



# Joint Documentation of Regional Coordination of Programmes of Measures for the EU Marine Strategy Framework Directive in the Baltic Sea Area

  
Baltic Marine Environment  
Protection Commission

Baltic Sea Action Plan 

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Adopted by EU Member States who are Contracting Parties of HELCOM.

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# 1. Introduction

The document describes the process and results of regional coordination of HELCOM Contracting Parties who are also EU Member States on reviewing and updating their national programmes of measures under the EU Marine Strategy Framework Directive (MSFD, Directive 2008/56/EC<sup>1</sup>) for the period 2022–2027, including use of exceptions (Article 14 MSFD). EU Member States are due to report their updated national programmes of measures under Article 13 MSFD by 31 March 2022.

The document follows up on the Joint Documentation of regional coordination of programmes of measures in the Baltic Sea area in 2016 (“[the 2016 Joint Documentation](#)”)<sup>2</sup>. It documented the coordination among HELCOM Contracting Parties, who are also EU Member States, of their first MSFD programmes of measures for 2016–2021. The present document looks at progress made on regional actions recommended to HELCOM for consideration in 2016 and steps taken to improve regional coherence when updating national programmes of measures.

The coordination for MSFD purposes is embedded in HELCOM Contracting Parties’ regional cooperation on the implementation of the Helsinki Convention to achieve a healthy Baltic Sea, in particular in the updated [Baltic Sea Action Plan \(BSAP\) for 2021–2030](#)<sup>3</sup>.

## 2. Protecting the Baltic Sea marine ecosystems

### 2.1 The Helsinki Convention

The Convention on the Protection of the Marine Environment of the Baltic Sea Area ([Helsinki Convention](#))<sup>4</sup>, 1974 and 1992, requires the Contracting Parties, individually or jointly, to take all appropriate legislative, administrative or other relevant measures to prevent and eliminate pollution in order to promote the ecological restoration of the Baltic Sea area and the preservation of its ecological balance. This includes all appropriate measures to conserve natural habitats and biological diversity and to protect ecological processes. HELCOM’s vision is a healthy Baltic Sea environment with diverse biological components functioning in balance, resulting in a good ecological status and supporting a wide range of sustainable economic and social activities.

The Convention enshrines the precautionary principle, the polluter-pays principle and the promotion of the use of Best Environmental Practice and Best Available Techniques as part of the fundamental principles and obligations of the Contracting Parties. Since 2003, the Helsinki Commission (HELCOM) is guided by the ecosystem approach to the management of human activities.

The Helsinki Convention, the Ministerial Declarations, the Baltic Sea Action Plan (BSAP), the Recommendations and other agreements adopted by HELCOM Contracting Parties form the body of regionally agreed measures to achieve a healthy Baltic Sea under the Helsinki Convention.

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<sup>1</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0056>

<sup>2</sup> <https://helcom.fi/media/publications/Joint-documentation-on-regional-coordination-of-PoMs.pdf>

<sup>3</sup> <https://helcom.fi/media/publications/Baltic-Sea-Action-Plan-2021-update.pdf>

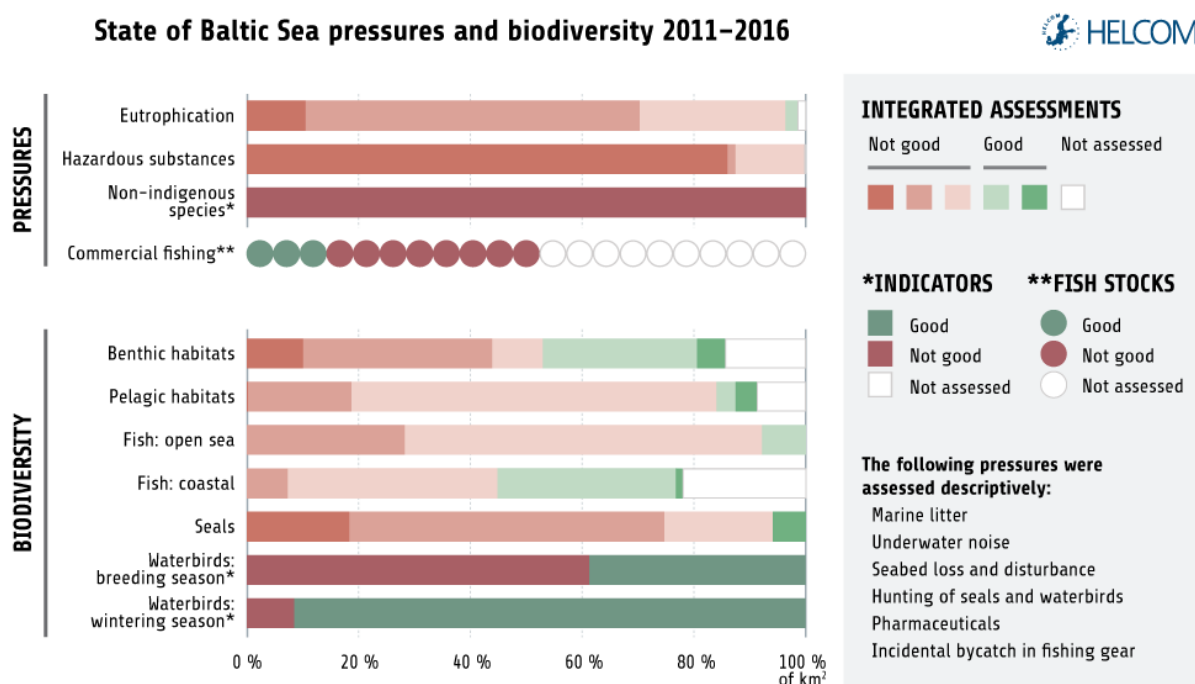
<sup>4</sup> [https://helcom.fi/media/publishingimages/Helsinki-Convention\\_July-2014.pdf](https://helcom.fi/media/publishingimages/Helsinki-Convention_July-2014.pdf)

HELCOM follows-up their implementation on a regular basis. Progress is documented in the [HELCOM Explorer](#).<sup>5</sup>

## 2.2 The status of the Baltic Sea environment

HELCOM Contracting Parties carry out jointly periodic assessments of the status of the Baltic Sea. These holistic assessments provide the scientific and factual basis for reviewing progress on achieving the ecological and management objectives set by HELCOM Contracting Parties, determining the actual quality status of the Baltic Sea and for identifying any need for additional actions to achieve a healthy Baltic Sea environment.

HELCOM published the last [holistic assessment \(HOLAS II\)](#), covering the assessment period 2011–2016, in 2018).<sup>6</sup> The results showed that, although signs of improvement in the state of the Baltic Sea are seen in some cases, HELCOM’s objectives have not yet been reached (Figure 1). The results also show that, at the time, frameworks for quantitative status assessments have not yet been available for all topics.



**Figure 1.** Summary of the assessment of pressures and status for the Baltic Sea showing the proportion of area covered by different assessment status categories (based on square kilometres). For commercial fishing, the summary shows status of fish stocks. Integrated assessment results (eutrophication, hazardous substances, benthic habitats, pelagic habitats, fish and seals) are shown in five categories. Assessment results based on indicators (commercial fishing, non-indigenous species, and waterbirds) are shown in two status categories. Source: [State of the Baltic Sea report – Second HELCOM holistic assessment 2011–2016](#)

<sup>5</sup> <http://maps.helcom.fi/website/HELCOMexplorer/>

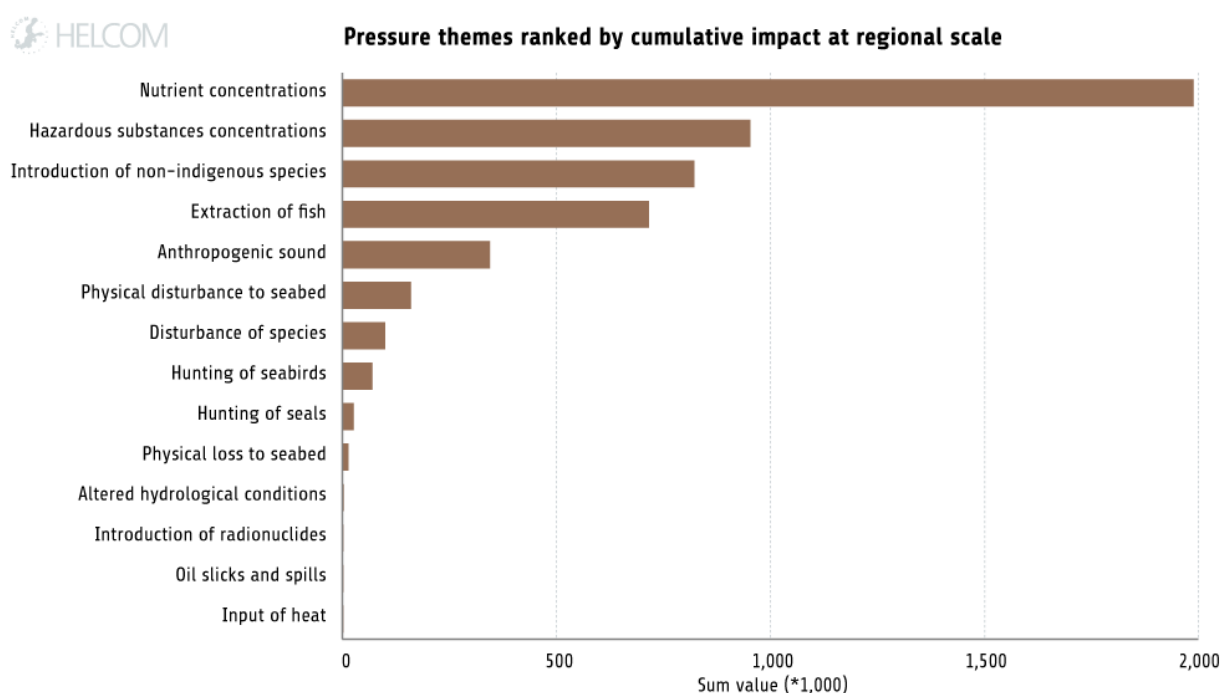
<sup>6</sup> <http://stateofthebalticsea.helcom.fi/>

## 2.3 Major pressures requiring action

The [2018 State of the Baltic Sea assessment](#) identified eutrophication, hazardous substances concentrations, the introduction of non-indigenous species and effects of commercial fishing as the major pressures causing the most widespread impacts in the Baltic Sea region (Figure 2). Many species are affected by these pressures, and are potentially sensitive to them, directly or indirectly. For example, the effects of eutrophication include changes in the natural composition of phytoplankton species and of phytoplankton biomass and extend via the Baltic Sea food web to zooplankton, and thus may ultimately influence food availability for fish, waterbirds and marine mammals. Phytoplankton biomass sinking down to the seafloor supplies benthic organisms with food. On the other hand, the effects of eutrophication comprise access blooms of phytoplankton, including of harmful algae, and oxygen deficiency at the sea floor may severely affect benthic fauna.

Many other pressures from human activities cause clearly-evident effects at smaller spatial scales, such as activities causing disturbance of the seafloor or loss of habitats. Due to the multiple interactions in the ecosystem, many of the biodiversity indicators primarily reflect a response to total environmental pressures rather than to individual ones. Thus, the roadmap towards healthy species and habitats involves several jointly contributing actions.

Annex 1 summarises the main pressures, associated activities, sources and pathways, which, based on the 2018 State of the Baltic Sea report and the 2020 [analysis of the sufficiency of measures](#)<sup>7</sup>, require action. Annex 1 includes references to objectives and actions of the BSAP 2021–2030 which respond to those needs.



**Figure 2.** Ranking of pressures themes attributed to cumulative impacts at regional scale in the Baltic Sea. Result of the Baltic Sea Impact Index. Source: State of the Baltic Sea report 2018 and HELCOM (2018E)

<sup>7</sup> <https://helcom.fi/baltic-sea-action-plan/som/>

## 2.4 Baltic Sea Action Plan 2021–2030

The Baltic Sea Action Plan (BSAP) is HELCOM’s strategic programme of measures and actions for achieving a healthy Baltic Sea under the Helsinki Convention. Initially adopted in 2007, the BSAP set 2021 as the target year for achieving a healthy Baltic Sea. The State of the Baltic Sea report in 2018 indicated that this goal would not be met. In 2019–2020 Contracting Parties reviewed the state of implementation of the BSAP 2007–2021, the effectiveness and sufficiency of measures in place to achieve HELCOM’s objectives, reasons why good status has not yet been reached, and the findings of the 2018 State of the Baltic Sea report to identify the actions needed to achieve HELCOM’s objectives. On this basis, Contracting Parties developed almost 200 actions, including measures and supporting actions, to address biodiversity loss, eutrophication, hazardous substances and sea-based activities such as shipping and fisheries. A Ministerial Meeting in Lübeck in October 2021 adopted the updated Baltic Sea Action Plan 2021–2030. It sets the frame for regional cooperation on measures for the present decade to move towards a healthy Baltic Sea. The BSAP includes regional measures as well as frameworks for national measures to achieve common objectives. An updated Regional Action Plan on Marine Litter and a new Regional Action Plan on Underwater Noise complement the BSAP with detailed measures and activities on these topics. Annex 1 lists the main pressures acting on the Baltic and describes the associated main activities/sources/pathways contributing to the pressures, HELCOM Recommendations still awaiting full implementation to address those pressures, as well as the response of the updated BSAP in terms of environmental targets and actions to counteract these pressures under the Helsinki Convention.

The objectives and actions of the BSAP are in line with, and contribute to, main global and European policies. They are aligned with e.g. the UN Sustainable Development Goals, the Convention on Biological Diversity. They align, in particular, with the European Green Deal, which includes notably the EU Biodiversity Strategy, the EU Farm to Fork Strategy, the Zero Pollution Action Plan, the EU Offshore Energy Strategy, the Circular Economy Action Plan and the EU Sustainable and Smart Mobility package. More concretely, the main supporting tool is the MSFD in which regional cooperation is recognised and encouraged. Similar to the Helsinki Convention and the BSAP, the MSFD promotes an integrated approach based on ecosystems with the aim to reach the “Good Environmental Status” of the marine waters. The BSAP reiterates the role of HELCOM as a platform for HELCOM Contracting Parties who are EU Member States to coordinate their implementation of the MSFD, and the need to coordinate and harmonise work in the context of the Baltic Sea Action Plan with various political instruments and initiatives, including the MSFD.

### 3. Coordination of MSFD programmes of measures in the Baltic Sea region for 2022–2027

Article 5 (2) MSFD requires Member States sharing a marine region or subregion to cooperate to ensure that, within each marine region or subregion, the measures required to achieve the objectives of this Directive, in particular the different elements of the marine strategies referred to in Article 5(2) MSFD are coherent and coordinated across the marine region or subregion concerned. In accordance with Article 6 MSFD, Regional Sea Conventions should play an important role in facilitating coherent and coordinated measures in the relevant marine region. This includes coordination in the development and six-yearly review and update of the programme of measures.

#### 3.1 Coherence of MSFD programmes of measures for 2016–2021

##### *Joint Documentation 2016*

The [2016 Joint Documentation](#) describes the coordination activities undertaken by EU Member States in the Baltic Sea region when establishing, for the first time, their national programme of measures for 2016–2021 under Article 13 MSFD. Taking account of the findings of HELCOM's assessment of the ecosystem health of the [Baltic Sea \(HOLAS I\)](#)<sup>8</sup>, starting point for measure coordination was the BSAP 2007, subsequent Ministerial Declarations and HELCOM recommendations and other agreements. Together these instruments provided the *acquis* of measures and the framework for regional cooperation in the Baltic Sea. Coordination was structured around the most important pressures acting on the Baltic Sea as well as spatial and restoration measures related to nature conservation, broadly reflecting the key type of measures of MSFD reporting.

Each pressure / nature conservation theme was complemented (in Annex 3 to the 2016 Joint Documentation) by actions proposed for further consideration in HELCOM to achieve HELCOM targets and objectives. The proposed actions related to the analysis of planned national measures in 2015, a comparison of which is included in Annex 1 to the 2016 Joint Documentation, and to gaps identified in HELCOM work. The proposed actions suggested measures at regional level in support of achieving the objectives of both BSAP 2007 and MSFD.

##### *Follow-up to “proposed actions for further consideration” of Joint Documentation 2016*

Annex 2 documents HELCOM's follow-up on the proposed actions for consideration. It shows that most of the proposed actions were taken up in HELCOM work and ultimately the updated BSAP 2021–2030. Some proposed actions are already accomplished, for example Guidelines for sea-based measures to manage internal nutrient reserves, risk assessment tools for ships, and a regional monitoring programme on non-indigenous species. Many proposed actions have been further explored, developed and started, and specified actions feature in the BSAP 2021–2030 for implementation in the coming years. This includes for example the cooperation on the effective management of MPAs and the relationship of MPAs and maritime spatial planning, and improving data collection on fisheries, namely by-catch, testing of alternative fishing gear/techniques to

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<sup>8</sup> <https://helcom.fi/wp-content/uploads/2019/08/BSEP122.pdf>



minimise incidental by-catch. Implementing the Regional Action Plan on Marine Litter, which was updated in 2021, and the Regional Action Plan on Underwater Noise adopted in 2021, requires continuous attention and effort. Only minor aspects have not been followed up so far.

As demonstrated, the proposed actions have been taken up in the HELCOM framework, both at regional and national action level. It remains now for Contracting Parties to cooperate on the regional or national implementation of those actions to ensure that they exert the effects intended to reduce pressures on marine ecosystems and improve the status of marine biodiversity.

*EU Commission assessment of regional coherence of programmes of measures 2016–2021*

The [EU Commission's assessment under Article 16 MSFD](#) of national programmes of measures 2016–2021<sup>9</sup> reported by EU Member States in 2016 is complemented by a [Draft Regional Report for the Baltic Sea Region](#), submitted in 2019 to the EU Marine Strategy Coordination Group<sup>10</sup>. EU Member States considered in their discussion on planning the update of their national programmes of measures for 2022–2027 the main conclusions of the EU Commission's on coherence of national programmes of measures in the Baltic Sea region and detailed recommendations to improve coherence, as summarised by CG MSFD for GEAR 19-2018 and updated for GEAR 20-2019 ([document 3-5](#))<sup>11</sup>. The Commission noted that overall coherence of programmes of measures under Article 13 MSFD in the Baltic Sea region and coherence of estimates by when good status is expected to be achieved as “moderate”. On the use of exceptions under Article 14 MSFD, the Commission noted differing approaches despite the transboundary nature of the pressures. As a general recommendation, the Commission encouraged Member States to identify measures for each marine region or sub-region concerned, for example, by using regional action plans. The Commission also recommended to be more specific in reporting on measures stemming from regional or international initiatives, which are included in their national programmes, instead of referring to regional and international action plans in general terms. The EU Commission's assessment under Article 16 MSFD as well as the national programmes of measures as reported by EU Member States in the Baltic Sea region in 2016 formed the basis for Contracting Parties to improve regional coherence of their updated programmes of measures for 2022–2027.

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<sup>9</sup> [https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/reports\\_en.htm](https://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/reports_en.htm)

<sup>10</sup> MSCG\_24-2019-13, [https://circabc.europa.eu/sd/a/e0001c8e-2946-42e3-a1ff-a2ce5df6a406/MSCG\\_24-2019-13\\_Baltic-regional-report.pdf](https://circabc.europa.eu/sd/a/e0001c8e-2946-42e3-a1ff-a2ce5df6a406/MSCG_24-2019-13_Baltic-regional-report.pdf)

<sup>11</sup> <https://portal.helcom.fi/meetings/GEAR%2020-2019-588/MeetingDocuments/3-5%20Updated%20Overview%20of%20EU%20Commission%20conclusions%20on%20MSFD%20Programme%20of%20Measures.pdf>

## 3.2 Concept of regional coordination of measures

Regional coordination on programmes of measures takes different modes:

- the exchange of information on and alignment of measures that are primarily of national concern and responsibility:

There is opportunity to be inspired by lists of measures from programmes of measures of other EU Member States. Therefore, sharing plans on new measures (as far as possible), and existing lists from 2015, has been one of the tasks carried out within HELCOM (GEAR). However, given the differing timelines of national planning, coordinating new measures in the preparation of updated programmes of measures remains a challenge. There is still opportunity to cooperate on the implementation of national measures where this is deemed useful for example by exchanging best practices as a means of mutual learning, and support or identifying aspects of implementation where cross-border coordination or collaboration, can strengthen the effect of the measure. As a planning instrument, national programmes of measures remain often general in the description of measures. The need for further specification and development to operationalise and implement national measures allows for continued opportunity to seek coherence across borders, basins and the Baltic Sea.

- the development of measures and actions at regional level with a focus on transboundary issues:

The update of the Baltic Sea Action Plan 2021–2030 in parallel with the update of national programmes of measures provided a unique opportunity to develop regional measures and actions for uptake in the BSAP for HELCOM purposes which also meet the MSFD needs for a regionally coherent management of human activities and pressures, especially those of transboundary nature, in the Baltic Sea region. With its specific and time-bound actions, the BSAP is expected to function as a framework for a coherent management of waters in the Baltic Sea and for continued regional coordination of national measures.

- the development of joint proposals for measures that are required to achieve good environmental status but are in the competence of the EU, international organisations (e.g. IMO, International River Basin Commissions) or third countries outside the EU and HELCOM (e.g. upstream-countries), and agreement of concerted actions of Contracting Parties to approach those bodies/countries through HELCOM:

The update of the Baltic Sea Action Plan 2021–2030 foresees concerted actions of HELCOM Contracting Parties to cooperate with bodies outside HELCOM. Examples include cooperation with UNECE Convention for Long-Range Transboundary Air Pollution (CLRTAP) to promote inclusion of the protection of the Baltic Sea ecosystem as an additional criterion in revising the emission targets of the Gothenburg Protocol (BSAP action E22); with river basin authorities of non-HELCOM countries through official agreements addressing transboundary waterborne nutrient inputs from non-Contracting Parties (BSAP action E4); with the European Maritime Safety Agency (EMSA) on safety of navigation (BSAP action S6); with the Baltic Sea Fisheries Forum (BALTFISH) on fisheries (BSAP action S41, S54); with the Regional Coordination Group of the EU Data Collection Framework and the International Council for the Exploration of the Sea (ICES) on improved data collection on recreational fisheries (BSAP action S39); with competent authorities to mitigate by-catch (BSAP actions S44, S45) and to take measures to protect certain fish stocks (BSAP actions S50, S51, S52).

Cooperation on selected topics with the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic (e.g. revision of the UNECE CLRTAP Gothenburg

Protocol, management of ballast water, underwater noise) fosters an inter-regional approach to common environmental topics of European or international dimension and challenge.

- the work towards more coherent environmental targets:

The reviewed ecological and management objectives, and the quantified pressure reduction targets in the updated BSAP on marine litter, spatial marine protection and non-indigenous species provide an important basis for coordination of measures in the Baltic Sea. Working together further on environmental targets is expected to foster cooperation on regional and national measures to achieve the common targets.

Coordination can take place at the level of the Baltic Sea region or outside HELCOM through bi- or multilateral cooperation across borders or within basins. As an example, Sweden and Finland have identified measures in their respective programmes of measures which are similar, and which could potentially benefit from coordination or cooperation in implementation. A plan for such collaboration is in place.

Joint and regionally coordinated measures may not necessarily end up in national MSFD programmes of measures. They may be better suited to sit in an instrument like the Baltic Sea Action Plan or they can be included in other relevant policy instruments such as the national river basin management plans and programmes of measures under the Water Framework Directive.

### 3.3 Organisation of regional MSFD coordination

The HELCOM Working Group on the Implementation of the Ecosystem Approach (GEAR) is tasked to provide a platform for EU Member States' regional MSFD coordination. Since 2018, the Correspondence Group on MSFD (CG MSFD) established under GEAR is the intersessional and operational instrument for continuous cooperation and exchange of EU Member States on MSFD implementation. GEAR set up the group to support broad scale, policy oriented, MSFD coordination, including on Articles 8, 9, 10, 11 and 13 MSFD, from a strategic point.

CG MSFD prepares the discussion of MSFD-related agenda items of GEAR meetings. An informal MSFD-session at GEAR meetings facilitates an open and trustful exchange of HELCOM Contracting Parties. This format helps EU Member States to mutually inspire and influence national processes at a point in time when national planning of MSFD action steps and positions on MSFD implementation issues are often still forming. The results are brought back to the formal sessions of GEAR where they are shared with all Contracting Parties and used, where relevant, to link up with HELCOM work.

### 3.4 Coordination activities on update of measures under Article 13 MSFD

Contracting Parties' exchange of experiences with their national programmes of measures in CG MSFD / GEAR shared highlights and lowlights regarding measure implementation, associated hurdles and supporting conditions, as well as regarding the match of the expected and manifested degree of a measure's effectiveness. Contracting Parties used messages from shared lessons learnt to feed into the continuous implementation of national measures and the planning process for 2022–2027. The exchange also provided opportunity to kick off bilateral cooperation on specific measures across state boundaries.

The chronological parallelism of the BSAP update for the period 2021–2030 and the update of national MSFD Programmes of Measures for the period 2022–2027 provided a strong interface between the two processes and opportunities for coordination. An important element was the HELCOM call in 2019 for proposals of actions for the update of the BSAP. Contracting Parties had the opportunity to bring forward measures from their national programmes or from planned updates thereof, which they considered useful for tackling specific pressures and activities also at regional scale, and to pick up action proposals for the update of the BSAP from other Contracting Parties or stakeholders, which yield actions at national level, in their national measure planning. This has resulted in a spread of national measures (especially of the first MSFD cycle based on state's experiences) across Contracting Parties' programmes of measures and into the BSAP as well as of new BSAP actions into national programmes of measures.

As national and regional measures may be defined at differing aggregation levels or may have differing orientations, their intersections may not necessarily be visible on the face of a measure's title or description. They may for example form one of several components of a measure, be part of detailed specifications for their operationalisation and implementation or may support the specification and implementation of a measure.

With the adoption of the updated BSAP 2021–2030, Contracting Parties had the opportunity in 2021, prior to finalising the update of their MSFD programmes of measures, to compare their draft programmes with the BSAP actions to identify any room for synchronising their measures or at least the operationalisation and subsequent implementation of their measures with the BSAP. Annex 1 provides a concise overview and interface of HELCOM measures with the main pressures and associated activities/pathways/sources in the Baltic Sea Region for easy linkage with MSFD key type measures if Member States wish to do so.

In 2020, some Contracting Parties, who had an early start on the updating of their national programmes of measures, shared informally initial ideas on additional measures for their updated programmes through CG MSFD, thereby providing further inspiration among Contracting Parties. This exchange was limited due to the differing timetables of Contracting Parties. It is intended to continue this exchange including a comparison of nationally planned measures in CG MSFD in 2022 to find broad matches across national programmes of measures on the one hand and with the BSAP on the other. Such matches could provide a basis for identifying opportunities for further cooperation and coherence at different scales (bilateral, within subbasins, across the Baltic Sea) when operationalising the measures and implementing them.

### 3.5 Coordination activities on updated of exceptions under Article 14 MSFD

Contracting Parties engaged in in-depth discussions on Article 14 MSFD in 2019 and 2020. They analysed the approaches they took on Article 14 MSFD reporting in 2016, the reasons for the divergence of approaches and the opportunities to improve approaches for 2022 reporting. The discussions identified a number of challenges hampering improved regional coherence.

Article 14 MSFD allows exceptions from (timely) achieving good status only in relation to specified circumstances. The reasons for not achieving good environmental status by 2020 are, however, diverse and mostly not reflected in the cases set out in Article 14 MSFD. This includes the maturity of assessment systems to determine the environmental status and guide measures as well as reasons which lie in the design of the MSFD itself, for example:

- timeline for achieving good status in 2020 is unrealistically short compared to 2016 when programme of measures were first established. Time was neither sufficient to fully implement all measures nor for such measures to take full effect.
- as a result of the MSFD comprehensive scope and integrated approach, achieving good status depends on the implementation of other EU and international policies (e.g. Common Agriculture Policy, Common Fisheries Policy, shipping regulation of the International Maritime Organisation) which, however, do not fully align with MSFD objectives or timelines for achieving good status.

To date there is no EU CIS guidance to establish a common understanding of, and determine basic requirements for, the application of Article 14 MSFD in support of a coherent approach across EU Member States. Such guidance would need to include how to deal with failure of (timely) achieving GES for other reasons than those covered by Article 14 MSFD, as described above. From the discussions of Contracting Parties it is clear that the current framework of MSFD and Article 14 creates high legal uncertainties and a dilemma for EU Member States in the implementation of the MSFD. Conflicts with the MSFD are foreseeable if Member States fail good status without justifying this by use of Article 14 MSFD as well as if Member States construct arguments for a use of Article 14 MSFD cases, while the reasons for not achieving GES lie elsewhere, including insufficient degree of planned measure implementation.

As a result of these obstacles and in the absence of EU guidance, it was not possible, despite best efforts, to truly coordinate the use of exceptions across the Baltic Sea Region. Therefore, Contracting Parties will follow in 2022 national approaches, guided by considerations such as to maintain consistency with their Article 14 MSFD reporting in 2016 and to respond to local requirements and specialities.

### 3.6 Scientific cooperation on estimated timelines for achieving good status

Contracting Parties engaged through the EU-co-financed HELCOM Action project in compiling a common scientific basis for estimates of the timelines for achieving good status in support of the update of the BSAP and of national programmes of measures under MSFD. This was done for selected environmental aspects and MSFD criteria, comprising aspects of eutrophication, selected hazardous substances, non-indigenous species, commercial fish stocks and seals.

The study explored impacts of environmental factors immanent in the marine system as well as climate change on achieving good status. The study is based on literature studies and compiles their findings as well as the range of estimated timelines derived from literature. The study takes a regional approach and perspective and does not account for local specialities and circumstances. It may still provide a broad estimation range within which more specific estimates of Member States may be found for their national waters.

Annex 2 provides an overview of those findings which Member States, if they so wished, could use in support of their reasonings under MSFD.

The Science Agenda<sup>12</sup> adopted by HELCOM Ministers in October 2021 provides a frame to help coordinating and addressing research and development needs across the Baltic Sea.

### 3.7 Cooperation on methodologies

In support of the update of the BSAP for 2021–2030, Contracting Parties worked through HELCOM projects to develop systematic approaches to evaluating effectiveness and sufficiency of measures and to guiding measures' planning to achieve a healthy Baltic Sea. Development work took account of expectations relating to gap analysis under MSFD and experiences of Contracting Parties with gap analysis under MSFD and other policy contexts.

The “Sufficiency of Measures” (SOM) analysis<sup>13</sup> allowed Contracting Parties to learn important lessons about methodological possibilities and limitations in assessing effectiveness of programmes of measures and business-as-usual scenarios. Lessons learnt include challenges in attempting to express a single measure's contribution to reaching an objective and to quantify such effects. This requires a series of assumptions and expert judgement resulting in high uncertainties, challenging the value of the output.

Methodological cooperation in HELCOM continues on sufficiency of measures, cost-effectiveness and cost-benefit analysis, thereby supporting EU Member States in developing feasible tools for updating their national programmes of measures as required by MSFD.

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<sup>12</sup> <https://helcom.fi/wp-content/uploads/2021/10/HELCOM-Science-Agenda.pdf>

<sup>13</sup> <https://helcom.fi/baltic-sea-action-plan/som/>

### 3.8 Coordination of consultation on transboundary impacts on programmes of measures

In 2015, Contracting Parties used HELCOM GEAR and the UNECE Seminar on Cooperation under the Espoo Convention in the Baltic Sea Subregion to exchange information on national strategic environmental assessments of their programmes of measures and to coordinate their approaches to transboundary consultation processes under the Protocol on Strategic Environmental Assessment (UNECE SEA Protocol) to the Convention on Environmental Impact Assessment in a transboundary context (UNECE Espoo Convention). HELCOM Contracting Parties agreed practical arrangements for notifying and informing Baltic Sea countries under the SEA Protocol about their programmes of measures and the findings regarding likely significant effects of their programmes on other Baltic Sea countries' waters, and for inviting participation in their public consultations. Contracting Parties followed the agreed simplified approach in the consultation processes for their programmes of measures for 2016–2021.

In 2021, Contracting Parties confirmed their intention to follow the same procedures in the consultation processes for their updated programmes of measures for 2022–2027. By end of 2021, Finland, Germany and Sweden have informed or notified, as appropriate, Baltic Sea countries accordingly under the SEA Protocol of the Espoo Convention.

## 4. Summary conclusions and next steps

HELCOM provides for a valuable process with formal and informal discussions to support regional coordination. EU Member States have actively engaged in these discussions and exchanges of information and experiences for the update of their national programmes of measures. The update of the BSAP strongly supported efforts of regional coordination through agreement of joint regional actions and regional frameworks requiring similar national actions. Also joint actions in HELCOM to draw together scientific evidence and develop methodologies have provided common experiences and support for national measure planning. It is therefore expected that regional coherence of the updated national programmes of measures will have improved compared to 2016. Some limitations to efficient regional coordination of national programmes of measures remain such as differing timelines and approaches of EU Member States in measure planning. Continued regional coordination will therefore emphasise cooperation on the implementation of nationally planned measures.

EU Member States have also intensively engaged in exchange of information and in analysis on the use of exceptions under Article 14 MSFD. Due to obstacles immanent in the Directive as well as the lack of a common understanding and guidance at EU level on the application of Article 14 MSFD, it was not possible to progress on a regionally coordinated application of Article 14 MSFD. Consistency of national approaches compared with 2016 and local specialities will drive the application of Article 14 MSFD in 2022 reporting. Regional cooperation will continue but requires clarification of legal uncertainties in relation to the failure to achieve timely (by 2020) good status and guidance on the use of Article 14 MSFD at EU level.

## Annex 1 Main pressures, associated activities/sources/pathways and updated BSAP responses

Main Pressures		Main activities/sources/pathways	HELCOM Recommendations awaiting full implementation → <a href="#">HELCOM Explorer</a>	BSAP 2021–2030	
				HELCOM environmental targets	Future BSAP actions and regional cooperation
Input of nutrients	Nutrient levels above threshold values affect all Baltic Sea waters. The sub-basin with highest nutrient levels is the Baltic Proper.	<p><b>Nitrogen</b></p> <ul style="list-style-type: none"> <li>- agricultural losses via rivers (i.e. runoff)</li> <li>- wastewater treatment plants</li> <li>- atmospheric deposition from agricultural sources, and from fossil fuels (transportation on land and on sea, power plants)</li> <li>- riverine transboundary loads from non-CPs reach 12 and 28 % of total nitrogen inputs in the Baltic Proper and the Gulf of Finland.</li> </ul> <p><b>Phosphorus</b></p> <ul style="list-style-type: none"> <li>- agricultural losses via rivers (i.e. runoff)</li> <li>- wastewater treatment plants</li> <li>- atmospheric deposition</li> <li>- stormwater/overflows</li> <li>- riverine transboundary loads from non-CPs reach 16 and 43 % of total phosphorus inputs in the Baltic Proper and the Gulf of Riga</li> </ul>	<ul style="list-style-type: none"> <li>- <a href="#">41-3</a> The use of national manure standards</li> <li>- <a href="#">38-1</a> Sewage sludge handling</li> <li>- <a href="#">37-3</a> Sustainable aquaculture in Baltic Sea Region</li> <li>- 28E5 Advanced municipal wastewater treatment</li> <li>- <a href="#">28E-6</a> On-site wastewater treatment of single-family-homes etc.</li> <li>- <a href="#">28E-7</a> Measures aimed at the substitution of polyphosphates (phosphorus in detergents)</li> <li>- <a href="#">23-5-Rev.1</a> Reduction of discharges from urban areas by the proper management of storm water systems</li> </ul>	National Input Ceilings in tonnes per year	<p>Follow-up on implementation of nutrient input targets: E1–E4</p> <p><i>Land-based sources:</i></p> <ul style="list-style-type: none"> <li>- Agriculture: E5–E19</li> <li>- Atmospheric nitrogen emissions: E20–E22</li> <li>- Wastewater sector: E23–E29</li> <li>- Nutrient recycling: E30–E36</li> </ul> <p><i>Sea-based sources:</i></p> <ul style="list-style-type: none"> <li>- Pollution from ships (discharge and air): S14, S15, S17, S18, S21, S23, S24, S27,</li> </ul>
Input of hazardous substances	The integrated assessment of hazardous substances indicates that the pressure from contaminants is high in all parts of the Baltic Sea, the levels of polybrominated	<ul style="list-style-type: none"> <li>- non-renewable energy generation (fossil fuel and nuclear powerplants) - PBDE, HBCDD, PFOS, PAH, PCB, heavy metals, dioxins</li> <li>- urban and industrial uses, industrial animal farming, inputs via waste waters –</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">14-3</a> Limitation of Emissions to the Atmosphere and Discharges into Water from Glass Industry;</li> <li><a href="#">17-6</a> Reduction of Pollution from Discharges into Water, Emissions into the Atmosphere and Phosphogypsum out of the Production of Fertilizers;</li> </ul>	No quantitative targets for input reductions available.	<p><i>Hazardous substances:</i></p> <ul style="list-style-type: none"> <li>- Hazardous substances: HL1-HL13</li> <li>- Legacy pollutants: HL14-HL21</li> <li>- Contaminants of emerging concern: HL22-HL30</li> </ul> <p><i>Sea-based sources:</i></p> <ul style="list-style-type: none"> <li>- Pollution from ships: S8-S10; S13, S16, S17, S19, S22, S24,</li> </ul>



	<p>diphenyl ethers (PBDEs), mercury and cesium-137 are still high in all parts of the sea, and contaminants of emerging concern, such as some pharmaceuticals, were also found in almost all components of the marine environment</p>	<ul style="list-style-type: none"> <li>- pharmaceuticals, heavy metals, PFOS</li> <li>- industrial uses (oil, gas, industrial plants) - PAH, PCB, heavy metals, dioxins</li> <li>- Restructuring of seabed morphology (dredging, sea-based deposit of dredged material, re-use of [contaminated] sediments for beach replenishment) – heavy metals, TBT, PFOS, dioxins</li> <li>- Transport (air, shipping, including infrastructure, incl. anchoring and mooring) - PAH, heavy metals, dioxins, PCB, oil spills (illegal discharges)</li> <li>- Solid waste (e.g. land-based disposal of dredged material, landfill, solid waste streams) - pharmaceuticals, PFOS, HBCDD, PBDEs, heavy metals</li> <li>- activities and sources outside the Baltic Sea Region – dioxins, PCB, HBCDD, PBDE</li> </ul>	<p><a href="#">23-4</a> Measures aimed at the reduction of mercury pollution resulting from light sources and electrical equipment;  <a href="#">23-7</a> Reduction of discharges and emissions from the metal surface treatment;  <a href="#">23-9</a> Restriction of atmospheric emissions and waste water discharges from hard coal cookeries;  <a href="#">23-10</a> Reduction of discharges and emissions from production and formulation of pesticides;  <a href="#">23-12</a> Reduction of Discharges and emissions from production of textiles;  <a href="#">24-4</a> Reduction of Emissions and Discharges from the Iron Steel Industry;  <a href="#">25-1</a> Elimination of PCBs and PCTs;  <a href="#">28E-8</a> Environmentally friendly practices for the reduction and prevention of emissions of dioxins and other hazardous substances from small-scale;  <a href="#">29-1</a> Reduction of emissions from crematoria;  <a href="#">31E-1</a> Implementing HELCOM’s objective for hazardous substances;  <a href="#">31E-2</a> Batteries and accumulators and waste batteries and accumulators containing mercury, cadmium or lead;  <a href="#">31E-3</a> Cadmium in fertilizers;  <a href="#">31E-4</a> Proper handling of waste/landfilling;  <a href="#">6-4</a> Measures Aimed at the Reduction of Mercury Resulting from Dentistry.</p>		<p>S25, S26, S27, S28, S29; S30-S34, S36-S37</p>
Input or spread of non-indigenous species	<p>Level of introduction is too high in all parts of the Baltic Sea. The share of main activities / sectors contributing to the pressure is</p>	<ul style="list-style-type: none"> <li>- transport – shipping ballast water (38%),</li> <li>- activities and sources outside the Baltic Sea Region (29%)</li> <li>- transport – shipping biofouling (17%)</li> </ul>	---	<p>Threshold value of input rate for NIS. While developed for status assessment, indicator has nature</p>	<p>Actions S7-S12</p>

	indicated in next column in brackets.	- Aquaculture – marine, including infrastructure, and transport – shipping infrastructure (canals)< 6%		of an environmental target.	
Extraction of, or mortality/ injury to wild species (by commercial and recreational fishing and other activities)		For marine mammals and birds mainly: - Fisheries with static gear - Fisheries with pelagic trawls For fish: - Fisheries with most gears	---	No quantitative targets available. By-catch indicator under development. While developed for status assessment, it can serve as an environmental target.	<i>Fisheries management:</i> S39-S24 <i>By-catch:</i> S43-S49
Physical disturbance and loss of seabed	On average, less than 1% of the Baltic Sea seabed is estimated to be potentially lost due to human activities (up to 5% in the western and southern Baltic Sea). On average, around 40% of the Baltic Sea seabed habitats are estimated to be potentially disturbed (40-100% in the western and southern Baltic Sea).	- Offshore and coastal installations in particular for <ul style="list-style-type: none"> <li>• Production of energy (wind, oil and gas) and associated infrastructure</li> <li>• Physical restructuring of rivers, coastline or seabed (water management): namely dredging and dumping of dredged material; coastal defence and flood protection; tourism/leisure infrastructure</li> </ul> - Extraction of non-living resources, mainly sand and gravel extraction - Extraction of living resources: fish & shellfish harvesting (professional, recreational), including effects from bottom-contacting gear	- <a href="#">17-3</a> Information and Consultation with regard to Construction of New Installations Affecting the Baltic Sea - <a href="#">19-1</a> Marine Sediment Extraction in the Baltic Sea Area (including Guidelines for Sediment Extraction) - <a href="#">36-2</a> Management of Dredged Material including Guidelines for Management of Dredged Material at Sea	No pressure-specific quantitative targets available. Impact indicator, while under development for status assessment, can serve as an environmental target. General target: The network of marine protected areas will cover at least 30% of the marine area of the Baltic Sea, of which at least 1/3 will be strictly protected.	<i>Seabed loss and disturbance:</i> S64-S68
Inlet of litter	80% of marine litter estimated to come from landbased	For beach litter: - tourism and leisure activities (main category)	<a href="#">42-43-3</a> Regional Action Plan on Marine Litter (adopted in 2021 with BSAP; updates and supersedes	Reduction of marine litter on beaches by at least	Marine Litter: H31-H32

	sources, 20% from seabased sources.	<ul style="list-style-type: none"> <li>- riverine inputs covering other land-based activities (e.g. urban uses, wastewaters, solid waste)</li> <li>- fish and shellfish harvesting</li> <li>- transport - shipping</li> </ul> <p>For microlitter:</p> <ul style="list-style-type: none"> <li>- Riverine inputs covering other land-based activities</li> </ul> <p>For seafloor:</p> <ul style="list-style-type: none"> <li>- Activities causing litter on the seafloor assumed to be similar to beach litter, though the type of items differ depending on physical properties and maritime activities are predominant.</li> </ul>	Recommendations 29/2 and 36/1 still awaiting implementation).	30% by 2025 and 50% by 2030, from the baseline total abundance of 40 litter items per one hundred meters of beach for the whole Baltic Sea (except for Kattegat in 2025-2016).	
Input of anthropogenic noise	<p>Up to 1,700 impulsive sound events were registered in 2011-2016, the majority from explosions.</p> <p>Areas with high sound levels are identified particularly along major shipping routes, and with the highest prevalence in the southernmost areas.</p>	<p>Impulsive noise</p> <ul style="list-style-type: none"> <li>- military operations (explosions)</li> <li>- research, survey and educational activities</li> <li>- marine and coastal construction (pile driving, construction)</li> </ul> <p>Continuous noise</p> <ul style="list-style-type: none"> <li>- shipping (major source)</li> <li>- tourism and leisure activities</li> <li>- fish and shellfish harvesting</li> </ul>	<a href="#">42-43-1</a> Regional Action Plan on Underwater Noise (adopted in with BSAP)	No quantitative target for noise input available.	S55-S63
Disturbance of species	All pressures (see above). Pressures causing disturbance are species specific.	<p>Activities causing pressure and disturbance are species-specific. Relevant sea-based activities include:</p> <ul style="list-style-type: none"> <li>- shipping</li> <li>- tourism and leisure activities</li> <li>- fish and shellfish harvesting</li> <li>- marine and coastal construction</li> <li>- offshore structures</li> <li>- extraction of oil and gas</li> <li>- extraction of minerals</li> <li>- restructuring of seabed morphology</li> </ul>	<p><a href="#">35-1</a> System of coastal and marine Baltic Sea protected areas (HELCOM MPAs)</p> <p><a href="#">15-1</a> Protection of the Coastal Strip</p> <p><a href="#">37-2</a> Conservation of Baltic Sea species categorized as threatened according to the 2013 HELCOM Red List</p> <p><a href="#">40-1</a> Conservation and Protection of Marine and Coastal Biotopes, Habitats And Biotope Complexes</p>	No pressure- or species-specific quantitative targets. General target: The network of marine protected areas will cover at least 30% of the marine area of the Baltic Sea, of which at least 1/3	All BSAP measures and actions addressing pressures and activities. Species-specific measures to conserve, restore and reintroduce species: B8–B24 Conservation of habitats and biotopes B25–B30 Spatial conservation measures B1–B7

			<p>Categorized as Threatened According to the HELCOM Red Lists</p> <p><a href="#">19-2</a> Protection and Improvement of the Wild Salmon*) (Salmo salar L.) Populations in the Baltic Sea Area</p> <p><a href="#">32-33-1</a> Conservation of Baltic Salmon (Salmo salar) and Sea Trout (Salmo trutta) Populations by the Restoration of their River Habitats and Management of River Fisheries</p> <p><a href="#">34E-1</a> Safeguarding important bird habitats and migration routes in the Baltic Sea from negative effects of wind and wave energy production at sea</p> <p><a href="#">17-2</a> Protection of Harbour Porpoise in the Baltic Sea Area</p> <p><a href="#">27-28-2</a> Conservation of seals in the Baltic Sea Area</p> <p><a href="#">24-10</a> Implementation of Integrated Marine and Coastal Management of Human activities in the Baltic Sea Area</p> <p><a href="#">25-4</a> Measures aimed at the reduction of discharges from water and marine fish farming</p> <p><a href="#">37-3</a> Sustainable Aquaculture in the Baltic Sea Region</p>	will be strictly protected.	Enabling ecosystem-based management: B31–B32
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## Annex 2 Follow-up on proposed actions for further considerations of 2016 Joint Documentation

No.	Action proposed for further consideration in <u>2016 Joint Documentation</u>	Follow-up and BSAP 2021-2030
4.1.1	Assess the role of [internal nutrient reserves] [accumulated nutrients] [stored nutrients] in the Baltic and potential management measures.	Encouragement for further investigations by Ministerial Declaration 2018. 2021 HELCOM Guidelines for sea-based measures to manage internal nutrient reserves (adopted with BSAP).
4.1.2	Intensifying HELCOM work to reduce airborne transboundary nitrogen input from outside of the HELCOM area, in particular the Gothenburg Protocol	BSAP actions: E21 Continue to reduce the deposition of atmospheric nitrogen on the Baltic Sea through the implementation of the national nitrogen reduction commitments of the Gothenburg Protocol and the EU NEC Directive 2016/2284 [...] E22 Enhance HELCOM cooperation with the UNECE CLRTAP to promote inclusion of the protection of the Baltic Sea ecosystem as an additional criterion in the process of the revision of the emission targets for nitrogen in the Gothenburg Protocol
4.2.1	Micropollutants in effluents from wastewater treatment plants	HOD 49-2015 agreed on a new HELCOM action on micropollutants in effluents from wastewater treatment plants to be included in the Pressure Working Group work plan. Based on a questionnaire, and a specific data call, a draft report on micropollutants in the WWTPs was prepared jointly by the BSR Interreg BSR WATER project platform, the CWPharma project and the BONUS CLEANWATER project. A report was approved by HoD in 2021, on micropollutants in WWTP effluents to be published in HELCOM BSEP series and and policy briefs will be published as HELCOM policy messages, respectively.-  Some actions of BSAP relating to pharmaceuticals and to a strategy on hazardous substances may provide an opportunity to look closer at the issue in the future.
4.3.1	Regional risk assessment tool for ships	2018 HELCOM Guidelines for Regional Risk Management to Improve European Pollution Preparedness and Response at Sea. Developed with support of HELCOM OpenRisk projekt (2017–2018). Methods include identifying high risk areas, potential measures for accident risk reduction, and improved preparedness and response measures.
4.4.1	Coordination of management measures of pressures and impacts on MPAs, in particular for adjacent transnational MPAs	2021 Instructions for the HELCOM MPA Database Pressure Evaluation
4.4.2	How to consider MPAs in Maritime Spatial Planning and vice versa? (BalticScope and Pan Baltic Scope)	Project results of the BalticScope (2017) on cross-border maritime planning process, leading to greater alignment of national plans, and of PanBaltic Scope (2019) on concept of Green Infrastructure. BSAP actions HT12-HT14 on linking spatial planning and information on high nature value areas and areas where sea-based activities can cause serious damage or disturbance. BSAP action 13 requiring spatial planning to incorporate maps on sensitivity of migratory birds to threats.
4.4.3	Develop joint tools/approach for assessing effectiveness of spatial protection measures for individual sites as well as network level	Results of the HELCOM PROTECT project (2018) including an analysis of ecological coherence of the MPA network. ACTION project and continuing work on methods for assessing management effectiveness of MPAs.

		BSAP actions B3-B5 on improving effectiveness of MPAs at national and network level, and B6-B7 on improving coherence of MPA network.
4.5.1	Activities to support conservation of Baltic Sea species and biotopes/habitats categorized as threatened according to the HELCOM Red List	BSAP actions B7-B24 on species (including birds, fish, seals and red listed species) and B25-B30 on the conservation of habitats and biotopes.
4.6.1	Development of joint principles for defining environmental targets for seabed habitats	BSAP action S65 on a common approach to minimize loss and disturbance of seabed habitats caused by human activities, supported by preparatory work for identifying measures (including quantified assessment of pressures, impact and status of benthic habitats) (S67) and map service for lost and disturbed habitats (S68). The work on developing indicators for the condition of benthic habitats, and cumulative impact on benthic habitats, will support the development towards environmental targets.
4.7.1	Adjustment or utilization of EU data collection frameworks to retrieve data for assessments and the development of management measures related to by-catch of species	2019 joint OSPAR/HELCOM Workshop on improving data collection on by-catch. 2020 HELCOM Roadmap on fisheries data in order to assess incidental by-catch and fisheries impact on benthic biotopes in the Baltic Sea. BSAP action S48 on effective data collection for more reliable data on incidentally by-caught birds and mammals and fishing effort consistent and fully in line with the data needs identified by the International Council for the Exploration of the Sea (ICES).
4.7.2	Testing alternative fishing gears/fishing techniques to minimize incidental catch through joint project/projects	BSAP actions S47 to continually test, promote and introduce new technical and operational mitigation measures such as alternative and seal safe gears in cooperation with competent authorities. Supported by BSAP actions S43-S46 on cooperation with competent authorities on technical and spatial measures to reduce by-catch.
4.8.1	Regional monitoring programme on non-indigenous species in the Baltic Sea	2020 HELCOM Monitoring Programme on non-indigenous species.
4.9.1	Regional Action Plan on Marine Litter (coordinated implementation)	2021 update of the Regional Action Plan on Marine Litter, adopted together with updated BSAP. Follow-up of the implementation ongoing task.
4.10.1	Regional Baltic Underwater Noise Roadmap 2015-2017	Roadmap adopted and followed up in 2021 through the Regional Action Plan on Underwater Noise (adopted with the updated BSAP).

## Annex 3 Reasons for not achieving a healthy Baltic Sea and estimate of timelines

Pressures	Reasons for not achieving good status (status 2020) → SOM analysis: ACTION project WP 6 results by topic <sup>14</sup>	Estimated timeline for achieving good status → SOM analysis: CTION project WP6 results by topic <sup>14</sup>
Input of nutrients	Existing measures are not sufficient to reach the reductions needed to achieve good status. An immediate reduction of nitrogen loading by one third is required to achieve good status. Estimation does not account for sediment loadings and releases of nitrogen from sediments. Long residence times lead to time lag of ecosystem response to nutrient reductions. A large pool of organic matter built up over the decades. Present nitrogen loading is ca. 3.4 times higher than the background.	50 to 100 years depending on futures measures. In case of an instant input reduction of 10%, nitrogen loading may decrease by one third in 44 years to achieve good status. Reduction of manageable N inputs by 30% which includes a reduction of P inputs as well in order to reduce N fixation, may bring the Baltic Sea into a significantly better condition within 20 to 40 years. Time lags may result from releases of N from sediments.
Input of hazardous substances	<p>Analysis of the sufficiency of measures is limited to the selected substances mercury, TBT, PFOS and diclofenac, and shows that measures are not enough to reach HELCOM objectives for the four substances. For selected substances a reduction around 45-70% of total pressures is estimated to be needed to achieve good status.</p> <p>Reductions in concentrations from existing measures are around 10-30% for mercury, around 5-30% for PFOS and close to zero for TBT and diclofenac.</p> <p>Main input factors are:</p> <p>Mercury: activities and sources outside the Baltic Sea Region (e.g. regional use of fossil fuels, global emissions and air-transport) and non-renewable energy generation (e.g. fossil fuel and nuclear powerplants)</p> <p>TBT: solid waste (e.g. land-based disposal of dredged material, landfill, solid waste streams) and restructuring of seabed morphology (dredging, beach replenishment, sea-based deposit of dredged material)</p> <p>PFOS: solid waste (e.g. land-based disposal of dredged material, landfill, solid waste streams) and waste waters (urban, industrial, and industrial animal farms; includes all waste streams entering wastewater systems e.g. microplastics, pharmaceuticals, etc.)</p> <p>Diclofenac: waste waters (urban, industrial, and industrial animal farms; includes all waste streams entering wastewater systems e.g. microplastics, pharmaceuticals, etc.) and solid waste (e.g. land-based disposal of dredged material, landfill, solid waste streams).</p> <p>Long degradation time causes time lag in response to measures. High retention in sediments leading to long-term releases, slow burial rates and</p>	<p>Under the assumption that all measures are being fully implemented by 2030, good status could be achieved for:</p> <p>Mercury: 30-50 years</p> <p>TBT: ca. 14 years</p> <p>PFOS: ca. 17 years</p> <p>Diclofenac: ca. 5 years</p>

<sup>14</sup> The analysis includes a series of assumptions and expert judgement resulting in high uncertainties, challenging the value of the output.

	that it is non-degradable confound reduction efforts for mercury, and local sedimentation rates those for TBT and PFOS.	
Input or spread of non-indigenous species	Existing measures are not sufficient to address introduction, nor the effects of NIS once introduced. Projected reductions (%) in the anthropogenic introduction of NIS from existing measures in the Baltic Sea in 2016-2030 according to SOM analysis is 20% with moderate certainty. Today, once a non-indigenous species has become established and spread to a wide area, eradication is not a viable management option. Full recovery in the sense of returning back to a previous state is not regarded possible. Uncertainties relate to risk of new arrival of alien species, which is difficult to eliminate and rather is expected to increase due to climate change.	100% reductions in pressure inputs (which would have been needed to reach target) are not likely to 2030.
Extraction of, or mortality/ injury to wild species (by commercial and recreational fishing and other activities)	<ul style="list-style-type: none"> <li>- Insufficient data to fully know the issue and proportion of problem.</li> <li>- Understanding the spatiotemporal variability of bycatch is important in order to implement adequate mitigation measures to reduce bycatch.</li> </ul>	Estimation not possible, given the lack of data and variety of populations/species/species groups, which will also make is difficult to assess when GES could be reached. However, for a few species/populations achieving GES may be possible within a few years. .
Physical disturbance and loss of seabed and state of benthic habitats	<p>Due to a current lack of established regional threshold values, the state improvement was presented in a qualitative format (noticeable improvement) to encompass a broad range of potential improvements in the state of benthic habitats. The probability to achieve GES was not estimated. The results suggest that existing measures are not sufficient to reduce pressures and achieve a noticeable improvements in the status of the five broad benthic habitats in any of the sub-areas of the Baltic Sea.</p> <p>These results are uncertain because the SOM analysis could only account for changes in 35-60% of pressures which affect the state of benthic habitats. The effect of changes in important pressures, such as eutrophication effects and food web changes, were not included. Further, the magnitude of the required pressure reductions to achieve a noticeable state improvement is very uncertain.</p>	<p>The average estimates for the time lag range from 10 to 25 years, depending on the habitat type and area. There is considerable uncertainty in the estimates. For example, <a href="#">recovery time post trawling</a> depends on species dispersal potential, longevity and habitat-specific requirements. The recovery for species with a high dispersal potential and less habitat-specific requirements is &lt;3 years, for longer-lived species with low dispersal potential and specific habitat requirements up to 20 years. Improvement of deep benthic habitats is linked to time lag of recovery from eutropication 30-40 years). Changes in climatic conditions could have additional significant impact on habitat recovery.</p> <p>The expert evaluations indicate still that even with sufficient measures implemented, it takes time to achieve state improvement for benthic habitats in the Baltic Sea and that any significant improvements in the state could be delayed beyond 2030. Main factors for delaying recovery include effects of accumulated nutrients in the sediment and generally long recovery times for certain species/communities due to time for re-establishment in an area and life-cycles. In addition, non-indigenous species and hypoxia are expected to delay recovery times for most of the habitat types.</p>
Input of litter	Several important policy tools have only recently been put in place. GES threshold value has recently been established for litter on beaches and litter on the seafloor, why estimations are still uncertain.	<p>No such estimates available.</p> <p>Large reductions in the input of the top 15 litter items if existing measures are fully implemented. The top 15 litter items comprise on average 74% of all items collected from surveyed beaches around the Baltic Sea, and thus reductions in the input of all beach litter would also be high (estimation with moderate to high certainty)</p>



<p>Input of anthropogenic noise</p>	<p>It is difficult to estimate whether GES will be achieved since threshold values have so far been unavailable. Few effective mitigation measures have been identified or implemented. Reductions from existing measures cannot compensate for the increases caused by the projected future development of activities, unless measures are taken to reduce potentially negative impact.</p> <p>Uncertainties relate to what effect measures might have, e.g. whether it's technically, societally, economically possible to reduce noise from ships significantly.</p>	<p>No such estimates available.</p> <p>Moderate increases are projected for continuous noise 63/125 Hz and 2 kHz. This result is driven by the increase in the extent of the main activities contributing to the input of continuous noise.</p> <p>Low reductions are projected for impulsive noise (peak energy below 10 kHz), assuming that main activities contributing to the input of impulsive noise stay constant until 2030.</p>
<p>Disturbance of species</p>	<p>Amount of data was too low for <b>mammals</b> and <b>water birds</b> to allow conclusions on the sufficiency of measures.</p> <ul style="list-style-type: none"> <li>- <b>Coastal fish</b>: The analysis accounts of 40–100% of the pressures linked to the state components. The probability to achieve GES for coastal fish with existing measures is estimated very low or low. Expected reductions in total pressures range around 5–35% for perch and other coastal piscivores, 5–20% for cyprinids and other mesopredators, and 5–30% for flounder, except for flounder in Danish coastal areas (Southwest), where probability to reach GES is high.</li> <li>- <b>Migratory fish</b>: Probability to achieve good status of migratory fish with existing measures is very low or low. Expected reductions in total pressures are close to zero for eel and range around 5–20% for sea trout. Estimates for salmon are available due to insufficient data.</li> </ul>	<p>Amount of data was too low for <b>mammals</b> to allow estimating time lags. Based on expert judgement and under the assumption that the required measures are fully implemented, time lags for recovery of species are estimated as follows for:</p> <ul style="list-style-type: none"> <li>- <b>coastal fish</b>: range from 0 to 10 years. The shortest time lag is anticipated for flounder. Main factors of time lag are generation time and additional factors including eutrophication, poor oxygen conditions and habitat recovery times.</li> <li>- <b>migratory fish</b>: time lag is estimated up to 50 years for eel due to long generation times, and ranging from 5 to 20 years for salmon and sea trout due to their life span and life cycle dynamics. In addition, ecosystem and food web recovery times may add to time lags for sea trout and lack of remaining wild populations, eutrophication and food web re-establishment for salmon.</li> <li>- <b>water birds</b>: Average time lag is estimated around 10 years for common eider, long-tailed duck and red-throated diver, and around 3 years for great cormorant. No estimates for other species due to lack of data. For all species, low reproduction rate and generally long life cycles are main factors for time lags. In cases of pressures that cause disturbance and habitat loss, a longer time to visible effects is expected than for pressures that directly affect survival (bycatch in fisheries) and reproduction (predation of nests and offspring).</li> </ul>