

HELCOM Monitoring Manual

Introduction

1. Background

Monitoring is a well-established function of the [Helsinki Convention](#). Coordinated monitoring of physical, chemical and biological variables of the open sea of the Baltic Sea has been carried out since 1979.

HELCOM monitoring is closely linked to environmental assessments and periodical assessment reports have been published since the 1980s. Since the 2000s the occasional production of reports evolved to regular publications of Baltic Sea thematic and holistic assessments. This development was supported by the first version of the HELCOM Monitoring and Assessment Strategy in 2005.

The [Baltic Sea Action Plan \(BSAP\)](#) further emphasizes the need to monitor and assess the change in the marine environment and the progress towards [the visions, goals and objectives of the BSAP](#).

In 2010, the HELCOM Ministerial Meeting decided to establish, for those HELCOM Contracting Parties being also EU-Member States, the role of HELCOM as the coordinating platform for the regional implementation of the Marine Strategy Framework Directive (MSFD) in the Baltic Sea. The Meeting also agreed that a common understanding of Good Environmental Status (GES) should be based on joint indicators and coordinated monitoring providing the necessary data for regular assessment of the status of the Baltic Sea and of pressures and impacts affecting the status.

The [HELCOM Monitoring and Assessment Strategy \(MAS\)](#) was adopted in 2013 to support an indicator-based monitoring and assessment approach and a regionally coordinated implementation of the BSAP and the MSFD. The objective of MAS is to establish a Joint Monitoring System, which enables to use regionally agreed and coordinated principles in national monitoring programmes to achieve a high degree of coordination, cooperation, sharing and harmonization of monitoring activities and data¹.

The [HELCOM Monitoring Manual](#) is developed to support the implementation of the MAS and it contains the monitoring programmes, guidelines and manuals which translate the general principles of the HELCOM MAS into concrete specifications and requirements.

¹ *Germany has a national marine surveillance program and a corresponding manual. For the Baltic Sea it is based in particular on EU requirements and on the HELCOM monitoring manual. However, it must be taken into account that due to the federal system in Germany and corresponding priorities, some programs are not totally in line with the HELCOM programs. Compulsory monitoring programs are those, which are officially submitted to the EU by Germany, but they are living programs and can be adapted to new requirements.*

The current monitoring programmes reflect the state of the art of the HELCOM indicator system and the varied maturity of the indicators. To meet the requirements of the BSAP and the MSFD, the associated revision of existing and establishment of new monitoring is a continuous process, which started in 2014 and is carried out regularly, i.e at least once per 6 years.

2. Structure of HELCOM Monitoring System

The HELCOM Monitoring Manual provides a detailed and transparent documentation of the monitoring programmes and activities in Baltic Sea region, the associated coordination among the Contracting Parties and the state of coherence and consistency of monitoring across borders and regimes. The manual is intended to support HELCOM EU Member States in reporting information about monitoring strategies, programmes and activities relevant for the MSFD and other related EU legislation (e.g. Water Framework Directive - WFD, Birds Directive - BD, Habitats Directive - HD).

The HELCOM Monitoring Manual

The manual is organized along 12 monitoring strategies (Table 1). The monitoring activities under the strategies are grouped thematically and presented as ecosystem elements or anthropogenic pressures files. In some cases an element/pressure file is equivalent to the monitoring strategy (e.g. mammals, birds, litter). The most detailed level of information is provided by monitoring programmes, which is a specific EU reporting level. At present, the manual includes information on coordinated monitoring in the Baltic as well as national monitoring activities, not yet coordinated, that can support relevant monitoring strategies and programmes. It is the ambition to develop HELCOM coordinated monitoring for all programmes and strategies.

Monitoring strategy	Ecosystem element / Pressure	Monitoring programme	MSFD Descriptors
Birds	Birds	<p>Marine breeding birds abundance and distribution</p> <p>Marine bird health</p> <p>Marine wintering birds abundance and distribution</p>	D1, 4
Mammals	Mammals	<p>Seal abundance</p> <p>Health status</p> <p>Harbour porpoise abundance</p>	D1, 4

Fish	Fish, shellfish and fisheries	Coastal fish Migratory fish Offshore fish Commercial shellfish Fisheries bycatch	D1, 3, 4
Water column habitats	Hydrography	Water column hydrological characteristics Water column physical characteristics Ice	D1, 5
	Hydrochemistry	Water column chemical characteristics Nutrients	D1, 5
	Phytoplankton	Pigments Species composition, abundance and biomass	D1, 4, 5
	Zooplankton	Species composition, abundance and biomass	D1, 4
Seabed Habitats	Seabed habitat distribution and extent	Habitat-forming species and substrates Seabed habitat physical characteristics	D1, 4, 6
	Species distribution and abundance (benthic community)	Hardbottom Species Softbottom fauna Softbottom flora	D1, 4, 6
	Benthic physical loss and damage		D1, 4, 6
Non-indigenous species	Non-indigenous species	Non-indigenous species	D2

Eutrophication	Inputs	Nutrient inputs from atmosphere Nutrient inputs from landbased sources Nutrient inputs from seabased sources (to be developed)	D5
	Hydrography	Water column hydrological characteristics	D5
	Hydrochemistry	Nutrients	D5
	Phytoplankton	Pigments	D5
Hydrographic changes	Hydrography	Water column hydrological characteristics Water column physical characteristics Ice	D7
	Seabed habitat distribution and extent	Seabed habitat physical characteristics	D7
Contaminants	Inputs	Contaminant inputs from atmosphere Contaminant inputs from landbased sources Acute pollution	D8
	Concentrations of contaminants	Contaminants in water Contaminants in sediment Contaminants in biota	D8
	Biological effects of contaminants	Imposex	D8

Contaminants in seafood	Contaminants in seafood	Contaminants in seafood (to be developed)	D9
Litter	Litter	Macrolitter characteristics and abundance-volume-beach litter Macrolitter characteristics and abundance-volume-floating litter Macrolitter characteristics and abundance-volume-litter in biota Macrolitter characteristics and abundance-volume-litter on the seafloor Microlitter particle abundance and characteristics	D10
Energy, including underwater noise	Underwater noise	Continuous noise Impulsive noise	D11

Table 1. Structure of the HELCOM Monitoring Manual

The description of the monitoring activities presented in monitoring programmes links to:

- relevant monitoring strategies and BSAP segments,
- detailed technical guidelines, QA standards and data management arrangements agreed for coordinated monitoring,
- the data and map service with monitoring-related data products,
- HELCOM core indicators and Baltic Sea Environment Fact Sheets for which the HELCOM monitoring system provides the data basis and which contribute to thematic and holistic assessments.

The Monitoring Manual will gradually integrate the technical guidelines that provide for coordinated monitoring in HELCOM, while these are still available as separate entities also. These include:

- The [Pollution Load Compilation guidelines](#) (PLC-Air and PLC-Water): on quantifying emissions of nutrients and hazardous substances to the air, discharges and losses to inland surface waters, and the resulting air and waterborne inputs to the sea.

- The [COMBINE](#) manual for these monitoring features that are not included into Joint Monitoring System yet.
- [Monitoring of radioactive substances \(MORS\)](#): on quantifying the sources and inputs of artificial radionuclides, as well as the resulting trend concentrations in the various compartments of the marine environment (water, biota, sediment).
- The coordination of the surveillance of incidental and [illegal oil spills](#) around the Baltic Sea, and the assessment of the numbers and distribution of such spills on an annual basis.
- Guidelines for reporting of dredging and dumping of dredged material.

Updating of the manual

The manual is updated once per year. Changes to be included in the manual should be considered by the HELCOM State and Conservation working group and after its endorsement submitted to the HELCOM Secretariat not later than 1 June. These changes will be valid from 1 January of the following year. All changes will be highlighted by a separate note, section by section.

The official version of the manual is available electronically via the HELCOM home page. Users of pdf copies are requested to check against the official online version.

3. Aims of HELCOM Monitoring

HELCOM joint monitoring provides the necessary data for regular assessments of the state of the Baltic Sea, the human pressures and their impacts affecting the state. It also enables evaluations of the extent to which measures are being effective and contributes to the implementation of relevant EU legislation (MSFD, WFD etc).

Components

In accordance with the HELCOM Joint Coordinated Monitoring System (Attachment 1, [HELCOM Monitoring and Assessment Strategy](#)) it enables the assessment of the following components:

- **Biological diversity:** population trends, distribution and condition of species and changes in quality and quantity of habitats and biotopes
- **Non-indigenous species:** trends in arrival, quantities and impacts
- **Commercially exploited fish and shellfish:** trends in population, age and size structure
- **Marine food webs:** their occurrence at normal abundance and diversity; levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity
- **Human-induced eutrophication** and its effects such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters

- **Sea-floor integrity:** including benthic ecosystems
- **Contaminants:** concentrations and biological effects, including radioactive substances
- **Marine litter:** quantities and properties
- **Underwater noise:** levels

In addition, the monitoring system enables the assessment of pressures and impacts in terms of:

- **Physical loss of, or damage to, habitats,** e.g. through smothering, sealing, siltation, abrasion and selective extraction of living and non-living resources
- **Inputs of:**
 - heavy metals and synthetic hazardous substances
 - radioactive substances
 - nitrogen and phosphorus as well as organic matter
- **Introductions of:**
 - non-indigenous species
 - microbial pathogens
 - marine litter
 - energy, including underwater noise
- **Alteration of** hydrological and hydrographical conditions through human activities, including a change in salinity and temperature, as well as acidification
- **Selective extraction of** species, including incidental by-catches (e.g. by commercial and recreational fishing)

HELCOM monitoring should also be arranged to **detect climate change and its impacts** on the Baltic Sea marine ecosystem over time. Therefore, sites with relevant long-term data records will be sustained, whilst accommodating improved data collection techniques where appropriate. National long-term data series should be integrated to this region-wide framework. This can enable assessment of the ability of the marine environment to cope with, adapt to or recover from the effects of climate changes.

Regarding major **environmental changes and emerging issues**, the coordinated HELCOM monitoring aims to detect major changes in the state of the environment and pressures on the environment by including long-term monitoring stations in the monitoring network. The coordinated monitoring is also associated with national or international surveys to detect and study emerging issues.

Several of the components outlined in the Strategy are not yet monitored in a coordinated way while it is the aim of Contracting Parties to achieve coordinated monitoring through ongoing HELCOM activities. There is e.g. still no dedicated HELCOM programmes on microlitter or data/information collection on human activities. Information on human activities was however used to assess pressures on the Baltic Sea in the first (BSEP 122) and second (BSEP 155) HELCOM holistic assessment and it is the ambition to widen the *ad hoc* gathering of information on human activities into an established programme. For better integration of similar activities under MSFD, the programme could take into account MSFD Annex III, where

anthropogenic pressures, uses and human activities in or affecting the marine environment are listed.

Spatial coverage

For the purposes of regional monitoring and assessments, the Baltic Sea is sub-divided into sub-basins as depicted in HELCOM sub-divisions of the Baltic Sea (Attachment 4, [HELCOM Monitoring and Assessment Strategy](#)). Different hierarchical sub-division levels can be used depending on the needs:

- the whole Baltic Sea,
- dividing of the Baltic Sea into 17 sub-basins,
- further dividing each of the 17 sub-basins into coastal areas (extending to 1 NM seaward from the baseline) and off-shore area (waters beyond 1 NM seaward from the baseline),
- further dividing the coastal areas into coastal water bodies or types according to the WFD.

Other sub-divisions can be agreed and used provided they remain within the boundaries and use the nomenclature of the described hierarchical system. The scale of sub-division to be chosen may differ depending on the monitoring and assessment purpose.

To maximise their use for national purposes, regional monitoring and assessment results are also presented in formats (e.g. point/station maps) that allow displaying them within national boundaries (EEZ, 12 nm) and showing hot spots.

Transboundary impacts and features

HELCOM coordinated monitoring provides the basis for consideration of transboundary impacts, such as eutrophication or hazardous substances and the state of transboundary features such as mobile species. The different assessment scales and nested approach further allow considering features and impacts in a transboundary context at the relevant scale and adjusting monitoring activities/requirements to the needs of the assessment scale concerned.

Modelling complements monitoring in order to identify transboundary impacts and help directing targeted measures. Such an activity exists for nutrient fluxes in the context of transboundary eutrophication problems. Appropriate approaches for investigating into priority transboundary impacts and features (through monitoring, modelling, one-off studies, etc.) will need to be addressed in the framework of the continued implementation of the HELCOM monitoring and assessment system.

4. Contracting Parties Commitments

The [Monitoring and Assessment Strategy](#) sets out the basis for how the HELCOM Contracting Parties commit themselves to design and carry out their national monitoring programmes and work together to produce and update joint assessments. It also supports regionally

coordinated activities of the HELCOM Contracting Parties (CPs) in respect of monitoring and assessment in implementing the BSAP and for those CPs, being also EU member states, the requirements of the EU MSFD or WFD, HD and BD.

Indicators and assessment

The HELCOM coordinated monitoring programme is driven by assessment needs arising from the BSAP and the MSFD as well as the production of regional HELCOM assessment products (Attachment 3, HELCOM Assessment System of the [Monitoring and Assessment Strategy](#)). These assessment needs are intended to be mainly covered through the [HELCOM core indicators](#), which are subject to continued development. HELCOM coordinated monitoring also covers additional parameters and information e.g. relating to climate change. The Contracting Parties' monitoring commitment is associated with the different types of HELCOM indicators and parameters (for a detailed description see Annex 1, [Glossary of terms](#)):

- **Core indicators** are commonly agreed among the HELCOM Contracting Parties and measure the progress towards [BSAP goals and/or MSFD descriptors](#). Parameters required for the core indicators are monitored in a coordinated way on a routine basis. Whenever ecologically relevant, monitoring is done Baltic-wide.
- **Pre-core indicators** have been identified as required for the BSAP/MSFD purposes, but are still not fully developed and/or there is no common agreement among the HELCOM Contracting Parties. Contracting Parties should aim to monitor the relevant parameters for the pre-core indicators in order to support their operationalization and to prepare for their future monitoring.
- **Supplementary indicators** are only applied in a limited area, such as a sub-basin, and are commonly agreed among the countries in that area. Parameters required in the supplementary indicator are monitored in a coordinated way on routine basis by the Contracting Parties in the relevant area.
- **Supporting parameters** are commonly agreed complementing parameters to core indicator information, but do not measure progress towards a BSAP objective and/or a MSFD descriptor. They are monitored in a coordinated way and provide supplementary information to the core indicators.

Additional parameters relevant for periodic regional assessments can be monitored or investigated by individual Contracting Parties or groups of Contracting Parties in a project- or campaign-like manner. These investigations include e.g. baseline studies, screening studies, process studies and tests of new methods and techniques.

Coordinated monitoring

HELCOM monitoring programmes are considered 'coordinated' when the following requirements are established:

- common technical guidelines,
- common quality assurance tools,
- agreed data submission and data management arrangements.

According to the MSFD art. 11 Reporting Guidance (2020) regional coordination of a monitoring programme can be described as one of the following list (look also Annex 2, '[Regional Cooperation, Implementation](#)')

- Agreed data collection methods,
- Common monitoring strategy (spatial and temporal design of programme),
- Coordinated data collection (delivered separately by each country),
- Joint data collection (multinational delivery using same platform and/or algorithms).

HELCOM joint coordinated monitoring and preparation of the various assessment products require that the Contracting Parties allocate adequate resources and commit to agreed schedules of activities. This includes ensuring that needed resources are available nationally, e.g. ships, laboratories, personnel, data management and analysis capacities and expertise.

The national monitoring is coordinated within and between Contracting Parties in order to use resources in an efficient way. Shared monitoring stations and activities, information and data are part of the coordinated monitoring. The aim is to use limited resources as efficiently as possible and to seek added value from HELCOM coordination and collaboration as a return to the Contracting Parties.

From the perspective of sub-basins, the main responsibilities for carrying out coordinated monitoring activities in the HELCOM area are as follows:

- **Northern Baltic Proper, Eastern Gotland Basin, Western Gotland Basin, Bornholm Basin, Arkona Basin:** Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Sweden and Russia
- **Bothnian Bay, The Quark, Bothnian Sea, Åland Sea:** Finland and Sweden
- **Gulf of Finland:** Finland, Estonia and Russia
- **Gulf of Riga:** Estonia and Latvia
- **Sound and Kattegat:** Denmark and Sweden
- **Great Belt:** Denmark
- **Kiel Bay and Mecklenburg Bay:** Germany
- **Gdansk Basin:** Poland and Russia

Apart from their main responsibilities, however, the Contracting Parties are encouraged to participate in coordinated monitoring in other regions of the Baltic Sea area whenever practicable.

The monitoring programmes are periodically reviewed. For the development of revised or new coordinated monitoring, the following initial requirements should be met:

- development of a strategy that enables the endorsement to prepare new or revised monitoring programmes by appropriate HELCOM working groups,
- identification of gaps in monitoring coverage that need to be filled,
- joint planning of activities in space and time.

Data and reporting

Deadlines for reporting data from coordinated monitoring are presented in Table 2². They refer to reporting deadlines agreed in HELCOM COMBINE, MORS, PLC and for illegal oils spills (see section 5: [HELCOM working structure in support of regionally coordinated monitoring](#)). For new programmes deadlines and technical solutions for reporting have not yet been agreed.

Ecosystem element/pressure <i>(Programme topic)</i>	Monitoring Programme	Deadline of reporting data from previous years to HELCOM database
Hydrography	Water column hydrological characteristics	1 September
	Water column physical characteristics	-
	Ice	-
Hydrochemistry	Water column chemical characteristics	1 September
	Nutrients	1 September
Phytoplankton	Phytoplankton – Pigments	1 September
	Phytoplankton - Species composition, abundance and biomass	1 September
Zooplankton	Zooplankton - Species composition, abundance and biomass	1 September
Fish, shellfish and fisheries	Fish - Coastal fish	31 June
	Fish - Migratory fish	TBD, DCF data reported to DG MARE annually
	Fish - Offshore fish	TBD
	Commercial shellfish	TBD, DCF data reported to DG MARE annually
	Fisheries bycatch	TBD, DCF data reported to DG MARE annually
Birds	Birds - Marine breeding birds abundance and distribution	TBD
	Birds - Marine bird health	TBD
	Birds - Marine wintering birds abundance and distribution	TBD

² HELCOM coordinated monitoring also embraces cruise cooperation. This section of the HELCOM Monitoring Manual is currently under development.

Mammals	Mammals - Seal abundance	TBD
	Mammals - Health status	TBD
	Mammals - Harbor porpoise abundance	TBD
Concentrations of contaminants	Contaminants in water Radioactive substances	Contaminants: 31 October Radioactive substances: 1 September
	Contaminants in sediment Radioactive substances	Contaminants: 31 October, Radioactive substances: 1 September
	Contaminants in biota Radioactive substances	Contaminants: 31 October, Radioactive substances: 1 September
Inputs	Eutrophication: Nutrient inputs from atmosphere	EMEP reporting
	Contaminant inputs from atmosphere	EMEP reporting
	Eutrophication: Nutrient inputs from landbased sources	31 October; Modelled results reported by 31 December. (TBC)
	Contaminant inputs from landbased sources	31 October (TBC)
	Eutrophication: Nutrient inputs from seabased sources	-
	Contaminant inputs from seabased sources	-
	Acute pollution	Annually (IWGAS meetings)
Biological effects of contaminants	TBT / ImPOSEX	31 October
Litter	Macrolitter characteristics and abundance/volume	TBD
	Litter microparticle abundance/volume	TBD
Underwater noise	Ambient noise	Annual, deadline TBD
	Impulsive sounds	1 September
Non indigenous species	(See Phytoplankton, Zooplankton and bottom species)	1 September
Seabed habitat distribution and extent	Habitat-forming species and substrates	TBD, can be considered in HELCOM DataFlow
	Seabed habitat physical characteristics	TBD

Benthic community species distribution and abundance	Hardbottom Species	TBD
	Softbottom fauna	1 September (offshore)
	Softbottom flora	-
Contaminants in seafood*		-
Benthic physical loss and damage*		TBD
Cumulative impacts on benthic habitats		TBD

Table 2. Deadlines for reporting data from coordinated monitoring.

5. HELCOM Working Structure in Support of Regionally Coordinated Monitoring

The regional cooperation on monitoring is supported by the HELCOM working structure. There are two permanent working groups focusing on regional coordination and monitoring of the Baltic Sea: Gear and State & Conservation, respectively. Regional coordination supports also implementation of MSFD, WFD, HD, BD and other relevant EU legislation.

Gear (Group for the Implementation of the Ecosystem Approach) steers the implementation of the HELCOM BSAP from a managerial point of view and is the responsible body for the regional coordination of the implementation of the MSFD. Gear also coordinates the implementation of the ecosystem approach across HELCOM's scientific-technical working groups.

State and Conservation (Working Group on the State of the Environment and Nature Conservation) oversees the technical development of monitoring programmes. The State and Conservation working group is responsible for developing, updating and maintaining the HELCOM monitoring in general. The group follows and co-operates with other international organizations dealing with relevant monitoring programmes.

In addition, there are several expert groups and expert networks and long-lasting projects **under State and Conservation** that address monitoring and sharing of information on marine mammals, phytoplankton, zooplankton, benthic habitats, birds, coastal fish, eutrophication and radioactive substances.

In addition, anthropogenic pressures are regionally managed and coordinated by the **Pressure** group (Working Group on reduction of Pressures from the Baltic Sea catchment area), working on inputs of nutrients and hazardous substances, marine litter and underwater noise issues, incl relevant monitoring.

The regional coordination and cooperation on monitoring that Gear, Pressure, State and Conservation and its expert groups and networks facilitate, are founded on the HELCOM [Monitoring and Assessment Strategy](#).

6. Baltic Sea Action Plan and the Marine Strategy Framework Directive

The implementation of the Baltic Sea Action Plan and the Marine Strategy Framework Directive is coordinated, including the monitoring and indicator based assessment systems.

BSAP Vision and Goals

The [Baltic Sea Action Plan \(BSAP\)](#) is a programme aiming for a healthy Baltic Sea by 2021 and achieve a good ecological status of the marine environment. It was adopted by the coastal states of the Baltic Sea and the EU in 2007 at the HELCOM Ministerial Meeting in Krakow. It is supplemented by the Declarations of the [Ministerial Meetings](#) of 2010 in Moscow, 2013 in Copenhagen and 2018 in Brussels. BSAP will be updated in 2021 to continue the efforts to achieve a good ecological status of the Baltic Sea and to fulfil the UN Agenda 2030 for Sustainable Development in the region.

The BSAP provides a concrete basis for HELCOM work by incorporating the latest scientific knowledge and innovative management approaches into strategic policy implementation. It stimulates a goal-oriented multilateral cooperation around the Baltic Sea region.

The overarching vision of the BSAP 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 human economic and sustainable activities.

It is further based on a vision, four main goals, and a number of ecological objectives associated to the goals (Figure 1).

Vision

Healthy Baltic Sea environment
with diverse biological components functioning in balance, resulting in a good environmental/ecological status and supporting a wide range of sustainable human economic and social activities

Goals

Unaffected by eutrophication	Life undisturbed by hazardous substances	Favourable conservation status of biodiversity	Environmental friendly maritime activities
			

Objectives

Nutrients at natural levels	Hazardous substances at natural levels	Natural landscape and seascape	No illegal pollution
Clear water	Fish safe to eat	Thriving and balanced plants and animals	Safe maritime activities without accidental pollution
Natural levels of algae blooms	Healthy wildlife	Viable population of species	Efficient response capacity
Natural distribution and occurrence of plants and animals	Radioactivity at pre-Chernobyl levels		Minimum sewage pollution
Natural oxygen levels			No introduction of alien species
			Minimum air pollution
			Zero discharges from offshore platforms
			Minimum threat from offshore installations

Figure 1. HELCOM Vision, goals and objectives.

MSFD GES and Descriptors

For these HELCOM Contracting Parties, being also EU Member States, the Marine Strategy Framework Directive (MSFD, 2008/56/EC, amended by directive (EU) 2017/845) establishes a framework within which the EU Member States shall take the necessary measures to achieve or maintain good environmental status of the marine environment by the year 2020 at the latest (MSFD, Article 1).

The core definition of Good Environmental Status (GES) according to the MSFD is: an environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and

the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.

In Annex I of the MSFD there are eleven qualitative descriptors for determining good environmental status as summarized in Table 3.

MSFD Descriptors		
D1	Biological diversity	Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions
D2	Non-indigenous species	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems
D3	Populations of all commercially exploited fish and shellfish	Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock
D4	Marine food webs	All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity
D5	Eutrophication	Human-induced eutrophication is minimized, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters
D6	Sea-floor integrity	Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected

D7	Alteration of hydrographical conditions	Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems
D8	Contaminants	Concentrations of contaminants are at levels not giving rise to pollution effects
D9	Contaminants in fish and other seafood for human consumption	Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards
D10	Marine litter	Properties and quantities of marine litter do not cause harm to the coastal and marine environment
D11	Energy	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment

Table 3. MSFD qualitative descriptors (D) for determining good environmental status.

Relationship between the BSAP Goals and the MSFD Descriptors

On an overarching level, the BSAP can be considered by EU-Member States as the HELCOM contribution to the regionally coherent implementation of the MSFD in the Baltic Sea. Its vision and the MSFD definition of GES are comparable in their objectives while BSAP goals can be linked to the MSFD descriptors (Table 4). MSFD GES descriptors however cover a wider definition of good environmental status than the BSAP goals and thus not all MSFD descriptors can be directly assigned to the BSAP goals. These are: D3 – Population of commercial fish and shellfish at safe biological levels; D7 – Hydrographical conditions; D10 – Properties and quantities of marine litter and D11 – Introduction of energy, including underwater noise. Furthermore, the BSAP segment on Maritime Activities partly covers several MSFD descriptors.

BSAP goal	MSFD Descriptor
Baltic Sea unaffected by eutrophication	D5 Eutrophication
Baltic Sea life undisturbed by hazardous substances	D8 Concentrations of contaminants D9 Contaminants in fish and shellfish
Favorable status of Baltic Sea biodiversity	D1 Biological diversity D2 Non-indigenous species D3 Commercial fishes and shellfish D4 Marine food webs D6 Sea-floor integrity
Maritime activities in the Baltic Sea carried out in an environmentally friendly way	D2 Non-indigenous species D5 Eutrophication D8 Concentrations of contaminants D10 Marine litter D11 Underwater noise

Table 4. Link between BSAP goals and MSFD Descriptors.

The BSAP ecological objectives lack a counterpart in the MSFD structure; sometimes they are most closely linked to descriptors while sometimes they are more similar to detailed criteria outlined in the Commission decision (EU) 2017/848 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU (GES Decision; Figure 2). However, there is a broad degree of coherence between the objectives of the two instruments (look also Annex 3).

Finally, HELCOM core indicators can be linked to the GES criteria and methodological standards as outlined in the GES Decision ((EU) 2017/848). The specific links are described in the monitoring programmes of the Monitoring Manual.

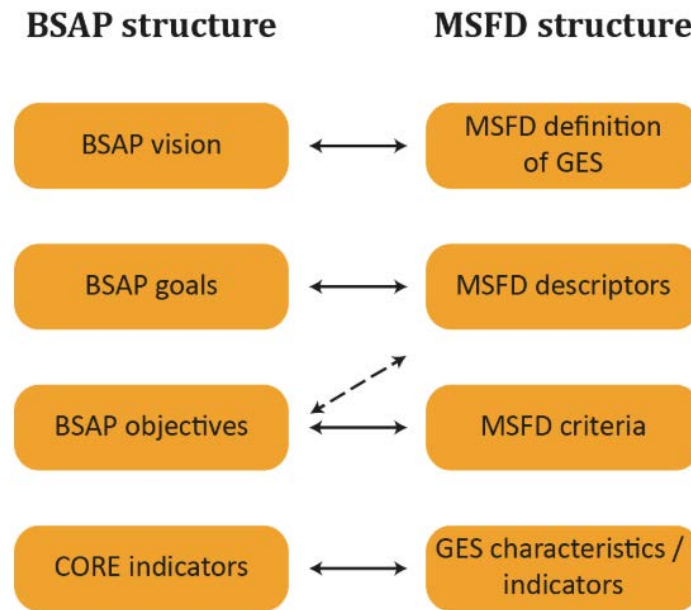


Figure 2. Relationships between BSAP and MSFD

Regional definition of GES and environmental targets

In the BSAP, the Contracting Parties to the Helsinki Convention agreed to periodically evaluate whether the goals of the Plan have been met by using indicator-based assessments.

Core indicators form the critical set of indicators which are needed to regularly assess the status of the Baltic Sea marine environment against a definition of GES or a threshold value and progress towards a set of environmental targets. According to the MSFD and GES Decision (EU) 2017/848 it is crucial for member states to cooperate in their actions to achieve a good environmental status of the sea region (Baltic Sea). For most MSFD descriptors assessments member states should establish regional lists for different criteria elements and threshold values for criterias through regional or subregional cooperation and that can be done within development of Helcom indicators.

For core indicators that reflect the status of the environment, a tentative/preliminary quantitative boundary is required to distinguish between a state within GES and a state not meeting GES.

For core indicators that reflect pressures on the environment, tentative/preliminary quantitative target values (*threshold values* in GES Decision) are required to define the maximum level of pressure that is acceptable to achieve or maintain GES (see *threshold value* in Annex 1, Glossary)

Quantitative GES-boundaries, targets or threshold values are available for some, but not for all **core indicators**. Their development is an ongoing process, depending on the maturity of the

indicator concerned. In those cases, interim boundaries or proxies are used to provide a measurable expression of GES, based on the current best available knowledge.

7. HELCOM Monitoring Strategies

Biodiversity – Birds

The aim of the programme is to provide data to assess the status, abundance, distribution and population structure of waterbirds in the Baltic. Waterbird monitoring can also give information on the state of the sea and of the benthic habitats. The monitoring supports the HELCOM core indicators and corresponding MSFD GES criteria and methodological standards for Descriptors 1 and 4.

There are two types of monitoring activities in the Baltic Sea region: monitoring of resting, migrating or moulting birds (wintering) and monitoring of breeding birds. For marine bird health monitoring is limited to the white-tailed sea eagle.

Monitoring of breeding birds varies between countries in relation to the species monitored, the start of the time series, and the temporal resolution of monitoring which ranges from annual monitoring to every third year depending on the species. Some countries have state financed monitoring programmes in place, while in some countries monitoring is carried out by volunteers.

All Baltic Sea countries have been carrying out ground-count-based coastal surveys for wintering birds with some time series starting as early as the 1960s. Most countries run these coastal counts as volunteer programmes. Offshore surveys using both ship and plane are also carried out in most countries.

National monitoring of breeding and wintering birds is taking place in almost all Baltic Sea countries either by the state or by volunteers. Regular monitoring is implemented by coastal counts only. Coordinated coverage of offshore parts has been initiated but is not implemented on a regular basis yet. Regionally coordinated guidelines and a database are under development for the Baltic to ensure that methods and the data collected are comparable and could support HELCOM assessments and core indicators as well as HD and BD assessments. A common, regionally agreed quality assurance programme is missing. National quality assurance and quality control exist.

Ecosystem element/ Programme topic: [Birds](#)

Biodiversity – Fish

The monitoring of coastal fish is carried out by national programmes and collated through HELCOM, specifically under the HELCOM FISH-PRO III project. The monitoring provides data on the relative abundance/biomass and species composition of the coastal fish community and

supports the HELCOM core indicators and corresponding MSFD GES criteria and methodological standards for Descriptor 1 and 4. Some of these fish are of freshwater origin, thus the populations are more local and respond more locally to environmental conditions compared to typical offshore fish that generally migrate over larger distances with populations spanning larger spatial scales. The current coastal fish monitoring as coordinated by HELCOM represents a minimum requirement and there are substantial geographical gaps.

Regarding migratory fish, national programmes focus on sea trout, salmon, twait shad, eel and sturgeon as well as lampreys and are coordinated by ICES (International Council for the Exploration of the Sea) and/or with regards to EU Habitats directive. Migratory fish monitoring in rivers is ongoing in many CPs whereas the spatial-temporal coverage of catch sampling from sea may need to be increased. The monitoring supports HELCOM core indicators and corresponding MSFD GES criteria and methodological standards for Descriptors 1 and 4 as well as HD assessment.

The monitoring of commercially exploited fish (MSFD D3) includes stocks that are regulated by TACs (total allowable catch) and country wise quotas and are exploited by large commercial fisheries (under EU Regulations 1380/2013 and 1004/2017). The monitoring is coordinated by ICES. The main commercial shellfish populations in the HELCOM region currently monitored are predominant in the western part of the region. The current monitoring of non-commercial fish species according to MSFD D1 is still a major gap, may not fulfill minimum requirements.

The EU GES Decision (2017/848) implies a need for redevelopment of the current HELCOM fish biodiversity indicators and corresponding monitoring, or the development of new indicators, to meet the need of assessing fish species as a component of the assessment element “fish” under D1 of the MSFD. Such development work would be relevant to support future coordinated approaches to fish assessments among HELCOM CPs that are also EU Member States. The GES Decision increases the emphasis under D1 on species abundance, condition and distribution while transferring emphasis on fish communities and functional criteria to Descriptor 4 that relates to assessments of food-webs. The GES Decision further requires that D1 assessments at species group level could, where relevant, include commercially exploited fish species. If commercially exploited fish species are included, they have to be assessed according to D3.

Ecosystem element / Programme topic: [Fish, shellfish and fisheries](#)

Biodiversity – Mammals

The aim of the programme is to provide data to assess the status, abundance, trends, distribution and health of marine mammal species native to the Baltic Sea. The monitoring supports the HELCOM core indicators and corresponding MSFD GES criteria and methodological standards for Descriptors 1 and 4.

The abundance and distribution of the three seal species native to the Baltic Sea – grey seal, harbour seal and ringed seal – are monitored by Finland, Denmark, Germany, Sweden and Estonia at their haul-out locations by aerial, ship-based and land-based methods.

The health status is currently monitored by investigations on stranded, by-caught and hunted animals.

A permanent or long-term programme for internationally coordinated monitoring of harbour porpoise abundance in the Baltic Sea does currently not exist, but data collection is regionally coordinated (data are delivered separately by each country). Ship-based line transect surveys for the management unit in the Belt Sea (in Danish, German and Swedish sea areas) are scheduled to be performed every six years under national Danish monitoring efforts.

Marine mammal monitoring is being coordinated by the HELCOM MAMA group especially regarding abundance and distribution of seals and health status of marine mammals. Common guidelines still need to be adopted to ensure common methods in monitoring. There is also no common database at present.

Ecosystem element/ Programme topic: [Mammals](#)

Biodiversity – Water column habitats

The monitoring programme for pelagic habitats is regionally coordinated and measures:

- Concentrations of nutrients and oxygen (under the ecosystem element/programme topic hydrochemistry), chlorophyll-a (under the ecosystem element/ programme topic phytoplankton) as well as Secchi depth (under the ecosystem element/ programme topic hydrography). This monitoring supports the HELCOM core indicators and corresponding MSFD GES criteria and methodological standards for Descriptor 5 for the assessment of the eutrophication status and the effectiveness of measures (nutrient concentrations).
- Information on salinity, temperature, turbidity and ice (under the programme topic hydrography) as well as pH and CO₂ (under the ecosystem element/ programme topic hydrochemistry) required in MSFD Annex III Table 1. This monitoring supports MSFD criteria of Descriptor 7.
- Abundance and biomass of phytoplankton and zooplankton species. This monitoring supports the HELCOM core indicators and corresponding MSFD criteria and methodological standards of Descriptors 1, 2, 4 and 5.

For some parameters and basins monitoring frequencies need to be increased and methods need to be harmonized. Work is under way to improve the spatial and temporal coverage of the monitoring programme by using earth observation data and data from automated measuring devices (ferryboxes and/or ships of opportunity).

Ecosystem elements/ **Programme**

topics: [Hydrography](#), [Hydrochemistry](#), [Phytoplankton](#), [Zooplankton](#)

Biodiversity – Seabed habitats

Monitoring of phytobenthos and soft-bottom fauna exists in all Baltic Sea countries and is partly covered by HELCOM coordinated monitoring. Monitoring of phytobenthos focuses on depth distribution, composition and coverage of benthic plant species. The monitoring potentially supports MSFD criteria and methodological standards for Descriptor 1, 5 and 6. Monitoring of soft-bottom fauna measures species composition, abundance and biomass and supports HELCOM core indicators and MSFD criteria and methodological standards (indicators) for Descriptor 1, 5 and 6.

Currently there is no monitoring in place which targets seabed habitat distribution and hard-bottom fauna is monitored only in a few countries in the Baltic Sea (e.g. Finland, Estonia). The “drop-video” technique in combination with traditional methods used for characterising benthic communities (grab sampling, SCUBA diving) could be a promising, cost-effective solution at least for certain habitats. Joint and standardized methods in the Baltic Sea area need to be agreed in HELCOM.

Ecosystem elements/ **Programme topics:** [Seabed habitat distribution and extent](#), [Benthic community species distribution and abundance](#)

Non-indigenous species

Non-indigenous species (NIS) monitoring addresses all biotic components as NIS may belong to any trophic level, may be found in all natural as well as man-made habitats and affect the functioning of the ecosystem. NIS data are needed to update a HELCOM core indicator “[Trends in arrival of new non-indigenous species](#)” and to report for EU MSFD, EU IAS regulation and to fulfil the data needs for exemptions under the Ballast Water Management Convention (BWMC). There is currently no Baltic-wide coordinated monitoring specifically targeting NIS. Some observations (e.g. plankton and soft bottom macrofauna species) are obtained through the HELCOM biological monitoring programmes and many new species are found during scientific projects. HELCOM monitoring system (incl. previous COMBINE programme) can currently be used for NIS records in a given area in the taxonomic groups covered by these monitoring programmes. However, while the HELCOM joint monitoring programme itself is far from sufficient both, temporally and spatially (fixed sampling stations) to obtain the required information on NIS, there are several elements which can be useful to exploit in NIS monitoring purposes.

In addition, HELCOM coastal fish gill-net monitoring and BITS surveys can provide information on NIS presence-absence, spread and abundance/biomass.

The only dedicated method to monitor NIS is the HELCOM/OSPAR Port survey protocol, which provides information on NIS found in ports to support decisions on granting exemptions (HELCOM, 2015). Such a protocol is part of the “[Joint HELCOM/OSPAR Guidelines on the granting of exemptions under the International Convention for the Control and Management of Ships’ Ballast Water and Sediments, Regulation A-4](#)” adopted by HELCOM and OSPAR

Contracting Parties in 2013. The protocol has been tested in several ports around the Baltic Sea, is regularly updated and ready for routine use. Information obtained during port surveys ([available on-line](#)) should also be used to complement NIS assessments for HELCOM and the MSFD (D2) reporting purposes for those HELCOM countries being EU members. Another NIS dedicated regionally coordinated monitoring method since 2017 is the extended [Rapid Assessment Survey](#) (eRAS) that sets a cost-efficient method to obtain data, e.g. specifically for the trend indicator (e.g. for D2C1, new introductions of NIS).

Pressures/ Programme topic: [Non-indigenous species](#)

Eutrophication

The existing HELCOM and WFD procedures have been successfully applied to assess the eutrophication status for marine and coastal waters. Eutrophication is a main pressure acting on the marine environment throughout the Baltic Sea region. Monitoring and assessment apply Baltic-wide. The monitoring programme is regionally coordinated and measures:

- Concentrations of nutrients and direct and indirect effects of nutrient enrichment in the marine environment: concentrations of chlorophyll-a (under the element/ programme topic phytoplankton) and oxygen (under the element/ programme topic hydrochemistry), transparency (under the element/ programme topic hydrography) and biological metrics relating to phytoplankton (under the element/ programme topic phytoplankton), macrophytobenthos and macrozoobenthos (under the element/ programme topic benthic community species distribution and abundance). This monitoring supports the HELCOM core indicators and corresponding MSFD GES criteria methodological standards for Descriptor 5 for the assessment of the eutrophication status, trends in pressures (nutrient concentrations) and impacts (indicators for direct and indirect effects) and the effectiveness of measures (nutrient concentrations). The measurements also provide information on physical and chemical characteristics of seawater (salinity, temperature, pH and distribution of nutrients and oxygen) and biological features (phytoplankton, angiosperms, macro-algae, invertebrate bottom fauna) required in MSFD Annex III Table 1.
- Inputs via rivers and direct discharges from land-based sources. It also collects model-based data on atmospheric inputs of nutrients to the sea. The monitoring supports the HELCOM BSAP nutrient reduction targets and corresponding national MSFD environmental targets, source-apportionments to help directing measures, and the assessment of the effectiveness of measures. The monitoring contributes information required under MSFD Annex III Table 2 on anthropogenic pressures affecting the marine environment (inputs of nutrients, eg fertilizers and other nitrogen and phosphorus-rich substances).

For some parameters and sea-basins, monitoring frequencies need to be increased and methods need to be harmonized. Work is under way to improve the spatial and temporal coverage of the monitoring programme by using earth observation data and data from automated measuring devices (ferryboxes and/or ships of opportunity).

Pressures/ Programme topics: [Inputs](#), [Hydrography](#), [Hydrochemistry](#), [Phytoplankton](#)

Hydrographic changes

The monitoring programme on hydrographic changes compiles the available monitoring data on the abiotic marine environment. In the marine environment both, the seafloor and the watermasses above are dynamic, constantly changing systems. The compiled monitoring information on hydrographic changes in the programme, forms a framework relevant for assessments of many other monitoring programmes tracking changes in biotic systems.

Ecosystem elements/ Programme topics: [Hydrography](#), [Seabed Habitat Distribution and Extent](#)

Contaminants

The aim of the monitoring programme is to provide data to assess the state regarding contamination in the Baltic Sea as well as to identify pressures and impacts leading to the contamination. This is done through a combination of measurement and modelling.

Concentrations of contaminants are monitored in water, sediment or biota. Monitoring covers heavy metals, organic substances and radionuclides and supports the HELCOM core indicators and corresponding MSFD GES criteria and methodological standards for Descriptor 8 and 9.

Contaminants are measured in selected species of biota from different geographical regions of the Baltic Sea in order to detect possible contamination patterns, including areas of special concern. Contaminants are also measured in biota at specific locations over time in order to detect whether levels are changing, also in response to the changes in inputs of contaminants to the Baltic Sea.

The programme covers all core indicators for concentrations of contaminants, but not in all matrices and areas. Identified gaps include the lack of monitoring of certain contaminants in biota on the eastern coast. Furthermore, the monitoring of contaminants in blue mussels and perch in the smaller sub-basins makes the assessment spatially limited.

Atmospheric inputs of metals and dioxins/furans to the Baltic Sea are modelled using estimated emission data. The Contracting Parties take measurements of atmospheric deposition on land and this data is used to calibrate the models.

Waterborne inputs of (heavy) metals from land-based sources to the Baltic Sea are calculated using measured data from the monitored rivers and MWWTPs in Baltic Sea catchment (300 monitored rivers and 23 unmonitored areas).

Furthermore, as a measure of acute pollution, the number of oil discharges observed in the Baltic Sea is reported. In the future also discharges of other substances could be included.

The only biological effect so far included in the Monitoring Programme on hazardous substances is the monitoring of imposex in snails as a result of TBT-exposure in support of the HELCOM core indicator.

Pressures/ Programme topics: [Inputs](#), [Concentration of contaminants](#), [Biological effects of contaminants](#)

Contaminants in seafood

Currently there is no regional monitoring programme for contaminants in seafood as it is regulated by EU Regulation 1881/2006. However, monitoring of contaminants in biota has been conducted in HELCOM monitoring programmes, which also include species that are used for food consumption. There are European regulations for sampling and analyzing contaminants in food. Sampling arrangements within countries may differ, e.g. size range for seafood sampling may differ from environmental monitoring. The analyzed matrix, analysis methods and quality standards used for food consumption analyses are not identical to environmental quality standards.

Pressures/ Programme topics: [Contaminants in seafood](#)

Litter

Currently, there are no HELCOM indicators, assessment procedures or coordinated monitoring in place in relation to the amount and composition of marine litter on the seafloor, in the water column and regarding the impact of litter on marine organisms. For beach litter monitoring guidelines are in place and [beach litter baselines](#) were established by EU together with Joint List of Litter Categories in 2019. Helcom countries carry out beach litter monitoring or surveys, and use information from fishing for litter projects to gain information on the presence of litter in the marine environment.

In the MSFD CIS framework, the EU Task Group Marine Litter has developed recommendations for monitoring which will provide a basis for the development of coordinated monitoring in the Baltic Sea Region. Various studies are under way to test methods with a view to determining options for developing cost-efficient monitoring programmes.

Pressures/ Programme topics: [Litter](#)

Noise

Underwater noise is quite new topic for the HELCOM community and core indicators are currently under development to assess impulsive and ambient noise levels. The aim of the monitoring programme is to provide data and assessments on the pressures and status of the marine environment. The monitoring programme is of relevance to both, the biodiversity and maritime traffic segments of HELCOM work.

The current development work on noise monitoring in HELCOM builds on results from the Technical Group Noise that was established in the MSFD-GES framework. Research projects on optimal monitoring methodologies are currently underway in the Baltic Sea area. HELCOM guidelines for monitoring continuous noise provide a standardized procedure for data collection to ensure that the output data is compatible with the HELCOM pre-core indicator.

Pressures/ Programme topics: [Underwater noise](#)

8. ANNEXES

Annex 1 – Glossary of Terms (INTERIM)

Definitions and interpretations of the terms relating to the Marine Strategy Framework Directive are agreed in the EU MSFD Common Implementation Strategy (CIS) process. In addition, the following references have been used:

[1] Common Understanding of (Initial) Assessment, Determination of Good Environmental Status (GES) & Establishment of Environmental Targets (Articles 8, 9 & 10 MSFD), [Status: 22.11.2011](#).

[2] Annex 3 of the Outcome of HELCOM MONAS 18-2013. “Rev” indicates that the definitions have been revised after MONAS-18.

[3] Reporting package for MSFD Article 11 on monitoring programmes. MSFD Guidance Document 17, updated in [2020](#).

[4] Commission Decision [\(EU\) 2017/848](#) of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU (*GES Decision*).

Additional and updated information on MSFD terms can be found in Reporting Guidances of MSFD articles, available in Eionet Central Data Repository (<http://cdr.eionet.europa.eu/help/msfd>).

The glossary will be updated to reflect changes in these reference documents as needed.

Biotope

A habitat and its associated community.

Characteristics

1. Ecosystem components relevant for analysing the environmental status and structure, functions and processes of marine ecosystems (species, habitats and ecosystems, incl food webs) as well as ecosystem elements as described in Annex III, Table 1 MSFD **[1]**.
2. Ecosystem elements describing GES as set out in Art. 9(1) MSFD (characteristics of GES) and associated criteria elements and criterias outlined in Commission decision [\(EU\) 2017/848](#) **[4]**.

Core indicators

Core indicators are indicators that are adopted by all Contracting Parties of the Helsinki Convention, utilise monitoring data, and carry out a scientifically justified evaluations against a well-defined, quantitative and approved threshold value(s) or environmental target(s).

Core indicators are either state or pressure indicators. Pressures related core-indicators measure progress towards environmental targets or input targets, State related core-indicators evaluate state of the marine environment against the quantitative threshold value(s) defined as good environmental status (i.e progress towards a GES-boundary). State core indicators are indirectly linked to anthropogenic pressures, and the link is described either qualitatively or quantitatively as appropriate.

Both types of indicators should also provide information on trends as trend data provide an additional indication of progress towards the BSAP objectives and/or a MSFD criteria.

Core indicators are Baltic wide whenever ecologically relevant, and the area of applicability is expressed through HELCOM assessment units.

Operational core indicators are to be regularly updated by the Contracting Parties through agreed long-term data handling arrangements and the updated results are published on the HELCOM webpage. The aim is that the parameters required for the core indicators are monitored by all Contracting Parties when ecologically relevant through HELCOM coordinated monitoring that is described in the [HELCOM Monitoring Manual](#). [2 rev]

GES criteria/criterion

According to the definitions in Art. 3(6) MSFD, “criteria” mean “distinctive technical features that are closely linked to qualitative descriptors”. 27 primary and 15 secondary criterias are listed for assessment of criteria elements under 11 descriptors in GES Decision (EU) 2017/848 [4].

Criterias (and methodological standards) are to be used when determining a set of characteristics for good environmental status, on the basis of MSFD Annexes I and III and by reference to the initial status assessment made pursuant to Article 8(1) of MSFD, to assess the extent to which good environmental status is being achieved [4].

For this reason, GES criteria refer to those aspects which are to be assessed, through the application of appropriate indicators, to determine whether GES is being achieved [1].

Criteria elements

According to the definition in Art. 2(4) of GES Decision, “criteria elements” means constituent elements of an ecosystem, particularly its biological elements (species, habitats and their communities), or aspects of pressures on the marine environment (biological, physical, substances, litter and energy), which are assessed under each criterion [4].

Descriptor

MSFD Annex I provides a list of eleven qualitative ‘Descriptors’ which constitute the basis for the assessment of GES, and provide a further refinement of aspects of the definition of GES in Art. 3(5) MSFD. These descriptors are substantiated and further specified in the GES Decision ([EU 2017/848](#)) through a set of 42 criterias (see also characteristics, GES criteria) [1, 4].

Ecosystem element

Ecosystem elements comprise biotic and abiotic elements of the marine environment, including those described in MSFD Annex III, Table 1. Abiotic elements include non-living physical, hydrological and chemical characteristics. Biotic elements include species groups, habitat types and associated biological communities, ecosystems structure, processes, functions and trophical guilds [1, 4].

Environmental Target

In the HELCOM Monitoring Manual, the term environmental target reflects the level of sustainable pressure on (or use of resources from) the marine environment. According to the MSFD art 3(7) ‘environmental target’ means a qualitative or quantitative statement on the desired condition of the different components of, and pressures and impacts on, marine waters in respect of each marine region or subregion.

The marine environment is assumed not to be negatively affected by the pressure when the pressure remains below the environmental target, indicating that good environmental status is reached. Article 10 of the MSFD requires that ‘Environmental targets’ and associated indicators are established to guide progress towards achieving good environmental status in the marine environment. The environmental targets should take into account the indicative lists of anthropogenic pressures, uses and human activities in or affecting the marine environment, set out in Table 2 of Annex III of the MSFD.

In HELCOM, environmental targets have been agreed for input of nutrients: Maximum Allowable nutrient Inputs (MAI) and Country Allocation of Reduction Targets (CART). For the most recent MAI/CART agreement see [HELCOM 2013 Ministerial Meeting](#).

Species groups

As a way of simplifying and categorizing biodiversity, species can be assigned to functional groups. Such groups comprise species with similar structural and functional characteristics, such as how they acquire their nutrients, their state of mobility or their mode of feeding.

Each functional group represents a predominant ecological role (e.g. surface-feeding birds, coastal fish etc) within the marine environment or within a habitat. For MSFD purposes, the term is particularly applied to birds, mammals, reptiles, fish and cephalopods to provide focus for the assessment of status of these often highly mobile or widely-dispersed species groups (GES Decision Part II, Table 1). The term is also useful in the context of assessing communities’

condition (in the water column or seabed) through assessment of the range of functional groups present. [1, 4]

Good Environmental Status

For the purposes of the MSFD, good environmental status (GES) is defined in Art. 3(5) MSFD as “the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations, ie:

(a) the structure, functions and processes of the constituent marine ecosystems, together with the associated physiographic, geographic, geological and climatic factors, allow those ecosystems to function fully and to maintain their resilience to human-induced environmental change. Marine species and habitats are protected, human-induced decline of biodiversity is prevented and diverse biological components function in balance;

(b) hydromorphological, physical and chemical properties of the ecosystems, including those properties which result from human activities in the area concerned, support the ecosystems as described above. Anthropogenic inputs of substances and energy, including noise, into the marine environment do not cause pollution effects.”

For GES a set of characteristics is to be determined on the basis of the qualitative descriptors listed in Annex I MSFD (Art. 9(1) MSFD). GES Decision [\(EU\) 2017/848](#) provides the criteria and methodological standards to be used for determining GES (Art. 9(3) MSFD).

For the purposes of the HELCOM BSAP, good environmental status is defined as the vision of “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 human economic and sustainable activities.”

In HELCOM, GES is expressed in quantitative terms for each indicator, e.g. as a threshold value or a range of values that have been identified as representative of GES based on a scientific analysis of data that underpin the specific indicator. The determination is based on the Descriptors and criteria laid down in Annex I MSFD, in GES Decision [\(EU\) 2017/848](#) and the visions, goals and ecological objectives of the [Baltic Sea Action Plan](#) (HELCOM 2007).

Habitat

The physical and environmental conditions (e.g. the seabed substratum and associated hydrological and chemical condition) that support a particular biological community or communities (Cochrane et al. 2010).

Hydrographical conditions

Hydrographical conditions (Descriptor 7) refer to the depth, tidal, current and wave characteristics of marine waters, including the topography and morphology of the seabed [1, 4].

Hydrological processes

Hydrological processes refer to the movement, distribution and quality of water. Interference with hydrological processes can encompass changes in the thermal or salinity regime, in the tidal regime, in sediment and freshwater transport, in current or wave action and in turbidity.

Hydrographical conditions can be influenced by (changing) hydrological processes [1].

Impact

An impact is the environmental effect of a pressure resulting from human activities. It is an alteration, whether permanent or temporary, in a physical, chemical or biological aspect of the environment that is considered undesirable [1].

Indicators that reflect the state of the environment inevitably also reflect the impact of pressures and human activities.

Parameter

A parameter is a measurable single characteristic e.g. number of individuals, biomass in g/dry weight, sediment particle diameter size in mm, concentration of nutrients in µg/l etc. An indicator can be based on single or multiple parameters.

Pre-core indicator (HELCOM)

Pre-core indicators have been identified as necessary by the HELCOM Contracting Parties for BSAP and MSFD purposes. A pre-core indicator is an indicator with a defined concept that has been elaborated significantly to provide a full indicator report (within the HELCOM indicator template) and a valid evaluation, yet may be lacking complete data (e.g. full monitoring data) or may not currently have full agreement and consensus on all components (e.g. threshold values).

Thus, the indicator has not been adopted as a core indicator e.g. because some aspects of the indicator may be under-developed and/or agreement on the indicator among the CP's may be intermediate. The Contracting Parties should aim to monitor the parameters relevant for the pre-core indicator, with the understanding that the pre-core indicators can be based on compilations of data from sources other than coordinated HELCOM monitoring data [2 rev].

Pressure

Pressures describe the causative anthropogenic factors behind environmental changes. Pressure indicators measure the magnitude of anthropogenic influence and the degree of resource use e.g. input of nutrients, introduction of non-indigenous species through shipping activities, or size of catches of fish in the fisheries.

Pressure core indicators are used to assess the progress towards reaching environmental targets.

State/status

The word ‘state’, as used in the context of the MSFD, refers to the quality/condition of specific aspects of the environment, such as ecosystem components. This can be determined through measurements in the environment of relevant parameters for such components; such measurements, by definition, will reflect any impacts (individual and cumulative) to which the component has been subjected.

The word ‘status’, as used in the context of Good Environmental Status or Environmental Quality Status, draws together the determination of the ‘state’ of individual ecosystem components, typically through use of particular criteria, threshold values and indicators, to assign a ‘status’ classification (e.g. at GES, below GES). MSFD Art 3 (4) defines ‘environmental status’ as the overall state of the environment in marine waters, taking into account the structure, function and processes of the constituent marine ecosystems together with natural physiographic, geographic, biological, geological and climatic factors, as well as physical, acoustic and chemical conditions, including those resulting from human activities inside or outside the area concerned.

State core indicators are used to assess progress toward reaching GES. **[1 rev]**

Supplementary indicator (HELCOM)

Supplementary indicators are applied in a limited area, such as a sub-basin, and are commonly agreed among the countries in that area. A supplementary indicator measures the progress towards GES or an environmental target. An indicator can be defined as a supplementary indicator and not a core indicator, for reasons such as resource limitation and not due to ecological reasons. The supplementary indicator should follow the guidance for a full core indicator, but will only be applied in the relevant assessment units for the Contracting Parties using it. Calibration of GES boundaries between the countries should ensure the applicability of these supplementary indicators also in common HELCOM integrated assessments.

For reasons of competence and/or resources not all Contracting Parties will be required to carry out all measurements, but all measurements will need to be covered on a work-sharing basis. **[2 rev]**

Supporting parameters (HELCOM)

Supporting parameters are commonly agreed complementing parameters to core indicator information or calculations, but do not measure the progress towards a BSAP objective and/or a MSFD descriptor. Supporting parameters are included in the coordinated monitoring programme and updated regularly. The structure of a supporting parameter is not as strictly defined as that of a core indicator and a supporting parameter does not measure progress towards GES or an environmental target. The commonly agreed *HELCOM Baltic Sea Environment Fact Sheets* are supporting parameters. **[2 rev]**.

Threshold value

‘Threshold value’ means a value or range of values that allows for an assessment of the quality level achieved for a particular criterion, thereby contributing to the assessment of the extent to which good environmental status is being achieved. **[4]**

Annex 2: Reporting of Monitoring Programmes under MSFD

Updated reporting format of Article 11 (monitoring programmes) of the MSFD in 2020 proposes a new structure in order to clarify the terminology used for the different monitoring concepts:

- a) Metadata: gathers information related to the administrative set-up of the monitoring programmes, including regional cooperation processes, and the public consultation;
- b) Monitoring strategies: each strategy describes the overall approach to monitoring for a particular descriptor and collects information on the coverage of GES criteria, targets and measures, as well as any gaps in the monitoring and plans to fill the gaps.
- c) Monitoring programmes: gathers information on the practicalities of monitoring, reflecting different monitoring types, methods, spatial and temporal scope, etc.

All lists mentioned in some questions can be retrieved from the original [Reporting Guidance of Article 11 for the MSFD \(2020\)](#).

Metadata

Public consultation dates

Public consultation dates: YYYYMMDD—YYYYMMDD

Start and end date of the MSFD Article 19(2c) public consultation related to the establishment or update of the monitoring programmes under MSFD Article 11.

Public consultation site

Provide URL web link for the public consultation website.

Regional cooperation

Regional cooperation undertaken in the establishment and implementation of the monitoring programmes (max 2500 characters). Where can additional information be found on your regional cooperation on monitoring programmes (if information is additional to that already provided under article 6, 7, 8, 9 and 10)?

Describe issues on cooperation that have not been reported before (under Art. 7 or Art. 8, 9 and 10), such as consistency in methodology.

Responsible Competent Authority

Name of a Competent Authority(s) (CA) which is responsible for the Article 11 monitoring programmes and who will act as a contact point for the Commission.

Name of Competent Authority (select from CAs reported under Art. 7).

Reporting under MSFD Art. 7 required the formally-appointed Competent Authority to be identified (within government) responsible for ensuring the implementation of monitoring programmes. In cases where several Competent Authorities share this responsibility, give one of these who will act as the contact point, if needed.

Note that the Competent Authority may differ from the organisation(s) that actually undertake the monitoring, such as research institutes or consultants. This can be indicated in “Responsible organisation”.

Responsible organisation

Optional: If the delivery of the monitoring programmes is delegated by the CA to other organisations, these can be listed. These are the organisations that actually undertake or manage the monitoring (e.g. a technical agency or research establishment which has the role to do the monitoring assigned to it by the responsible CA).

Name(s) of responsible organisations.

Where the monitoring is sub-contracted to a number of consultants, which may vary from year to year, it is not recommended that these be reported here.

Relationship to Competent Authority

Optional: Explain (max 1000 characters) the relationship of the responsible organisations to the relevant CA (e.g. an agency of the CA) or provide URL web link.

Monitoring strategies

Descriptor

Enter name/corresponding code of the Descriptor (MSFD Annex I) for which this monitoring strategy applies.

Select one from List: GEScomponent_Enum (Annex II b in the [Reporting Guidance 2020](#)).

A monitoring strategy is to be provided for each Descriptor. Relevant GES criteria are entered in the associated ‘Monitoring programmes’ schema.

Whenever a Descriptor is not relevant (e.g. ‘D1 Biodiversity - reptiles’ in the Baltic Sea), this should be indicated in the fields ‘MonitoringStrategyDescription’, ‘Coverage_GEScriteria’ and ‘Gaps_Plans’; no other reporting is needed in such cases.

Monitoring Strategy description

Description (free text, max 5000 characters) of the strategy, including:

- rationale for how activities, pressures, impact and state are monitored (DPSIR framework),
- how the risk of not achieving GES or of deteriorating from GES is addressed by the strategy, and
- how the strategy will enable progress with related targets and measures to be assessed.

Describe also, whether the strategy includes the use of a low-risk approach. Whenever a Descriptor is not relevant (e.g. D1 Biodiversity - reptiles), enter 'Descriptor not relevant for Member State's waters').

Coverage_GES criteria

In relation to the GES criteria (as set in Commission Decision (EU) [2017/848](#) and Annex II b in Reporting Guidance) addressed, indicate when sufficient monitoring was in place or by when sufficient coverage will be in place.

Enter one value from list 'Coverage_Enum' (Annex II g of the Reporting Guidance) to indicate the timeframe for when sufficient monitoring was or will be in place to provide sufficient coverage:

Value	Observation
Adequate monitoring was in place in 2014	Year of implementation of Art. 11
Adequate monitoring was in place by 2018	Year implementation was previously reported for some programmes
Adequate monitoring is in place by July 2020	Date for updating monitoring programmes
Adequate monitoring will be in place by 2024	Year for next updates of Art. 8, 9, 10
Monitoring is not being put in place for this descriptor due to a low risk	
Monitoring for this descriptor is not relevant	E.g. does not occur in MS waters (note this option is not relevant for targets or measures, where monitoring is expected to enable progress with the targets or measures to be assessed).

Gaps and plans (GES)

If the monitoring strategy is not considered fully adequate, describe the implementation of gaps and plans to complete the establishment and implementation of this descriptor monitoring strategy.

Free text (max 1000 characters), which should particularly address aspects indicated in the **three** 'Coverage' fields (**for GES criteria, targets and measures**), where implementation is not yet fully in place. If the Descriptor (D1 Biodiversity - reptiles) is not relevant, enter 'Monitoring for this descriptor is not relevant'.

Related targets (from Art. 10)

Target(s) defined under MSFD Article 10 that are relevant for this descriptor and monitored within this strategy (e.g. targets addressing relevant pressures and impacts).

Enter as many target codes as relevant (as reported by MS under the 2018 reporting of Article 10). Include targets for which monitoring is not yet in place and indicate timescale for implementation in 'Coverage_Targets'.

Coverage_Targets

In relation to the targets addressed, indicate when sufficient monitoring was in place or by when sufficient coverage will be in place.

Enter one value from list 'Coverage_Enum' (Annex II g in Reporting Guidance; same list as for [Coverage of GES criteria](#)) to indicate the timeframe for when sufficient monitoring was or will be in place to provide sufficient coverage for targets.

Gaps and plans (Targets)

Which targets and associated indicators for your marine waters (as included in your Member State report for Art. 10) are not yet adequately covered by monitoring strategies? Description of the implementation gaps and plans to complete the establishment and implementation of this descriptor monitoring strategy and targets coverage.

Free text (max 1000 characters), which should particularly address aspects indicated in the three 'Coverage' fields (for GES criteria, targets and measures), where implementation is not yet fully in place. If the Descriptor (D1 Biodiversity - reptiles) is not relevant, enter 'Monitoring for this descriptor is not relevant'.

Provide also a justification for not including specific GES criteria, environmental targets and MSFD Annex III Table 1 characteristics in your monitoring strategies which you have reported under Art. 8, 9 and 10 as being relevant to your Member State waters (e.g. based on risk assessment). In cases where you have reported under Articles 8, 9 and 10 that particular GES criteria, targets and Annex III elements are relevant to your Member State waters, but you have indicated 'Not relevant' under 'Coverage_GES criteria' or 'Coverage_Targets', provide a justification as to why they are not included in your monitoring strategies.

Related measures

Select Measure code(s) defined under MSFD Article 13 that are relevant for this descriptor and monitored within this strategy e.g. measures addressing relevant pressures and impacts). Enter as many measure codes as relevant (as reported by MS under the 2016 reporting of Article 13 or 2019 reporting of Article 18). Include measures for which monitoring is not yet in place and indicate timescale for implementation in 'Coverage_Measures'.

Add also Measure name(s) defined under MSFD Article 13 that are relevant for this descriptor and monitored within this strategy. Enter the corresponding measure names (as reported by MS under the 2016 reporting of Article 13 or 2019 reporting of Article 18).

Coverage_Measures

In relation to the measures addressed, indicate when sufficient monitoring was in place or when sufficient coverage will be in place.

Enter one value from list 'Coverage_Enum' (Annex II g in Reporting Guidance; same list as for [Coverage of GES criteria](#)) to indicate the timeframe for when sufficient monitoring was or will be in place to provide sufficient coverage for measures.

Monitoring Programmes

Enter these Monitoring programmes that contribute to this descriptor monitoring strategy.

Enter as many programme codes as necessary (as reported in the 'Monitoring programmes' schema). No codes need to be entered if under Coverage_GESCriteria the values 'Monitoring is not being put in place for this descriptor due to a low risk' or 'Monitoring for this descriptor is not relevant' are provided. Note that a Monitoring programme can be linked to more than one Monitoring strategy.

Indicative list of monitoring programme names is given in Annex III of the Reporting Guidance.

Monitoring programmes

Programme Code

Provide a unique identifier for the monitoring programme.

Enter sub-programme code reported in 2014.

In case of new programmes, use MS code plus MS-defined alpha-numeric code, showing also a Descriptor (e.g. EE-D08-01).

Temporal scope

Provide the start date of the programme (past or future) and, if appropriate, an end date, or indicate the programme is ongoing.

YYYY-YYYY (if the end date is unknown, provide '9999' as end-date).

Only one start date and end date is permitted. The start date should be the earliest date that the sub-programme started, going back as many years as possible before 2014. Whilst data quality issues may have improved over time (i.e. data from long past may be of lesser quality) such past data nevertheless can usefully contribute to a time-series dataset for this sub-programme.

It is expected that most sub-programmes reported in the 2014 reporting cycle will at present have no planned end date– in such cases, enter 9999. This situation may change in future reporting cycles to reflect changing needs of the monitoring.

There will be cases where the earliest start date varies amongst elements/parameters of the same sub-programme. Here, the earliest starting date of a particular element/parameter of the programme should be used. If additional detail or clarification is required, this should be provided in 'MonitoringDetails'.

The following example from Poland illustrates possible variations in start dates: the sub-programme on nutrient levels started in 1979 (within the then HELCOM BMP), although only in the offshore area. It was included in the National Monitoring Programme only in 1990. Since 1999 it was extended into the entire Polish sector of the Baltic Sea, including the coastal zone. For MSFD, enter 1979 as the start date and provide the additional detail in 'MonitoringDetails'.

Spatial scope

Spatial coverage of the programme according to the jurisdictional zones of marine waters.

Select one (or more) option(s) from list:

- 'Terrestrial part of MS'
- 'Transitional waters (WFD)'
- 'Coastal waters (WFD)'
- 'Territorial waters'
- 'EEZ (or similar) (e.g. Contiguous Zone, Fishing Zone, Ecological Protection Zone)'
- 'Continental shelf (beyond EEZ)'
- 'Beyond MS Marine Waters'

This question is intended to give only a coarse categorization of the areas (zones) covered by the programme. If only a proportion of the selected category is covered by the programme, this can be described in 'MonitoringDetails'.

“Terrestrial part of MS” refers to any monitoring above the high water mark.

“Continental shelf (beyond EEZ)” refers to monitoring of MS seabed/subsoil beyond the zone where the Member State has jurisdiction over the water column (e.g. beyond 200nm of EEZs or the Territorial Waters/Contiguous Zone of some Mediterranean states).

“Beyond MS Marine Waters” refers to monitoring in Areas Beyond National Jurisdiction (ABNJ), including monitoring in the water column/air above MS Continental Shelf areas (i.e. high seas). It can also be used for monitoring in waters of neighbouring countries

Monitoring Purpose

Main purpose(s) for collecting the data and information.

Select one (or more) option(s) from list:

- ‘Environmental state and impacts’
- ‘Pressures in the marine environment’
- ‘Pressures at source’ (land-based, riverine, sea-based and atmospheric sources)
- ‘Human activities causing the pressures’
- ‘Effectiveness of measures’

The categories provided are related to the DPSIR model and are intended to reflect the main focus of the programme. As programmes should be defined separately according to the main elements being monitored (e.g. particular species/species groups or habitats, specific pressures), it is expected that typically only one category will be relevant per programme. However, monitoring of certain naturally occurring elements (e.g. nutrients, underwater sound) is sometimes considered as ‘state monitoring’, whilst the reason for this monitoring is to assess whether the levels are raised above natural levels (i.e. whether it is acting as a pressure) – in these cases, the category ‘pressure in the marine environment’ should be selected. Where the elements monitored are being changed due to a pressure (e.g. oxygen levels resulting from nutrient enrichment), they should be categorised as ‘state/impact monitoring’.

Sea-based ‘Pressures at source’ refers to monitoring pressures from sea-based activities where the monitoring is directly at the activity rather than at a distance from or time period after it is generated by the activity (e.g. D1 incidental by-catch when fishing, D2 ballast water discharges, D6 use of bottom fishing gear, D8 contaminant discharges and pollution events from a vessel or pipeline, D11 impulsive sound events from a vessel or platform).

Other policies and conventions

Monitoring for other Union legislation or international agreements that contributes to the monitoring programme.

In addition to the MSFD, state to which other EU policies and international agreements (including Regional Sea Conventions), this programme contributes. Enter as many Directives and Conventions as necessary from list ‘DirectivesConventions_Enum’ (Annex II f of Reporting Guidance 2020).

Element

Element(s) monitored (e.g. specific species, habitats, contaminants, litter categories).

Whenever needed, enter the specific element(s) that are expected to be monitored (at least one element needs to be entered for features marked in bold blue in 'Feature_Enum'):

- species (D1C2-C5, D2C2, D3, D5C3, D8C2, D10C4)
- species group (D2C3)
- habitat (D1C6, D2C3, D6C3-C5, D7C2, D8C2)
- trophic guild, physical, hydrological and chemical characteristics (D4)
- eutrophication-related elements (D5)
- hydrographical elements (D7C1)
- contaminants (D8C1, D9C1)
- litter category (D10C1-C3)
- frequency band (D11C2)

The elements are to be selected from the MSFD Reporting Reference List (<http://cdr.eionet.europa.eu/help/msfd>). If the list does not contain the elements needed, contact msfd.helpdesk@eionet.europa.eu.

For criteria D1C1, D2C1 and D8C4 the elements monitored cannot be predefined, so enter 'Not applicable'. For criteria D6C1, D6C2, D8C3 and D11C1 no elements are defined for the relevant features, so enter 'Not applicable'. The relevant parameters monitored for all these criteria can be entered in the field 'Parameter' or 'ParameterOther'.

For features in the lists 'Pressure inputs to the marine environment' and 'Uses and human activities' no elements are defined. Relevant parameters may be reported in the field 'Parameter' or 'ParameterOther' by entering 'Not applicable' for the element.

For some monitoring methods the elements present (e.g. species, habitats) will vary between locations and sampling times; in such cases enter the main target elements for the programme at a suitable resolution (e.g. phytoplankton communities).

A summary of the features and elements to be used per descriptor and criterion is given in Annex V of the Reporting Guidance (2020).

Parameter, Parameter_Other

Parameter monitored under the Criteria.

For each criterion, enter the relevant parameter(s) monitored from list 'Parameters_Enum' (Annex II d of the Reporting Guidance (2020)). If the parameter monitored is not in the list, enter 'Other' and provide the parameter in 'ParameterOther'.

The species monitored under D8C1 are supposed to be included at the Parameter level. Please use 'ParameterOther' to report the tissue and species: e.g. 'CONC-B-xx - Spp name' (xx being the corresponding tissue, as in the Parameters list).

For ParameterOther: free text (max. 250 characters). Use this field for species and tissues used for D8C1 monitoring, or if the parameter monitored is not in the 'Parameter_Enum' list.

Monitoring method, Monitoring method_Other

Guidelines/protocols describing the method for monitoring.

Enter corresponding method code(s) from list 'MonitoringMethod_Enum' (Annex II e of the Reporting Guidance (2020)). If 'Other' is selected, provide details in 'MonitoringMethodOther'.

For 'MonitoringMethodOther': Free text (max. 2500 characters) or provide URL web link. Additional information on methodology can also be entered, if needed, to complement the information provided under 'MonitoringMethod' (e.g. adjustments to the published methodology).

Monitoring details

General description (free text, max. 2500 characters) of how the monitoring is undertaken (how the data are collected).

This field is required for countries that plan to use the MSFD art 11 reporting tools 'Export to PDF/RTF' application.

Provide a description of what is monitored (features, elements, parameters), where (spatial scope), when (start date, frequency) and how (methods for data collection and sample handling/QA, QC).

Quality Control (QC)

What type of Quality Control is used? Free text (max. 2500 characters) or provide URL web link.

QC refers to the systems or checks put in place to ensure the monitoring is undertaken according to the methodological guidelines (i.e. as reported under 'MonitoringMethod').

Monitoring Frequency

Frequency of the monitoring.

Enter corresponding frequency from list 'Frequency_Enum' (Annex II h of the Reporting Guidance (2020)).

Programme Description

Description of the monitoring programme (free text, max. 5000 characters).

Provide an introduction/overview of the programme, its purpose, aims and policy context, any (sub)regional cooperation, and the overall strategy including addressing risk (of failing to achieve GES or deteriorating from a GES situation). Include whether there are plans for implementing innovative monitoring. Describe here whether the programme will end before 2024 if replaced by innovative monitoring.

Specific details on how the monitoring is undertaken should be described in 'MonitoringDetails'.

Data Management

General description (free text, max. 2500 characters) of the data management (post data collection).

Provide a description of the data storage (where, how), quality control (on data), processing/analysis, access and reporting (where the data are sent).

Data access

Link to where monitoring data can be accessed (MSFD Art. 19(3)).

Provide URL link(s) to the server where the datasets from the monitoring programmes are (or will be made) available.

Feature

Feature(s) monitored (ecosystem components, pressures, activities).

Enter the codes of the feature(s) from list 'Feature_Enum' (Annex II c of Reporting Guidance (2020)). This list includes four sections, each intended for particular aspects of monitoring and assessment, but not confined to these:

- Ecosystem components (relevant for monitoring and assessment for MSFD Article 8(1a) for D1C2-C5, D3, D4, D6C3-C5, D7C2);
- Pressures and impacts in the marine environment (relevant for monitoring and assessment for MSFD Article 8(1b) for D1C1, D2, D5, D6C1-C2, D7C1, D8, D9, D10, D11);
- Pressure inputs to the marine environment (relevant for monitoring and assessment for MSFD Article 10);
- Uses and human activities (relevant for monitoring and assessment for MSFD Article 8(1c) and 13).

For features related to 'Ecosystem components' or 'Pressures and impacts in the marine environment', at least one element has to be provided (see features marked in bold blue in the list 'Feature_Enum', Annex II c).

For features related to ‘Pressure inputs to the marine environment’ and ‘Uses and human activities’, no elements are reported, but parameters may be reported.
A summary of the features and elements to be used per descriptor and criterion is given in Annex V of the Reporting Guidance (2020).

GES Criteria

GES criteria monitored.

For each element, enter as many criteria codes as relevant from list ‘GEScomponent_Enum’ (Annex II b of Reporting Guidance (2020)). Enter ‘Not relevant’ whenever parameters are to be reported for features from the ‘activities’ or ‘pressure inputs’ lists.

Related Indicator, Related Indicator_Name

Indicator(s) to which the programme contributes and indicator name.

Enter as many indicator codes as necessary (as reported by MS under the schema ‘Indicators’ used in the 2018 update of MSFD Articles 8 and 10).

For new indicators: use sub(region) code plus RSC/MS code plus defined alpha-numeric code (e.g. ABI-OSPAR-Nutrients2017) (max. 50 characters).

Enter name of the indicator (max. 250 characters). Not needed when the indicator has been reported under the schema ‘Indicators’ in the 2018 update of MSFD Articles 8 and 10.

Marine Reporting Unit

Area(s) where the programme takes place.

Enter all relevant Marine Reporting Units for the MS marine waters (or entire monitoring programme for multinational programmes) where the programme takes place (MarineUnitID, as reported by MS in 4geo.xml file).

Data Access

Link to where monitoring data can be accessed (MSFD Art. 19(3)).

Provide URL link (s) to the server where the datasets from the monitoring programmes are (or will be made) available.

Programme Name

Name of monitoring programme.

Short name that reflects main focus of the programme, such as the ecosystem elements, pressures and associated policy, e.g. OSPAR CEMP contaminants monitoring, Habitats Directive Posidonia monitoring. An indicative list of names is provided in Annex III of the Reporting Guidance (2020).

Update type

Report on whether the programme was reported in 2014 (as a sub-programme), modified from the 2014 report, is a new programme or is no longer in place.

Select one of the list:

- 'Same programme as in 2014',
- 'Modified from 2014',
- 'New programme'
- 'Programme no longer in place'.

All sub-programmes reported in 2014 need to be accounted for in the 2020 report.

Use 'Same programme as in 2014' when the programme remains essentially the same (i.e. it has the same purpose, features/elements/parameters, spatial scope and monitoring frequency, type and method, or with only minor changes). If these aspects are modified, use 'Modified from 2014' and provide an explanation of the changes in 'ProgrammeDescription'.

In cases where the value 'Modified from 2014' involves a change of the codes, enter all the codes from the corresponding 2014 sub-programmes in the field 'OldProgrammeCodes'.

In cases where 'Programme no longer in place' is selected, provide a reason in 'ProgrammeDescription'.

Old programme codes

Codes from the old sub-programmes related to the reported programme.

Enter as many old (2014) sub-programme codes as needed. This field is required whenever codes have changed and 'Modified from 2014' is selected under the field 'UpdateType'.

Monitoring Type

Type of monitoring (in-situ, remote sensing, etc.).

Select relevant options from list:

- 'In-situ sampling offshore',
- 'In-situ sampling coastal',
- 'In-situ sampling land/beach',
- 'Remote surveillance' (e.g. buoys),
- 'Remote satellite imagery' (satellite observations),
- 'Remote flight imagery' (orthoimages),
- 'Numerical modelling',
- 'Ecological modelling',
- 'Administrative data collection',
- 'Visual observation',
- 'Other'.

Regional cooperation, coordination

Corresponding Regional Sea Convention or other coordinating body.

Select one (or more) option(s) from list: 'HELCOM', 'OSPAR', 'BARCON', 'BSC', or 'Other'.

If 'Other' is selected, give the name of the coordinating body in 'ProgrammeDescription'.

Regional cooperation, countries

Which other countries are involved in practical implementation of this monitoring programme. Provide a list of countries involved in the programme (from List 'CountryCode_Enum', Annex II a of Reporting Guidance (2020)). No need to complete this field if 'RegionalCooperation_coordination' has been filled in.

Regional cooperation, implementation

Indicate the degree of cooperation among countries within the same (sub)region for this monitoring programme.

Indicate the level of implementation by selecting one of the following:

- Agreed data collection methods,
- Common monitoring strategy (spatial and temporal design of programme),
- Coordinated data collection (delivered separately by each country),
- Joint data collection (multinational delivery using same platform and/or algorithms).

For HELCOM purposes a detailed description was suggested by State & Conservation Extra MA-2020 meeting as follows:

Code	Art. 11 Category	S&C Extra MA-2020 Definition
0	No regional level agreements are in place.	No regional coordination. Monitoring and data collection requirements under EU legislation (D3 fisheries, D9 food safety) are not by default considered as regionally coordinated, unless actual agreed coordination has been agreed.
1	Agreed data collection methods	There are regionally agreed monitoring guidelines in place outlining recommended methods, techniques and standards (e.g. HELCOM monitoring guidelines).
2	Common monitoring strategy (spatial and temporal design of programme)	1. There are regionally agreed monitoring guidelines in place outlining recommended methods, techniques and standards (e.g. HELCOM monitoring guidelines); and 2. There are regionally coordinated stations and their location and number are defined.
3	Coordinated data collection (delivered separately by each country)	1. There are regionally agreed monitoring guidelines in place outlining recommended methods, techniques and standards (e.g. HELCOM monitoring guidelines); and 2. There are regionally coordinated stations and their location and number are defined. and 3. There is regional coordination for arrangements for data collection made (timing and responsible institution),

		and/or regionally coordinate regular and consistent dataflows are in place. NB: see exception for criteria 1-2 outlined under para. 1.4d.
4	Joint data collection (multinational delivery using same platform and/or algorithms)	1. There are regionally agreed monitoring guidelines in place outlining recommended methods, techniques and standards (e.g. HELCOM monitoring guidelines, ICES standards); and 2. There are regionally coordinated stations and their location and number are defined. and 3. There is regional coordination of arrangements for data collection made (timing and responsible institution), and/or regionally coordinate regular and consistent dataflows are in place. and 4. There are regionally agreed shared arrangements for data collection, e.g. sharing vessels or use of regional scale satellite data and a joint data collection platform is used (e.g. ICES or HELCOM).

Contact

Institute (responsible/coordinator), contact email (functional) - free text (max. 2500 characters).

References

Reference(s) to publications about the monitoring programme. Provide URL link (s) or free text (max. 2500 characters).

Annex 3 Links Between EU Monitoring Programmes and HELCOM Monitoring Programmes

EU Programme	HELCOM Programmes
Mobile species – abundance and/or biomass	Marine breeding birds abundance and distribution Marine wintering birds abundance and distribution Seal abundance Harbor porpoise abundance Coastal fish Migratory fish Offshore fish Commercial shellfish
Mobile species – population characteristics	Coastal fish Migratory fish Offshore fish Commercial shellfish
Mobile species – health status	Marine bird health Health status of mammals
Mobile species – state of habitats	Ice Water column hydrological characteristics Water column chemical characteristics Nutrients
Mobile species – mortality/injury rates from fisheries	Fisheries by-catch
Mobile species – mortality/injury rates from other human activities	No equivalent HELCOM sub-programme
Seabed habitats – distribution and extent	Habitat-forming species and substrates
Seabed habitats – physical/chemical characteristics	Seabed habitat physical characteristics
Seabed habitats – community characteristics	Hardbottom Species Softbottom fauna Softbottom flora

Benthic species – abundance and/or biomass	Hardbottom Species Softbottom fauna Softbottom flora
Benthic species – health status	Imposex
Water column – physical characteristics	Water column –physical characteristics
Ice cover	Ice
Water column – hydrological characteristics	Water column – hydrological characteristics
Water column – chemical characteristics	Water column – chemical characteristics Nutrients
Pelagic habitats – community characteristics	Phytoplankton – Pigments Phytoplankton – Species composition, abundance and biomass Zooplankton – Species composition, abundance and biomass
Plankton blooms	Phytoplankton – Species composition, abundance and biomass Phytoplankton – Pigments
Non-indigenous species inputs – from specific sources	No equivalent HELCOM sub-programme
Nutrient inputs – land-based sources	Nutrient inputs from landbased sources
Nutrients input from atmosphere	Nutrient inputs from atmosphere
Nutrients input from sea-based sources	Nutrient inputs from seabased sources

Contaminants inputs – land-based sources	Contaminant inputs land-based sources
Contaminants input from atmosphere	Contaminant inputs from atmosphere
Contaminants input from sea-based sources	No equivalent HELCOM sub-programme
Contaminants input from sea-based acute events incl. oil spills	Acute pollution
Litter inputs – land based (riverine) sources	No equivalent HELCOM sub-programme
Non-indigenous species – abundance and/or biomass	Non-indigenous species. At present referring to monitoring of phytoplankton, zooplankton, macrophytes, benthic fauna
Nutrients levels – in water column	Nutrients
Physical loss – distribution and extent (e.g. from infrastructure, coastal protection)	Physical damage and loss – under development
Physical disturbance – from bottom trawling	Physical damage and loss – under development
Physical disturbance – from dredging and disposal of dredge material	Physical damage and loss – under development
Physical disturbance from sand and gravel extraction	Physical damage and loss – under development

Contaminant levels – in water/sediment	Contaminants in water Contaminants in sediment
Contaminants levels – in species, including seafood	Contaminants in biota Contaminants in seafood – under development
Microbial pathogen levels – in water column (bathing water)	No equivalent HELCOM sub-programme
Microbial pathogen levels – in biota (seafood)	No equivalent HELCOM sub-programme
Litter – characteristic and abundance/volume	Macrolitter characteristics and abundance/volume
Litter microparticles – abundance/volume	Microlitter particle abundance and characteristics
Acute underwater noise – distribution, frequency and levels	HELCOM monitoring programme but not yet in place
Diffuse underwater noise – distribution, frequency and levels	HELCOM monitoring programme but not yet in place
Activities extracting living resources (fisheries, including recreational, mearl, seaweed)	No equivalent HELCOM sub-programme. Catch data available, but not yet included in the manual
Activities extracting non-living resources (sand, gravel, dredging)	No equivalent HELCOM sub-programme. Data collection and reporting requirements exists in HELCOM, but no yet included in the manual
Activities extracting non-living resources (desalination)	No equivalent HELCOM sub-programme

Activities producing food (aquaculture)	No equivalent HELCOM sub-programme
Activities with permanent infrastructures (e.g. renewable energy, oil & gas, ports) or structural changes (e.g. coastal defences)	No equivalent HELCOM sub-programme
Sea-based mobile activities (shipping, boating)	No equivalent HELCOM sub-programme
Coastal human activities (e.g. tourism, recreational sports, ecotourism)	No equivalent HELCOM sub-programme
Land-based activities	No equivalent HELCOM sub-programme
Effectiveness of measures	No equivalent HELCOM sub-programme

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