture and forestry as contributor to input of organic matter
- Urban and industrial uses as sources of litter (wastewater treatment disposal)

Deviations from draft proposal by Finland (HOD 55-2018, document 3-9).

Finland presented to HOD 55-2018 a draft partial activity-pressure matrix that has been used as a model for the simplified matrix. Some deviations have however been made. The proposal from Finland mentioned, in terms of pressures: non-indigenous species, water quality, contamination, marine litter and noise. In

¹ For EU Member States the MSFD criteria for assessing changes to hydrological conditions are "secondary" meaning that they are to be used when there is at risk of not achieving or not maintaining good environmental status for the particular criterion.

addition the matrix included in Attachment 1 addresses pressure from ‘Extraction of species’, including e.g. impacts from fishing and hunting, and ‘Loss and disturbance of the seabed’ to make a complete mapping of topics that are considered in HELCOM.

In document 3-9 to HOD 55-2018 it was furthermore proposed to include, in the same matrix, a mapping of different aspects of biodiversity linked to different ‘Preservation activities’ to activities such as MPAs, restoration activities etc. This however results in columns and rows that are un-linked from the activity-pressure mapping since they are related to management measures, not to sector activities or pressures. Based on results of the Baltic Sea Impact Index it is however possible to extract information on the pressures causing major impacts on birds, mammals, fish, pelagic and benthic habitats. Such information will be retrieved in spring 2019 to also support the analyses on sufficiency of measures that will take place as part of the BSAP update.

		Aquaculture - land	Agriculture	Forestry	Non-renewable energy generation (fossil fuel products)
Eutrophication	Input of nutrients				
	Input of organic matter				
Hazardous substances	Input of hazardous substances*				
Marine litter	Input of litter**				
Non-indigenous	Input or spread of NIS				

Figure 1. Principles for mapping 1) identify activity-pressure linkages 2) map existing HELCOM agreements for each identified linkage.

Mapping of HELCOM agreements, targets and indicators

This document contains two examples of mapping of HELCOM agreements based on the linkages identified through the simplified matrix; ‘Physical loss and disturbance to the seabed’ and ‘Input of nutrients’. The mapping is currently presented in a table to provide an overview of the available material but when the HELCOM Explorer is revised as part of the BSAP update the information will be included in the database for future easy extraction.

The mapping is based on the proposed supporting framework for the BSAP update that has been delineated in previous HELCOM documents (GEAR 19-2018, document 3-2, HOD 55-2018, document 3-3):

1) The identified **activity-pressure linkages are mapped against HELCOM actions, including Recommendations**. The activity-pressure linkages are closely linked to ‘HELCOM action areas’ which have been proposed to be formulated for each segment of the BSAP (e.g. “sustainable agriculture”, “effective waste water treatment” under Eutrophication). The rationale for formulating action areas are that they provide for a clear link to SDG goals, which often refer to specific human activities or drivers. Since BSAP segments are not agreed yet, some indicative examples on how they could be formulated are included.

The table also includes information on two associated issues in order to support the identification of gaps in HELCOM agreements;

- 1) available information regarding the extent of activity or the magnitude of pressures from the respective activity. This type of information can help identifying activity-pressure linkages of major concern and which could be targeted for further work in HELCOM.

- 2) any restrictions or limit values among HELCOM agreements that relate to the activity. Such values are available e.g. from some HELCOM Recommendations and can be used to follow-up HELCOM actions.

2) **Management objectives are mapped against HELCOM and associated pressure targets.** Currently, management objectives have only been formulated for the Maritime segment of the BSAP. Such objectives are proposed to be formulated also for other aspects as simple descriptions of the desired change in pressure or conservation status as a result of management measures (e.g. ‘reduced input of nutrients’, ‘halt the loss of red listed species’). Currently indicative examples are given while it will be task for HELCOM Working Groups to prepare proposals for HOD. Management objectives can be followed-up by pressure targets and associated indicators (e.g. MAI/CART scheme) or conservation targets for biodiversity (e.g. targets for MPAs).

3) **Ecological objectives are mapped against HELCOM status indicators** and associated threshold values. HELCOM ecological objectives identify the desired state of the environment. They can be followed-up by core indicators representing the status of the environment. As agreed by HOD 55-2018, HELCOM Working Groups will in spring 2019 initiate the review of existing ecological objectives and proposed new ones for marine litter, underwater noise, loss and disturbance of the seabed.

The mapping of management objectives-pressure targets, and ecological objectives-status indicators is made at the level of pressures since at this time there are no activity-specific indicators agreed in HELCOM.

Reflections on the preliminary results of the mapping for two chosen topics

Loss and disturbance of the seabed

- There are no HELCOM management objectives nor ecological objectives related to loss and disturbance of the seabed. As agreed by HOD 55-2018 new objectives will be proposed by HELCOM Working Groups in spring 2019.
- Existing operational status indicators supports only a limited assessment of seabed habitats, i.e. the condition of soft-bottom macrofauna.
- Overall there are only a limited number of HELCOM Recommendations and actions related to impacts on the seabed or specific activities that are causing loss and disturbance to the seabed and thus, gaps exist for many of activity-pressure linkages. The commitment of the HELCOM Ministerial Declaration 2018, [to ... developing threshold values for the adverse effects of anthropogenic physical disturbance and, ..., to develop the necessary regionally coordinated quantitative targets for the reduction of physical disturbance caused by human activities and habitat loss (para 41)], can serve as the basis for development of new HELCOM actions.
- The activities that previously have been evaluated as causing the major areal loss of the seabed or having the highest impact on the seabed in the Baltic Sea are linked to sea-based activities.
- The HELCOM agreements related to loss and disturbance to the seabed could tentatively be part of an action area labelled ‘*Sustainable practices of activities causing an impact on the seabed*’ which could also address other activities having an impact on the seabed.

Input of nutrients

- There are existing ecological objectives related to input of nutrients under the current BSAP segment on Eutrophication. As agreed by HOD 55-2018 they will be reviewed by HELCOM Working Groups in spring 2019.
- Status indicators cover several aspects of eutrophication (nutrients levels, direct effects, indirect effects).

- Eutrophication, being a focal area for HELCOM for many years, is linked to a relatively large number of existing agreements. HELCOM Ministerial Declaration 2018 identified nutrient recycling as a new action area.
- For some activity-pressure linkages HELCOM agreements are however missing (forestry, urban land use, marine plant harvesting). For input of nutrients there has so far not been any prioritization between activity-pressure linkages i.e. based on magnitude or impacts, and it is thus possible that some of the linkages are of less importance in the Baltic Sea area.
- Information on sources of input of nutrients was compiled and assessed in the frame of PLC-6 project. Information is however missing on the effect of measures to reduce input of nutrients from diffuse sources.
- In terms of action areas, input of nutrients could potentially be formulated for several activities or groups of activities e.g. *'Sustainably managed agriculture, aquaculture, forestry'*, *'Effective waste water treatment'*, and also for issues not directly related to activities such as *'Management of internal nutrient reserves'*.

Annex 1 Mapping of HELCOM agreements, objectives and indicators

The annex includes two examples of mapping of HELCOM agreements according to the activity-pressure linkages identified in Attachment 1, sheet labelled 'Simplified matrix': 'Physical loss and disturbance to the seabed', and 'Input of nutrients'. The results are indicative of the type of information available and the presentation is only temporary; the information will be incorporated into a database. Note that the indication that a HELCOM action exists does not imply that the action is sufficient to address the activity-pressure linkage in question.

Interpretation of tables

Two type of tables are presented. Note that once the information has been included in a database it will be possible to extract information from another starting point if desired (e.g. activities, recommendations). In the current tables the following applies:

- a) For each pressure a **table with information on existing management objectives and ecological objectives and associated targets or indicators** is provided.
- b) For each activity-pressure linkage a **table with existing HELCOM agreements** is provided.
 - The tables are sorted by broader themes of activities and pressures as applied in the HOLAS II project and as used in the revision of Annex III of the Marine Strategy Framework Directive¹. Abbreviations used: S=Sea-based activity, L= Land-based activity
 - Colour coding of tables is according to activities in Attachment 1, Simplified matrix.
 - The mapping of agreements currently includes HELCOM Recommendations that address measures aimed at reducing the impact of the activity and/or pressure in question. Some examples from the Recommendations are given but for full information please consult the original text (links are provided). Note that the Recommendations listed in the tables will be followed-up through the reporting of Recommendations in 2019 and the level of implementation will thus be clarified during the course of the BSAP update process. HELCOM actions from the BSAP and Ministerial Declaration 2010, 2013 and 2018 are also limited to those that are linked to concrete measures to reduce pressure to the Baltic Sea and that are not yet fully implemented. The status of accomplishment is according to the reporting available to the 2018 HELCOM Ministerial Meeting. Colour coding: orange – partly accomplished, red – not accomplished, grey – future target year. For national actions the number countries that have implemented the action is indicated (status). Access to information on already accomplished HELCOM actions and actions related to data, knowledge, etc will be available through the updated database on HELCOM actions.
 - Information is also gathered on whether the Recommendation or HELCOM actions include any restrictions or limit values that can be used to follow up the agreement or effect of measures.
 - The table also indicates if there is available information in HELCOM on the extent of the activity or the magnitude of pressure originating from the activity. 'GIS-layers' refers to those used for latest HELCOM assessment of the Baltic Sea Pressure and Impact Index (BSPI and BSII).

1) Loss and disturbance to seabed

Loss of the seabed is addressed separately from disturbance to the seabed since activities having a major impact differs between the two aspects. Prioritizations of activity-pressure linkages have been made in both cases for the purpose of the test-mapping:

- Loss: Several activities and pressure types are causing physical loss of the seabed; in total 38 activities have been linked to physical loss of the seabed (Attachment 1, TAPAS matrix). The mapping of HELCOM agreements is based on prioritizing the four activities that are causing the major areal loss (99%) of the seabed according to the application of the BSII¹.

¹ In the simplified matrix the titles have been adjusted to the version of MSFD Annex III adopted in 2017.

- Disturbance: Several activities and pressure types are causing physical disturbance to the seabed; in total 55 activities have been linked to physical disturbance to the seabed (Attachment 1, TAPAS matrix). The mapping of HELCOM agreement is based on a prioritization of activities having high to moderate impact on seabed habitats as described in [BSEP 164](#) and used in the BSII in the 'State of the Baltic Sea' reportⁱⁱ.

In addition to activity-pressure specific actions, there are HELCOM Recommendations that apply in general to the allowance of human activities from a spatial perspective. These are listed in Table 1.1 since they are relevant for minimizing both the loss and disturbance to the seabed from multiple activities.

Theme: GENERAL

Table 1.1 Activity: Non-specific, Pressure: Loss and disturbance of the seabed

Subject	Existing	Additional information
HELCOM actions	Yes	<p>HELCOM Rec 15/1, Protection of the coastal strip. Recommends the establishment of a generally protected coastal strip and restrictions to certain activities within the strip (see restrictions below).</p> <p>HELCOM Rec 24/10, Implementation of Integrated Marine and Coastal Management of Human Activities in the Baltic Sea Area. About organizing, planning, improving data for integrated CZM.</p> <p>HELCOM Rec 17/3, Information and Consultation with regard to Construction of New Installations Affecting the Baltic Sea. Includes criteria on when to inform Contracting Parties and HELCOM on new installations.</p> <p>HELCOM Rec 28E/9, Development of Broad-Scale Marine Spatial Planning Principles in the Baltic Sea Area. E.g. to jointly develop common principles for marine and coastal broad-scale spatial planning, improve spatial data, map interacting/conflicting interests.</p> <p>New HELCOM action from MD 2018:</p> <ul style="list-style-type: none"> - develop threshold values for the adverse effects of anthropogenic physical disturbance and, based on the best available scientific information in close coordination with other relevant fora, if needed to achieve GES, to develop the necessary regionally coordinated quantitative targets for the reduction of physical disturbance caused by human activities and habitat loss;
HELCOM restrictions or limit values	Yes	<p>HELCOM Rec 15/1</p> <ul style="list-style-type: none"> - A generally protected coastal strip therefore be established outside urban areas and existing settlements, the width of which shall be determined by the nature and landscape values of the coast, extending at least 100 to 300 meters from the mean water line landwards and seawards - That in this protected coastal strip: <ul style="list-style-type: none"> o activities which would permanently change the nature and landscape such as extraction of soil and minerals, construction of buildings (except for buildings necessary for existing farming or fishing and saunas in connection with existing buildings), marinas, roads, camping grounds etc. not be allowed except when proved to be in overwhelming public interest including responsibilities of public administration with regard to coastal and flood protection and when it is proved that no less sensitive site can be found; o intensive forestry and intensive farming including drainage be restricted o that exceptions can be made from the provisions in points b) and c) by a land use plan approved and sanctioned by a competent authority - That a zone of at least 3 kilometres landwards from the mean water line should be established as a coastal planning zone where major building development and other major permanent changes in nature and landscape be preceded by an appropriate land use plan, and/or an environmental impact assessment
Information on magnitude or extent	Not applicable	

Physical loss of the seabed

Management objectives and ecological objectives

Table 1.2. Objectives, pressure targets and indicator for physical loss of the seabed

Subject	Existing	Comment
Management objectives	No	Potential general management objective: <i>'Minimum loss of seabed habitats from sea-based activities'</i> .
Indicators for pressure	No	Although there are no officially agreed indicators, collation of information on permanent structures and extent of activities that are causing physical loss of the seabed takes place on an <i>ad hoc</i> basis in HELCOM (e.g. for use in BSII).
Targets for pressures ²	No	MD 2018 however states: "to develop the necessary regionally coordinated quantitative targets for the reduction of physical disturbance caused by human activities and habitat loss";
Ecological objectives	No	There is no specific ecological objective linked to the pressure but the current biodiversity segment of the BSAP states that existing ecological objectives are covering the topic to: <i>"restoring and maintaining sea floor integrity at a level that safeguards the functions of the ecosystems"</i> .
Indicators for status	Not applicable	Since the area that is already lost is not available for benthic features a status indicator is not applicable
Threshold values for status	-	
Indicators under development	-	

Activity-pressure linkages, Loss of seabed

Activities tabled below are those causing major areal loss of the seabed according to the application of the BSII. For a full list of activity-pressure linkages see Attachment 1.

Theme: Physical restructuring of coastline or seabed

Table 1.3 Activity: Dredging, beach replenishment (S), Pressure: Physical loss of the seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 36/2 , Management of Dredged Material including Guidelines for management of dredged material at sea . Refers to the implementation of HELCOM Guidelines for Management of Dredged Material at Sea, adopted in 2015, including e.g. guidelines for characterisation of dredged material, impact assessments at deposit site, monitoring at deposit site. The Rec encourages countries to use BEP to minimize quantity of material that has to be dredged and the impact of the dredging.
HELCOM restrictions or limit values	No	
Information on magnitude or extent	Yes	GIS layers: Dredging (capital), Dredging (maintenance), deposit of dredged material. Through follow-up of the guidelines, also the type and origin of dredged material, weight of dredged material, relocation of sediments etc is also reported. Dredging and dumping of dredged material is estimated to contribute to 44% of the areal loss of seabed in the Baltic Sea ¹ .

² "Target for pressures" refers to potential agreements agreed in HELCOM related to the magnitude or extent of the pressure to achieve good environmental status.

Theme: Transport

Table 1.4 Activity: Infrastructure (harbours, ports) (S), Pressure: Physical loss of seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 15/1 Protection of the coastal strip. Recommends the establishment of a generally protected coastal strip and restrictions to certain activities within the strip.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	No	GIS-layers: Harbours, marinas. Port anchorage is estimated to contribute to 37% of the areal loss of seabed in the Baltic Sea ¹ .

Theme: Extraction of non-living resources

Table 1.5 Activity: Extraction of minerals (S), Pressure: Physical loss of seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 19/1 , Marine Sediment Extraction in the Baltic Sea Area (including guidelines for sediment extraction). Provides guidelines for carrying out sediment extraction including EIA, extraction practice (e.g. BAT, BEP), monitoring. HELCOM Rec 18/2 , Offshore activities. Provides guidelines i.e. on environmental assessments prior to start of activity, rules for discharge of drilling cuttings, monitoring. HELCOM Rec 15/1 Protection of the coastal strip. Recommends the establishment of a generally protected coastal strip and restrictions to certain activities within the strip.
HELCOM restrictions or limit values	Yes	No restrictions to the extent of the activity, however: HELCOM Rec 19/1 places restrictions in that permits to extract sediments should not be granted for nature reserves, national parks, Natura 2000 areas. In other sensitive areas (as defined in the recommendation) permits should only be granted if an EIA according to the Guidelines is proving that the extraction is not likely to cause significant negative ecological effects HELCOM Rec 18/2 places restrictions on e.g. no exploration or exploitation in Baltic Sea Protected Areas HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	No	GIS layer: Area of extraction of sand and gravel. Sand and gravel extraction are estimated to contribute to 15% of the areal loss of seabed in the Baltic Sea ¹ .

Theme: Production of energy

Table 1.6 Activity: Renewable energy generation: operational windfarms, tidal barrages, wave energy (S), Pressure: Physical loss of seabed

Subject	Existing	Comment
HELCOM actions	Yes	If in the coastal strip: HELCOM Rec 15/1 . Protection of the coastal strip . Recommends the establishment of a generally protected coastal strip and restrictions to certain activities within the strip. No other actions are related to measures or to limiting the extent windfarms but there is a link to the following Recommendation:
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	No	GIS layers: Wind farms operational. Windfarms is estimated to contribute to 3% of the areal loss of seabed in the Baltic Sea ¹ .

Physical disturbance to the seabed

Management objectives and ecological objectives

Table 1.7. Objectives, pressure targets and indicator for physical disturbance of seabed

Subject	Existing	Comment
Management objectives	No	Potential general management objective: ‘Minimum impact on seabed habitats from sea-based activities’. Management objectives could however also be formulated for specific activities
Indicators for pressures	No	Although there are no officially agreed indicators collation of information on extent of activities that are causing physical disturbance of the seabed as well as pressures to the seabed per se takes place on an <i>ad hoc</i> basis (e.g. for use in BSII).
Targets for pressures ³	No	MD 2018 however states: “to develop the necessary regionally coordinated quantitative targets for the reduction of physical disturbance caused by human activities and habitat loss”;
Ecological objectives	No	There is no specific ecological objective linked to the pressure at this time but the current biodiversity segment of the BSAP states that existing ecological objectives are covering the topic to: “restoring and maintaining sea floor integrity at a level that safeguards the functions of the ecosystems”.
Indicators for status	Partly	<i>State of the soft-bottom macrofauna community</i> . The indicator considers only the condition of communities associated to one habitat type (soft-bottoms). This is currently the only operational indicator and condition of other habitat types or changes to the extent of habitats are not covered by the indicator.
Threshold values for status	Partly	Not for all sub-basins [add information on missing sub-basins]
Indicators under development	Yes	<i>Cumulative impact on benthic biotopes, Condition of benthic habitats</i>

Activity-pressure linkages with HIGH disturbance to the seabed

The tables address activity-pressure linkages with ‘high’ and ‘moderate to high’ impacts on seabed habitats according to HELCOM BSEP 164. For a full list of activity-pressure linkages see Attachment 1.

Theme: Extraction of living resources

Table 1.8 Activity: Fish and shellfish harvesting (professional, recreational) (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	No	No HELCOM action that address directly the impact on the seabed from fishing activities. The activity-pressure is related to the following action: Not accomplished joint action ■ Development and implementation of fisheries management measures for fisheries inside marine protected areas
HELCOM restrictions or limit values	No	
Information on magnitude or extent	Yes	GIS-layer: Fishing intensity (subsurface swept area ratio average 2011-2016)

³ “Target for pressures” refers to potential restrictions agreed in HELCOM related to the magnitude or extent of the pressure to achieve good environmental status.

Theme: Extraction of non-living resources

Table 1.9 Activity: Extraction of minerals (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 19/1 , Marine Sediment Extraction in the Baltic Sea Area (including guidelines for sediment extraction). Provides guidelines for carrying out sediment extraction including EIA, extraction practice (e.g. BAT, BEP), monitoring. HELCOM Rec 18/2 , Offshore activities. Provides guidelines i.e. on environmental assessments prior to start of activity, rules for discharge of drilling cuttings, on monitoring
HELCOM restrictions or limit values	Yes	No restrictions to the disturbance from the activity, however: HELCOM Rec 19/1 places restrictions in that permits to extract sediments should not be granted for nature reserves, national parks, Natura 2000 areas . In other sensitive areas (as defined in the recommendation) permits should only be granted if an EIA according to the Guidelines is proving that the extraction is not likely to cause significant negative ecological effects HELCOM Rec 18/2 places restrictions on e.g. no exploration or exploitation in Baltic Sea Protected Areas
Information on magnitude or extent	Yes	GIS layer: Area of extraction of sand and gravel

Table 1.10 Activity: Extraction of oil and gas (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 18/2 , Offshore activities. Provides guidelines i.e. on environmental assessments prior to start of activity, rules for discharge of drilling cuttings, on monitoring <i>[The HELCOM 'Action Plan for the protection of the environment from offshore platforms', adopted through the BSAP, includes e.g. limit values and restrictions for operation of offshore platforms, e.g. on chemicals, discharges of oil, air emissions, solid waste but not to physical disturbance to the seabed]</i>
HELCOM restrictions or limit values	Yes	No restrictions to the extent of the activity, however HELCOM Rec 18/2 places restrictions on e.g. no exploration or exploitation in Baltic Sea Protected Areas
Information on magnitude or extent	Yes	GIS layer: Oil platforms

Theme: Physical restructuring of coastline or seabed

Table 1.11 Activity: Dredging, beach replenishment (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	No	HELCOM Rec 36/2 , Management of Dredged Material including Guidelines for management of dredged material at sea . Refers to the implementation of HELCOM Guidelines for Management of Dredged Material at Sea, adopted in 2015, including e.g. guidelines for characterisation of dredged material, impact assessments at deposit site, monitoring at deposit site. The Rec encourages countries to use BEP to minimize quantity of material that has to be dredged and the impact of the dredging.
HELCOM restrictions or limit values	No	
Information on magnitude or extent	Yes	GIS layers: Dredging (capital), Dredging (maintenance), deposit of dredged material

Theme: Transport

Table 1.12. Activity: Shipping (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	No	There are many HELCOM recommendations and actions aimed at limiting the impact from shipping; but none that is directly linked to minimizing impacts on the seabed.
HELCOM restrictions or limit values	No	
Information on magnitude or extent	Yes	GIS-layer; Shipping density

Activity-pressure linkages with **MODERATE** disturbance to the seabed

The tables address activity-pressure linkages with ‘moderate’ impacts on seabed habitats according to HELCOM BSEP 164. For a full list of activity-pressure linkages see Attachment 1.

Theme: Physical restructuring of coastline or seabed

Table 1.13. Activity: Land claim (L), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 15/1 Protection of the coastal strip . Recommends the establishment of a generally protected coastal strip and restrictions to the allowance of certain activities within the strip.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	Yes	GIS layer: Area land claim

Table 1.14. Activity: Canalisation and other watercourse modifications (L), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 15/1 Protection of the coastal strip Recommends the establishment of a generally protected coastal strip and restrictions to the allowance of certain activities within the strip.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	Yes	GIS layer: Water course modification

Table 1.14. Activity: Coastal defence and flood protection (L/S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	<p>HELCOM HELCOM Rec 15/1 Protection of the coastal strip Recommends the establishment of a generally protected coastal strip and restrictions to the allowance of certain activities within the strip.</p> <p>HELCOM Rec 16/3 Preservation of natural coastal dynamics. General guidelines e.g.</p> <ul style="list-style-type: none"> - new coastal defence measures outside settlements normally not be executed except when integrated coastal zone management plans provide otherwise; - active cliffs as sediment supplier and natural coastal flood areas as potential nutrient traps should not be subject to any new coastal defence measures except when integrated coastal zone management plans provide otherwise; - coastal areas outside settlements that have been subject to episodic flooding before they were dyked for land use purposes only, should be

		restored as coastal wetlands through removal or relocation of dykes further inland, wherever possible; - if coastal defence measures are necessary, natural materials such as stones, sand, soil or wood shall be preferred to artificial materials, - coastal defence measures be nationally or regionally incorporated into integrated coastal zone management plans.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	Yes	GIS layer: Coastal defence and flood protection

Theme: Production of energy

Table 1.15. Activity: Renewable energy generation: operational windfarms, tidal barrages, wave energy (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 15/1 R Protection of the coastal strip .Recommends the establishment of a generally protected coastal strip and restrictions to the allowance of certain activities within the strip.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	Yes	GIS layers: Wind farms, operational and under construction

Theme: Physical restructuring of coastline or seabed

Table 1.16. Activity: Offshore structures (other than for energy production/extraction) (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 15/1 Protection of the coastal strip . Recommends the establishment of a generally protected coastal strip and restrictions to the allowance of certain activities within the strip.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	Yes	GIS-layers, cables, pipelines, mariculture, oil terminals

Theme: Transport

Table 1.17. Activity: Transport infrastructure (harbours, ports, bridges, tunnels) (S), Pressure: Disturbance to seabed

Subject	Existing	Additional information
HELCOM actions	Yes	HELCOM Rec 15/1 Protection of the coastal strip . Recommends the establishment of a generally protected coastal strip and restrictions to the allowance of certain activities within the strip.
HELCOM restrictions or limit values	No	No restrictions to extent of the activity. HELCOM Rec 15/1 places restrictions that applies in general to allowance of activities in the coastal strip.
Information on magnitude or extent	Yes	GIS-layers: Harbours, marines, bridges

Theme: Education and research**Table 1.18. Activity: Research and survey (seismic surveys, fish surveys) (S), Pressure: Disturbance to seabed**

Subject	Existing	Additional information
HELCOM actions	No	
HELCOM restrictions or limit values	No	
Information on magnitude or extent	Partly	Information on airgun arrays used for seismic surveys are reported to the HELCOM registry of impulsive noise

2) Input of nutrients

In addition to activity-pressure specific actions, there are HELCOM Recommendations that apply in general to the reduction of input of nutrients. These are listed in Table 2.2.

Table 2.1 Management objectives and ecological objectives

Subject	Existing	Comment
Management objectives	Partly	A management objective exists related to input of nutrients from the current Maritime segment: ' <i>Minimum sewage pollution from ships</i> '. A potential general management objective could be: ' <i>Minimum input of nutrients from all sources</i> '. Management objectives could however also be formulated for specific activities such as the existing example from the BSAP maritime segment.
Indicators for pressure	Yes	<i>Inputs of nutrients to the sub-basin</i>
Targets for pressures	Yes	MAI
Ecological objectives	Yes	<i>Concentrations of nutrients close to natural levels</i>
Indicators for status	Yes	<i>Nitrogen (DIN), Phosphorous (DIP) Total nitrogen (TN), Total phosphorous (TP) Chlorophyll-a Water clarity Oxygen debt</i>
Threshold values for status	Partly	Not agreed for all sub-basins for TN, TP and oxygen debt
Indicators under development	Yes	<i>Cyanobacterial bloom index</i> (pre-core, tested in HOLAS II)

Theme: GENERAL

Table 2.2 Activity: Non-specific

Subject	Existing	Additional information												
HELCOM actions	Yes	<p>Not yet accomplished national actions</p> <table border="0"> <thead> <tr> <th></th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>  National programmes to achieve nutrient reductions </td> <td>4</td> </tr> <tr> <td>  Achieving Country Allocated Nutrient Reduction Targets: Nitrogen </td> <td>1 / 9</td> </tr> <tr> <td>  Achieving Country Allocated Nutrient Reduction Targets: Phosphorous </td> <td></td> </tr> <tr> <td>  Evaluation of effectiveness of national programmes for reduction of nutrients and need for additional measures, in order to reach the country-wise reduction targets </td> <td>4 / 9</td> </tr> <tr> <td>  Initiate joint activities to address transboundary nutrient inputs from non-Contracting Parties according to the HELCOM nutrient reduction scheme </td> <td>3 / 8 Target year: 2020</td> </tr> </tbody> </table> <p>New commitment from MD 2018:</p> <ul style="list-style-type: none"> - Elaborating by 2020 a Baltic Sea Regional Nutrient Recycling Strategy that aims for reduced nutrient inputs to and eutrophication of the Baltic Sea - Develop possible nutrient recycling measures to be included in the updated BSAP. <p>[there are also other commitment from MD 2018 linked to nutrient but they are related to improving knowledge and cooperation, not to direct measures]</p>		Status	 National programmes to achieve nutrient reductions	4	 Achieving Country Allocated Nutrient Reduction Targets: Nitrogen	1 / 9	 Achieving Country Allocated Nutrient Reduction Targets: Phosphorous		 Evaluation of effectiveness of national programmes for reduction of nutrients and need for additional measures, in order to reach the country-wise reduction targets	4 / 9	 Initiate joint activities to address transboundary nutrient inputs from non-Contracting Parties according to the HELCOM nutrient reduction scheme	3 / 8 Target year: 2020
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 Evaluation of effectiveness of national programmes for reduction of nutrients and need for additional measures, in order to reach the country-wise reduction targets	4 / 9													
 Initiate joint activities to address transboundary nutrient inputs from non-Contracting Parties according to the HELCOM nutrient reduction scheme	3 / 8 Target year: 2020													
HELCOM restrictions or limit values	Not applicable													
Information on magnitude or extent	Yes	Total input of nutrients followed-up regularly through PLC												

⁴ All countries have some form of nutrient reduction programmes but it has not been clarified by all countries if they are sufficient to reach HELCOM CART

Theme: Cultivation of living resources

Table 2.3 Activity: Agriculture (L), Pressure: Input of nutrients

Subject	Existing	Additional information																
HELCOM actions	Yes	<p>Amendments to Annex III “Criteria and measures concerning the prevention of pollution from land - based sources” of the 1992 Helsinki Convention Provides general guidance on location of farm animal houses, construction of e.g. storage and application of plant nutrients, plant protection products, environmental permits, monitoring.</p> <p>Not yet accomplished joint actions</p> <ul style="list-style-type: none"> ■ Review and update part II of Annex III of the Helsinki Convention ■ Aim for elimination of remaining Hot Spots under the HELCOM JCP* (Target year: 2018) <p>Not yet accomplished national actions</p> <table border="0"> <thead> <tr> <th></th> <th style="text-align: right;">Status</th> </tr> </thead> <tbody> <tr> <td>■ Implement and enforce the provisions of part 2 of Annex III "Prevention of pollution from agriculture" of the 1992 Helsinki Convention</td> <td style="text-align: right;">4 / 9</td> </tr> <tr> <td>■ Measures to bring all installations for the intensive rearing of cattle, poultry and pigs as well as other agricultural activities in compliance with part 2, Annex III of the Helsinki Convention</td> <td style="text-align: right;">4 / 9</td> </tr> <tr> <td>■ Apply as a minimum the updated EU’s BREF document and Conclusions on BAT for intensive rearing of poultry and pigs, especially for the facilities located within areas critical to nutrient losses</td> <td style="text-align: right;">7 / 9</td> </tr> <tr> <td>■ Revised palette of measures for reducing phosphorus and nitrogen losses from agriculture. Optional agro-environmental measures to be implemented through corresponding international and national instruments</td> <td style="text-align: right;">3 / 9</td> </tr> <tr> <td>■ Establish national guidelines or standards for nutrient content in manure with the view to fully utilize nutrient content of manure in fertilization practices and to avoid overfertilization</td> <td style="text-align: right;">5 / 9</td> </tr> <tr> <td>■ Agreement on national level on measures to reduce nutrient surplus in fertilization practices to reach nutrient balanced fertilization</td> <td style="text-align: right;">5 / 9 Target year: 2018</td> </tr> <tr> <td>■ Promote and advance towards applying annual nutrient accounting at farm level, taking into account soil and climate conditions, in areas critical to nutrient losses as a first step and with an aim to apply it region-wise</td> <td style="text-align: right;">4 / 9 Target year: 2018</td> </tr> </tbody> </table>		Status	■ Implement and enforce the provisions of part 2 of Annex III "Prevention of pollution from agriculture" of the 1992 Helsinki Convention	4 / 9	■ Measures to bring all installations for the intensive rearing of cattle, poultry and pigs as well as other agricultural activities in compliance with part 2, Annex III of the Helsinki Convention	4 / 9	■ Apply as a minimum the updated EU’s BREF document and Conclusions on BAT for intensive rearing of poultry and pigs, especially for the facilities located within areas critical to nutrient losses	7 / 9	■ Revised palette of measures for reducing phosphorus and nitrogen losses from agriculture. Optional agro-environmental measures to be implemented through corresponding international and national instruments	3 / 9	■ Establish national guidelines or standards for nutrient content in manure with the view to fully utilize nutrient content of manure in fertilization practices and to avoid overfertilization	5 / 9	■ Agreement on national level on measures to reduce nutrient surplus in fertilization practices to reach nutrient balanced fertilization	5 / 9 Target year: 2018	■ Promote and advance towards applying annual nutrient accounting at farm level, taking into account soil and climate conditions, in areas critical to nutrient losses as a first step and with an aim to apply it region-wise	4 / 9 Target year: 2018
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■ Promote and advance towards applying annual nutrient accounting at farm level, taking into account soil and climate conditions, in areas critical to nutrient losses as a first step and with an aim to apply it region-wise	4 / 9 Target year: 2018																	
HELCOM restrictions or limit values	Yes	<p>Amendments to Annex III of the 1992 Helsinki Convention</p> <p>Application rates for nutrients:</p> <p>The amount of livestock manure applied to the land each year including by the animals themselves should not exceed the amount of manure containing:</p> <ul style="list-style-type: none"> - 170 kg/ha nitrogen - 25 kg/ha phosphorus <p>Farms with livestock production above a specified size should require approval with regard to environmental aspects and impacts of the farms. Installations for the intensive rearing of poultry, pigs and cattle with more than 40,000 places for poultry, 2,000 places for production pigs (over 30 kg), 750 places for sows or 400 animal units cattle shall have a permit fully coordinated by the relevant authorities. Requirements for 6 months manure storage capacity.</p>																
Information on magnitude or extent	Partly	<p>46% (246256 tonnes per year) of the total riverine nitrogen load to the Baltic Sea from diffuse sources⁵, 36% (7951 tonnes per year) of the total riverine phosphorus load to the Baltic Sea from diffuse sources (PLC 6, BSEP 153)</p>																

⁵ In BSEP 153 stated as “mainly from agricultural sources”

Table 2.4 Activity: Aquaculture (L/S), Pressure: Input of nutrients

Subject	Existing	Additional information
HELCOM actions	Yes	<p>HELCOM Rec 25/4: Measures Aimed at the Reduction of Discharges from Fresh Water and Marine Fish Farming. Rec 25/4 includes 12 recommendation paragraphs, including e.g.</p> <ul style="list-style-type: none"> - Fish farming should be subject to permits or prior regulations by the competent authority or appropriate body in accordance principles set by the recommendation - Annual nutrients discharges should be below limit values set by the recommendation. - The use of bioactive chemicals and drugs at fish farms should be officially approved and effectively controlled to minimize hazards to the environment. <p>HELCOM Rec 37/3: Sustainable Aquaculture in the Baltic Sea Region. General guidance, e.g. to:</p> <ul style="list-style-type: none"> - ensure that possible negative impacts from aquaculture will not hinder the achievement of a good environmental/ecological/chemical status, as agreed upon in HELCOM BSAP and relevant national and international legislation; - take full account of nutrient discharges and losses from marine aquaculture in an overall endeavour by the Contracting Parties to keep inputs within Maximum Allowable Inputs for nitrogen and phosphorus for the Baltic Sea basins, as agreed at the 2013 HELCOM Copenhagen Ministerial Meeting and in its possible future updates; - foster development and innovation towards ecologically sustainable farms and aquaculture technologies, including nutrient neutral and nutrient extractive ones, to avoid or minimize, and mitigate discharges of nutrients, organic matter, litter, chemicals and handling of escapees and diseases, as relevant
HELCOM restrictions or limit values	Yes	HELCOM Rec 25/4 includes limit values for the release of nitrogen and phosphorus from fish farming.
Information on magnitude or extent	Yes	Share of input from aquaculture from point sources is 8,3 % (812 tonnes per year) and share of phosphorus is 13.5% (86 tonnes per year) (PLC 6, BSEP 153). Information on share from diffuse sources is not available.

Table 2.5 Activity: Forestry, Pressure: Input of nutrients

Subject	Existing	Additional information
HELCOM actions	No	
HELCOM restrictions or limit values	No	
Information on magnitude or extent	No	

Theme: Urban and industrial uses

Table 2.6 Activity: Industrial and urban waste treatment and disposal, Pressure: Input of nutrients

Subject	Existing	Additional information
HELCOM actions	Yes	<p>HELCOM Rec 28E/5 Municipal wastewater treatment. Provides guidelines on the development of sewerage systems and limit values on the discharge of municipal wastewater.</p> <p>HELCOM Rec 28E/6, On-site wastewater treatment of single family homes, small businesses and settlements up to 300 person equivalents</p> <p>HELCOM Rec 28E/7 Measures aimed at the substitution of polyphosphates (phosphorus) in detergents</p> <p>HELCOM Rec 38-1 Sewage sludge handling</p>
		Not yet accomplished national actions Status

		<ul style="list-style-type: none"> ■ Target the elimination of phosphorus in laundry detergents for consumer use as soon as possible but not later than by 2015 8 / 9 ■ Enhance the recycling of phosphorus (especially in agriculture and wastewater treatment) and to promote development of appropriate methodology 3 / 9 ■ Advanced municipal waste water treatment under HELCOM Recommendation 28E/5 3 / 9
HELCOM restrictions or limit values	Yes	Rec 28E/5; includes %reduction or limit values for BOD, TP, TN, for 300 -2.000 PE, 2.000-10.000 PE, 10 000-100.000 PE, >100.000 PE Rec 28E/6; includes Maximum permissible daily load per capita for BOD 5 TP and TN of treated wastewater for <300 PE. Rec 28E-7; includes that a maximum limit for the content of TP should be applied and a hurdle of 0.2 to 0.5% P weight/weight could be recommended
Information on magnitude or extent	Partly	Share of nitrogen from municipal point sources is 73.5% (7214 tonnes per year) and share of phosphorus is also 73.5% (488 tonnes per year). Share of nitrogen from industrial point sources is 18,3% (1793 tonnes per year) and share of phosphorus is 13,6% (90 tonnes per year) (PLC 6, BSEP 153). Information on share of municipal and industrial wastewater from diffuse sources is not available.

Table 2.7 Activity: Urban use (land use), Pressure: Input of nutrients

Subject	Existing	Additional information
HELCOM actions	No	
HELCOM restrictions or limit values	No	
Information on magnitude or extent	No	

Theme: Transport

Table 2.8 Activity: Shipping; Pressure: Input of nutrients

Subject	Existing	Additional information		
HELCOM actions	Yes	<p>Not yet accomplished national actions</p> <table border="0"> <tr> <td> <ul style="list-style-type: none"> ■ Implement the [HELCOM] Roadmap for upgrading port reception facilities for sewage in passenger ports in the Baltic Sea Area ■ Implement the [HELCOM] Roadmap for upgrading port reception facilities for sewage in passenger ports in the Baltic Sea Area </td> <td> <p>Status</p> <p>Priority ports: 4 / 5</p> <p>Secondary ports: 1 / 4</p> </td> </tr> </table> <p>Adoption of the Baltic Sea as a MARPOL Annex VI NECA area, based on a joint proposal in HELCOM, is accomplished.</p>	<ul style="list-style-type: none"> ■ Implement the [HELCOM] Roadmap for upgrading port reception facilities for sewage in passenger ports in the Baltic Sea Area ■ Implement the [HELCOM] Roadmap for upgrading port reception facilities for sewage in passenger ports in the Baltic Sea Area 	<p>Status</p> <p>Priority ports: 4 / 5</p> <p>Secondary ports: 1 / 4</p>
<ul style="list-style-type: none"> ■ Implement the [HELCOM] Roadmap for upgrading port reception facilities for sewage in passenger ports in the Baltic Sea Area ■ Implement the [HELCOM] Roadmap for upgrading port reception facilities for sewage in passenger ports in the Baltic Sea Area 	<p>Status</p> <p>Priority ports: 4 / 5</p> <p>Secondary ports: 1 / 4</p>			
HELCOM restrictions or limit values	Yes	According to NECA requirements (Tier III standards of MARPOL Annex VI). According to the Baltic Sea Special Area for Sewage under MARPOL Annex IV. The Baltic Sea Special Area for sewage under MARPOL Annex IV will enter into force on 1 June 2019 for new passenger ships and 1 June 2021 for existing ones. When the special area regulations are in effect, passenger ships certified for more than 12 passengers will be limited to discharging sewage into port reception facilities or alternatively at sea only after treatment with advanced on-board sewage treatment plants able to reduce nutrient input into the sea.		
Information on magnitude or extent	Yes	<p>Sewage</p> <p>Total annual nutrient content of toilet sewage from cruise ships is roughly estimated at 86–107 tonnes of nitrogen and 30–36 tonnes of phosphorus. In addition, sewage is produced by the 40 million passengers on board international ferries as well as the uncalculated number of voyages by smaller ferries and leisure boats. Some sewage is already being delivered to ports in the Baltic Sea area on a voluntary basis but there is no available estimate of these</p>		

amounts. It is thus difficult to estimate the total nutrient load which is discharged to the sea.

NOx emissions

From 2005–2015, the annual emissions of NOx from ships in the Baltic Sea have been around 320–360 ktonnes per year. Of these total annual emissions, approximately 19 ktonnes of reduced nitrogen ends up in the Baltic Sea as direct deposition to the sea surface.

In 2016 the Baltic Sea was designated as a NOx emission control area (NECA) which will enter into force for new ships on 1 January 2021. According to EMEP 2016 the reduction in annual total nitrogen deposition to the Baltic Sea region achieved by these regulations will be approximately 22 ktonnes by 2030s, compared to a non-NECA scenario, as a combined effect of the Baltic Sea and North Sea NECAs (Jonson et al. 2015).

Theme: Extraction of living resources

Table 2.9 Activity: Marine plant harvesting, Pressure: Input of nutrients

Subject	Existing	Additional information
HELCOM actions	No	
HELCOM restrictions or limit values	No	
Information on magnitude or extent	No	

Theme: Physical restructuring of coastline or seabed

Table 2.10 Activity: Dredging, beach replenishment, Pressure: Input of nutrients

Subject	Existing	Additional information
HELCOM actions	No	No actions or agreement specifically linked to limiting input of nutrients
HELCOM restrictions or limit values	No	
Information on magnitude or extent	No	

ⁱ Korpinen S, Klančnik K, Zupančič G, Nurmi M, Laamanen L, Andersen JH, Murray C, Harvey T, Zenetos A, Stein U, Tunesi L, Piet GJ, Kallenbach & Vaughan D (in preparation) Pressures and their effects in Europe's seas. ed. Künitzer, A., ETC/ICM Technical Report X/2019, Magdeburg: European Topic Centre on inland, coastal and marine waters.

ⁱⁱ HELCOM (2018): Thematic assessment of cumulative impacts on the Baltic Sea 2011-2016. Available at: <http://www.helcom.fi/baltic-sea-trends/holistic-assessments/state-of-the-baltic-sea-2018/reports-and-materials/>