Baltic Marine Environment Protection Commission

Project for the development of the second holistic assessment of the Baltic Sea

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Background

HELCOM assessments build on commonly agreed core indicators (HELCOM Monitoring and Assessment Strategy). This document presents the core indicators currently under development in the HELCOM projects EUTRO-OPER and CORESET II. EUTRO-OPER operationalizes status core indicators for eutrophication and the HELCOM project CORESET II operationalizes status core indicators for biodiversity and hazardous substances as well as pressure core indicators. The core indicators are sorted according to which MSFD criteria/indicator they are primarily linked to (Table 1). The relevant BSAP objective is also provided. Note that Table 1 does not include candidate indicators identified as needed to be developed in the future or indicators that have been put on hold in CORESET II.

Currently the listed indicators are at different phases of development, with indicators listed as 'core' being the most developed followed by the 'pre-core' and the 'candidates' being at the lowest stage of development. For a core indicator to be fully operational the indicator must meet detailed criteria. The criterion that the data-arrangements are to be developed is of key importance for carrying out assessments and an overview of the current situation is presented per indicator.

HELCOM indicators are also tabulated versus MSFD criteria to provide an overview of how well they cover MSFD requirements (Table 2).

Baltic Sea Environment Fact Sheets (BSEFS) provide supportive and background information that can also be used for assessments. This document contains a list of Baltic Sea Environment Fact Sheets, currently in revision (Table 3).

Action required

The Meeting is invited to

- take note of the HELCOM indicators under development including the current state of the data-arrangements.
- take note that several indicators are of relevance to more than one BSAP objective or MSFD descriptor,
- take note of the BSEFS that are available.

HELCOM core indicators

The HELCOM core indicators that are to be used as the basis for thematic- and holistic assessments are currently being developed and operationalized. More information on these projects can be found in the project pages for CORESET II and EUTRO-OPER.

Definition

Core indicator

Core indicators are commonly agreed indicators among the HELCOM Contracting Parties. A core indicator measures the progress towards a BSAP objective and/or an MSFD criteria. A core indicator describes a scientifically sound phenomenon and is based on measurements, observations or validated models. Core indicators are Baltic wide whenever ecologically relevant, and the area of applicability is expressed through HELCOM assessment units.

Core indicators are either state- or pressure indicators. Pressure core indicators measure an anthropogenic pressure directly, and measure the progress towards an environmental target. State core indicators measure the progress towards a GES-boundary. The environmental target and/or the GES-boundary are described in detail in an operational core indicator, as well as the assessment methods and rationale. State core indicators are indirectly linked to anthropogenic pressures, and the link is described either qualitatively or quantitatively as appropriate.

Operational core indicators are to be regularly updated by CP's through agreed long-term data handling arrangements and the updated result is published on the HELCOM web-page. 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 will be described through the HELCOM Monitoring Manual.

Pre-core indicator

Pre-core indicators have been identified as necessary by the HELCOM Contracting Parties for BSAP and MSFD purposes. 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. 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

Candidate indicator

Candidate indicators include indicators on which there is not yet a common understanding on the concept but a need for the indicator has been identified to cover gaps in the requirements of the BSAP or the MSFD. The stage of development of the content of the indicator is completely or severely lacking and/or there is no common agreement on the indicator among the CP's. The candidate indicator list is a living document.

Abbreviations used for BSAP objectives

Segment	Objective	
Eutrophication	• Concentrations of nutrients close to natural levels • Clear water • Natural level of algal blooms • Natural distribution and occurrence of plants and animals • Natural oxygen levels	CN CW AB NPA OL
Biodiversity	• Natural marine and coastal landscapes • Thriving and balanced communities of plants and animals • Viable populations of species	MCL TBC VP
Hazardous substances	• Concentrations of hazardous substances close to natural levels • All fish are safe to eat • Healthy wildlife	HS FS HW RPC

	• Radioactivity at the pre-Chernobyl level	
Maritime activities	• Enforcement of international regulations – no illegal discharges • Safe maritime traffic without accidental pollution • Efficient emergency and response capabilities • Minimum sewage pollution from ships • No introductions of alien species from ships • Minimum air pollution from ships • Zero discharges from offshore platforms • Minimum threats from offshore installations	NIP ST NIS

Table 1.Overview of the HELCOM core indicators that are being operationalized in the projects EUTRO-OPER and CORESET II.

BSAP objective	Primary MSFD criteria/ indicator	Secondary MSFD criteria/ indicator	Indicator name	Indicator status	Indicator type	Data-arrangements
NPA	1.1.		Distribution of seals	core	status	Close to operational, BALSAM developing database structure, possibly to be hosted at the Secretariat
NPA	1.1.		Harbour porpoise distribution	candidate	status	ASCOBANS database hosted at Secretariat, data-flow and QA issues need solving before operational for indicator purposes
NPA, VP	1.2.	1.1, 1.3., 4.1, 4.3	Population trends and abundance of seals	core	status	Provisional system in place though HELCOM SEAL EG
VP	1.2.	1.1, 1.3, 4.3.	Number of drowned mammals and waterbirds in fishing gears	core	pressure	No regular monitoring in place, thus no data-arrangements in place
NPA, VP	1.2.	1.1., 4.3.	Abundance of waterbirds in the wintering season	core	status	No arrangements in place, options currently being explored
VP (NPA)	1.2.	1.1., 1.3., 4.3.	Abundance of waterbirds in the breeding season	core	status	No arrangements in place, options currently being explored
TBC, VP	1.2.	4.3.	Abundance of key coastal fish species	core	status	No arrangements in place, options currently being explored
VP	1.2.	4.1., 4.3.	Abundance of sea trout spawners and parr	core	status	Operational through ICES
VP	1.2.	4.1. , 4.3.	Abundance of salmon spawners and smolt	core	status	Operational through ICES
HW, VP	1.3.	4.1., 8.2.	Reproductive status of marine mammals	core	status	Provisional system in place though HELCOM SEAL EG
HW, VP	1.3.		Nutritional status of marine mammals	core	status	Provisional system in place though HELCOM SEAL EG
TBC, VP	1.3.	6.2.	Population structure of long-lived macrozoobenthic species	core	status	Very scarce monitoring data available, no established data-arrangements in place
VP	1.3.		Mean maximum length (MML) of the fish community (off-shore)	candidate	status	No arrangements in place, data held nationally
MCL	1.4., 1.5.	1.6, 6.1.	Distribution, pattern and extent of benthic biotopes	pre-core	status	No regular monitoring activities implemented specifically for the indicator, no data-arrangements in

						place
NPA, TBC	1.5.	6.2, 5.3.1	Lower depth distribution limit of macrophyte species	pre-core	status	Monitoring data available, potential data-flow described but not implemented
NPA, TBC	1.6.	4.3.	Abundance of coastal fish key functional groups	core	status	No arrangements in place, options currently being explored
TBC	1.6.	4.2., 6.2.	Proportion of large fish in the community (off-shore)	core	status	Potential data-arrangements for demersal community through ICES being explored, no arrangements for pelagic communities where data is held nationally
NIS	2.1.		Trends in arrival of new non-indigenous species	core	status	Data-arrangements in place but data-flow is not fully operational
TBC (VP, MCL)	4.3.	5.2. (?)1.6., 4.1.	Ratio of diatoms and dinoflagellates	candidate	status	Some of the required parameters reported through COMBINE, but no indicator specific arrangements in place
TBC	4.3.	1.6.	Zooplankton mean size and total stock	core	status	Provisional data-arrangements in place, indicator up-dating unresolved
NPA, VP	4.3.	4.1.	Seasonal succession of functional phytoplankton groups	candidate	status	Some of the required parameters reported through COMBINE, but no indicator specific arrangements in place
NPA	4.3.	1.6, 1.7	Phytoplankton species assemblage clusters based on environmental factors	candidate	status	Some of the required parameters reported through COMBINE, but no indicator specific arrangements in place
CN	5.1.1	1.6	DIN concentration, winter average	core	status	operational, automation developed under EUTRO-OPER
CN	5.1.1	1.6	DIP concentration, winter average	core	status	operational, automation developed under EUTRO-OPER
CN	5.1.1	1.6	Total nitrogen concentration	candidate	status	developed under EUTRO-OPER (by Jan 2015)
CN	5.1.1	1.6	Total phosphorus concentration	candidate	status	developed under EUTRO-OPER (by Jan 2015)
CN	5.1.2		Nutrient ratios (N:P and N:Si)	candidate	status	considered by EUTRO-OPER
AB	5.2.1	1.6	Chlorophyll-a, summer average	core	status	operational, automation developed under EUTRO-OPER
AB	5.2.1	1.6	Chlorophyll-a, spring bloom intensity	candidate	status	developed under EUTRO-OPER (by Jan 2015)
AB	5.2.4		Cyanobacterial surface accumulations	candidate	status	developed under EUTRO-OPER (by Jan 2015)
CW	5.2.2	1.6	Water transparency (Secchi depth), summer	core	status	operational, automation developed under EUTRO-OPER
OL	5.3.2		Oxygen debt below halocline	core	status	operational, automation developed under EUTRO-OPER
OL	5.3.2		Oxygen consumption	candidate	status	developed under EUTRO-OPER (by May 2015)
CNNL	D5		Actual inputs of nitrogen and phosphorous to the basins	candidate	pressure	Close to operational system in place, being developed in the HELCOM PLUS project

NPV	5.3.	1.7.	Biomass ratio of opportunistic and perennial macroalgae	candidate	status	No data-arrangements in place
MCL	6.1.		Cumulative impact on benthic biotopes	pre-core	pressure	No data-arrangements in place
TBC	6.2.	1.6. , 5.3	State of the soft-bottom macrofauna communities	core	status	Main parameters reported through COMBINE, but no indicator specific arrangements in place
HS, FS	8.1.	9.1.	Polybrominated biphenyl ethers (PBDE): BDE-28, 47, 99,100, 153 and 154	core	status	Common reporting though COMBINE but data-flow to indicator not yet operational
HS, FS	8.1.	9.1.	Hexabromocyclodocecane (HBCDD)	core	status	Common reporting though COMBINE but data-flow to indicator not yet operational
HS, FS	8.1.	9.1.	Perfluorooctane sulphonate (PFOS)	core	status	Common reporting though COMBINE but data-flow to indicator not yet operational
HS, FS, HW	8.1.	8.2., 9.1.	Polychlorinated biphenyls (PCB) and dioxins and furans: CB-28, 52, 101, 118, 138, 153 and 180: WHO-TEQ of dioxins, furans –dl-PCBs	core	status	Common reporting though COMBINE but data-flow to indicator not yet operational
HS, FS, HW	8.1.	8.2., 9.1.	Polyaromatic hydrocarbons and their metabolites: US EPA 16 PAHs / selected metabolites	core	status	Common reporting though COMBINE but data-flow to indicator not yet operational
HS, FS, HW	8.1.	8.2., 9.1.	Metals (lead, cadmium and mercury)	core	status	Common reporting though COMBINE but data-flow to indicator not yet operational
FS, RPC	8.1.	9.1.	Radioactive substances: Caesium-137 in fish and surface waters	core	status	Operational arrangement in place though HELCOM MORS database and expert group
HS, HW	8.1.	8.2.	Pharmaceuticals: Diclofenac, EEA2 (+E1, E2, E3 + in vitro yeast essay)	pre-core	status	No regular monitoring data available and no indicator specific arrangements in place
HS, HW, VP (NIP?)	8.1; 8.2.		Tributyltin (TBT) and imposex	core	status	Common reporting though COMBINE for TBT but data-flow to indicator not yet operational, and no operational arrangements in place for imposex
HW, VP, NIP, ST	8.2.	(1.2, 1.3.)	Oil-spills affecting the marine environment	pre-core/ candidate	pressure	Aerial surveillance based data-arrangements close to operational
HW	8.2.		Lysosomal Membrane Stability – a toxic stress indicator	pre-core	status	No data-arrangements in place yet, data held nationally
HW	8.2.		Fish Disease Index– a fish stress indicator	pre-core	status	No data-arrangements in place yet, data held nationally
HW	8.2.		Micronucleus test – a genotoxicity indicator	pre-core	status	No data-arrangements in place yet, data held nationally
HW, VP	8.2.		Reproductive disorders: Malformed eelpout and amphipod embryos	pre-core	status	No data-arrangements in place yet, data held nationally
HW	8.2.		Vitellogenin induction	candidate	status	No data-arrangements in place yet, data held nationally
HW	8.2.		EROD/CYP1A (Ethoxyresorufin-O-	candidate	status	No data-arrangements in place yet, data held nationally

				deethylase) induction			
HW	8.2.			Acetylcholin-esterase inhibition	candidate	status	No indicator specific data-arrangements in place (ICES database contains AChE as a parameter)
NPA, VP	8.2. (1.3.)	4.1. , 8.2.		White-tailed eagle productivity	core	status	Provisional data-arrangements under consideration, currently data held nationally
MCL	10.1.			Beach litter	candidate	status/ pressure	No regular monitoring data available yet, no data-arrangements in place
MCL	10.1.			Litter on the seafloor	candidate	status/ pressure	No regular monitoring data available yet, no data-arrangements in place
MCL	10.1.	(10.2)		Microlitter in the watercolumn	candidate	status/ pressure	No regular monitoring data available yet, no data-arrangements in place
(NIP)	11.1.	1.1.		Low and mid frequency impulsive sounds	candidate	pressure	No regular monitoring data available yet, no data-arrangements in place
(NIP)	11.2.	1.1.		Ambient noise	candidate	pressure	No regular monitoring data available yet, no data-arrangements in place

Table 2. MSFD criteria vs HELCOM indicators.

Within brackets; C=core indicators, P-C=pre-core indicator, CA=candidate, Shaded cells = secondary MSFD criterion i.e. the indicator is primarily assigned to another criterion.

Descriptor 1. Biodiversity.

Species level.

MSFD Criteria	Mammals	Birds	Fish	Macrozoobenthic species
1.1 Species distribution	- Distribution of seals (**C**) - Harbour porpoise distribution (**CA**) - Population trends and abundance of seals (**C**) - Number of drowned mammals and waterbirds in fishing gears (**C**)	- Abundance of waterbirds in the wintering season (**C**) - Abundance of waterbirds in the breeding season (**C**)	-	-
1.2 Population size	- Population trends and abundance of seals (**C**) - Number of drowned mammals and waterbirds in fishing gears (**C**)	- Abundance of waterbirds in the wintering season (**C**) - Abundance of waterbirds in the breeding season (**C**) - Number of drowned mammals and waterbirds in fishing gears (**C**)	- Abundance of key coastal fish species (**C**) - Abundance of sea trout spawners and parr (**C**) - Abundance of salmon spawners and smolt (**C**)	-
1.3 Population condition	- Reproductive status of marine mammals (**C**) - Nutritional status of marine mammals (**C**) - Population trends and abundance of seals (**C**) - Number of drowned mammals and waterbirds in fishing gears (**C**)	-	- Mean maximum length (MML) of the fish community (off-shore) (**CA**)	- Population structure of long-lived macrozoobenthic species (**C**)

Habitat level, including associated biological communities.

MSFD Criteria	Seabed habitats			Water column habitats		
	Habitats	Angiosperms and macrolagae	Invertebrate benthic fauna	Habitat	Fish	Plankton
1.4 Habitat distribution	- Distribution, pattern and extent of benthic biotopes (**P-C**)					
1.5 Habitat extent	- Distribution, pattern and extent of benthic biotopes (**P-C**)	- Lower depth distribution limit of macrophyte species (**P-C**)				
1.6 Habitat condition	- Distribution, pattern and extent of benthic biotopes (**P-C**)		- State of the soft-bottom macrofauna communities (**C**)	- DIN concentration, winter average (**C**) - DIP concentration, winter average (**C**) - Total nitrogen concentration (**CA**) - Total phosphorus concentration (**CA**) - Chlorophyll-a, summer average (**C**) - Chlorophyll-a, spring bloom intensity (**CA**) - Water transparency (Secchi depth), summer (**C**)	- Abundance of coastal fish key functional groups (**C**) - Proportion of large fish in the community (off-shore) (**C**)	- Ratio of diatoms and dinoflagellates (**CA**) - Phytoplankton species assemblage clusters based on environmental factors (**CA**)
1.7 Ecosystem structure						- Phytoplankton species assemblage clusters based on environmental factors (**CA**) - Biomass ratio of opportunistic and perennial macroalgae (**CA**)

Descriptor 2. Non-indigenous species.

MSFD Indicator	HELCOM indicator
2.1 Abundance and state characterisation of non-indigenous species, in particular invasive species	- Trends in arrival of new non-indigenous species (**C**)
2.2 Environmental impact of invasive non-indigenous species	-

Descriptor 4. Food webs.

MSFD Criteria	Mammals	Birds	Fish	Zooplankton	Phytoplankton
4.1. Productivity (production per unit biomass) of key species or trophic groups	- Population trends and abundance of seals **(C)** - Reproductive status of marine mammals **(C)**				- Ratio of diatoms and dinoflagellates **(CA)**
4.2. Proportion of selected species at the top of food webs			- Proportion of large fish in the community (off-shore) **(C)**		
4.3. Abundance/distribution of key trophic groups/species	- Population trends and abundance of seals **(C)** - Number of drowned mammals and waterbirds in fishing gears **(C)**	- Abundance of waterbirds in the wintering season **(C)** - Abundance of waterbirds in the breeding season **(C)**	- Abundance of key coastal fish species **(C)** - Abundance of sea trout spawners and parr **(C)** - Abundance of salmon spawners and smolt **(C)** - Abundance of coastal fish key functional groups **(C)**	- Zooplankton mean size and total stock **(C)**	- Seasonal succession of functional phytoplankton groups **(CA)** - Phytoplankton species assemblage clusters based on environmental factors **(CA)** - Ratio of diatoms and dinoflagellates **(CA)**

Descriptor 5. Eutrophication.

MSFD criteria	MSFD indicators	HELCOM indicators
5.1 Nutrients levels	5.1.1 Nutrients concentration in the water column	- DIN concentration, winter average **(C)** - DIP concentration, winter average **(C)** - Total nitrogen concentration **(CA)** - Total phosphorus concentration **(CA)**
5.1 Nutrients levels	5.1.2 Nutrient ratios (silica, nitrogen and phosphorus), where appropriate	- -Nutrient ratios (N:P and N:Si) **(CA)**
5.2 Direct effects of nutrient enrichment	5.2.1 Chlorophyll concentration in the water column	- Chlorophyll-a, summer average **(C)** - Chlorophyll-a, spring bloom intensity **(CA)**
5.2 Direct effects of nutrient enrichment	5.2.2 Water transparency related to increase in suspended algae, where relevant	- Water transparency (Secchi depth), summer **(C)**
5.2 Direct effects of nutrient enrichment	5.2.3 Abundance of opportunistic macroalgae	
5.2 Direct effects of nutrient enrichment	5.2.4 Species shift in floristic composition	- Cyanobacterial surface accumulations **(CA)** - Ratio of diatoms and dinoflagellates **(CA)**
5.3 Indirect effects of nutrient enrichment	5.3.1 Abundance of perennial seaweeds and seagrasses (e.g. fucoids, eelgrass and Neptune grass) adversely impacted by decrease in water transparency	- Biomass ratio of opportunistic and perennial macroalgae **(CA)** - Lower depth distribution limit of macrophyte species **(P-C)** - (State of the soft-bottom macrofauna communities **(C)**)
5.3 Indirect effects of nutrient enrichment	5.3.2 Dissolved oxygen, i.e. changes due to increased organic matter decomposition and size of the area concerned	- Oxygen debt below halocline **(C)** - Oxygen consumption **(CA)**

Descriptor 6. Sea-floor integrity.

MSFD Criteria	HELCOM indicator
6.1 Physical damage, having regard to substrate characteristics	- Cumulative impact on benthic biotopes **(P-C)**
	- Distribution, pattern and extent of benthic biotopes **(P-C)** - Lower depth distribution limit of macrophyte species **(P-C)**
6.2 Condition of benthic community	- State of the soft-bottom macrofauna communities **(C)**
	- Population structure of long-lived macrozoobenthic species **(C)**

Descriptor 8. Hazardous substances.

MSFD Criteria	HELCOM indicator
8.1 Concentration of contaminants	- Polybrominated biphenyl ethers (PBDE): BDE-28, 47, 99,100, 153 and 154 **(C)** - Hexabromocyclodocecane (HBCDD) **(C)** - Polychlorinated biphenyls (PCB) and dioxins and furan **(C)** - Perfluorooctane sulphonate (PFOS) s: CB-28, 52, 101, 118, 138, 153 and 180: WHO-TEQ of dioxins, furans –dl-PCBs **(C)** - Polyaromatic hydrocarbons and their metabolites: US EPA 16 PAHs / selected metabolites **(C)** - Metals (lead, cadmium and mercury) **(C)** - Radioactive substances: Caesium-137 in fish and surface waters **(C)** - Pharmaceuticals: Diclofenac, EEA2 (+E1, E2, E3 + in vitro yeast essay) **(P-C)** - Tributyltin (TBT) and imposex **(C)**

8.2 Effects of contaminants	- Oil-spills affecting the marine environment (**P-C**/(**CA**) - Lysosomal Membrane Stability – a toxic stress indicator (**P-C**) - Fish Disease Index– a fish stress indicator (**P-C**) - Micronucleus test – a genotoxicity indicator (**P-C**) - Reproductive disorders: Malformed eelpout and amphipod embryos (**P-C**) - Vitellogenin induction (**CA**) - EROD/CYP1A (Ethoxyresorufin-O-deethylase) induction (**CA**) - Acetylcholin-esterase inhibition (**CA**) - White-tailed eagle productivity (**C**)
	- Reproductive status of marine mammals (**C**) - (Perfluorooctane sulphonate (PFOS) s: CB-28, 52, 101, 118, 138, 153 and 180: WHO-TEQ of dioxins, furans –dl-PCBs (**C**)) - (Polyaromatic hydrocarbons and their metabolites: US EPA 16 PAHs / selected metabolites (**C**)) - (Metals (lead, cadmium and mercury) (**C**)) - (Pharmaceuticals: Diclofenac, EEA2 (+E1, E2, E3 + in vitro yeast essay) (**P-C**))

Descriptor 9. Contaminants in seafood.

MSFD Criteria	HELCOM Indicator
9.1. Levels, number and frequency of contaminants	- Polybrominated biphenyl ethers (PBDE): BDE-28, 47, 99,100, 153 and 154 (**C**) - Hexabromocyclododecane (HBCDD) (**C**) - Polychlorinated biphenyls (PCB) and dioxins and furan (**C**) - Polychlorinated biphenyls (PCB) and dioxins and furan (**C**) - Perfluorooctane sulphonate (PFOS) s: CB-28, 52, 101, 118, 138, 153 and 180: WHO-TEQ of dioxins, furans –dl-PCBs (**C**) - Polyaromatic hydrocarbons and their metabolites: US EPA 16 PAHs / selected metabolites (**C**) - Metals (lead, cadmium and mercury) (**C**) - Radioactive substances: Caesium-137 in fish and surface waters (**C**)

Descriptor 10. Marine litter.

MSFD Criteria	HELCOM indicator
10.1. Characteristics of litter in the marine and coastal environment	- Beach litter (**CA**) - Litter on the seafloor (**CA**) - Microlitter in the watercolumn (**CA**)
10.2. Impacts of litter on marine life	- Microlitter in the watercolumn (**CA**)

Descriptor 11. Input of energy.

MSFD Criteria	HELCOM indicator
11.1 Distribution in time and place of loud, low and mid frequency impulsive sounds	- Low and mid frequency impulsive sounds (**CA**)
11.2. Continuous low frequency sound	- Ambient noise (**CA**)

HELCOM Baltic Sea Environment Fact Sheets (BSEFS)

MONAS 18-2013 proposed that the commonly agreed **HELCOM Baltic Sea Environment Fact Sheets (BESFS)** should be considered as supporting parameters (MONAS 18-2013).Supporting parameters were furthermore defined as:

 "commonly agreed complementing parameters to core indicator information, 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".

Table 3. Overview of the HELCOM Baltic Sea Environment Fact Sheets (BESFS). Note that the list has not been up-dated for some time and is currently under revision by HELCOM State WG.

Category	Title	Responsible institute/author	Comments
Hydrography	Water exchange between the Baltic Sea and the North Sea and conditions in the deep basins	IOW	
Hydrography	Hydrography and oxygen in the deep basins	SMHI & FIMR	
Hydrography	Development of Sea Surface Temperature in the Baltic Sea	IOW	
Hydrography	Runoff to the Baltic Sea Regions and total runoff	SMHI	
Hydrography	The ice season	FIMR/Finnish Meteorological Institute (FMI)	
Hydrography	Wave climate in the northern Baltic Sea	FIMR/FMI, SMHI & BSH	
Maritime	Illegal discharges of oil in the Baltic Sea	HELCOM RESPONSE	
Maritime	Emissions from the Baltic Sea shipping	FMI	
Eutrophication	Emissions of nitrogen to the air	EMEP MSC-W	
Eutrophication	Atmospheric deposition of nitrogen to the Baltic Sea	EMEP MSC-W	Will be part of the core pressure indicator on nutrient inputs
Eutrophication	Riverine load of nutrients	PLC	Will be part of the core pressure indicator on nutrient inputs
Eutrophication	Temporal and spatial variation of dissolved nutrients in the Baltic Sea	FIMR/SYKE	
Eutrophication	Spatial Distribution of the Winter Nutrient Pool	SMHI	
Eutrophication	Chlorophyll a concentrations from satellite remote-sensing of ocean colour	EC JRC	
Eutrophication	Phytoplankton biomass and species succession in the Gulf of Finland, Northern Baltic Proper and Arkona Basin in 2003	Finnish Institute of Marine Research (FIMR)/SYKE	
Eutrophication	Phytoplankton spring bloom biomass in the Gulf of Finland, Northern Baltic Proper and Arkona Basin in 2003	FIMR/SYKE	
Eutrophication	Cyanobacterial blooms in the Baltic Sea	SMHI	
Eutrophication	Cyanobacteria bloom index	FIMR/SYKE	
Eutrophication	Cyanobacteria biomass indicator	PEG	

Eutrophication	Water transparency in the Baltic Sea	FIMR/SYKE	Core indicator
Hazardous substances	Cd, Hg, Pb emissions to the air	EMEP MSC-E	
Hazardous substances	Atmospheric depositions of Cd, Hg, Pb on the Baltic Sea	EMEP MSC-E	
Hazardous substances	PCDD/F emissions to the air	EMEP MSC-E	
Hazardous substances	Atmospheric deposition of PCDD/Fs on the Baltic Sea	EMEP MSC-E	
Hazardous substances	Riverine load of heavy metals	PLC	
Hazardous substances	Total amounts of the artificial radionuclide caesium -137 in Baltic Sea sediments	MORS	
Hazardous substances	Concentrations of the artificial radionuclide caesium-137 in Baltic Sea fish	MORS	Core indicator
Hazardous substances	Liquid discharges of Cs-137, Sr-90 and Co-60 into the Baltic Sea from local nuclear installations	STUK	
Hazardous substances	Temporal Trends in Contaminants in Herring in the Baltic Sea	ICES	
Hazardous substances	Lead concentrations in fish liver	Swedish Museum of Natural History (SMNH)	Core indicator
Hazardous substances	Cadmium concentrations in fish liver	SMNH	Core indicator
Hazardous substances	Mercury concentrations in fish muscle	SMNH	Core indicator
Hazardous substances	PCB concentrations in fish muscle	SMNH	Core indicator
Hazardous substances	TCDD-equivalents in herring muscle and guillemot egg	SMNH	Core indicator
Hazardous substances	Hexabromocyclododecane (HBCD) concentrations in herring muscle and Guillemot egg	SMNH	Core indicator
Hazardous substances	Perfluorooctane sulfonate (PFOS) concentrations in fish liver and guillemot egg	SMNH	Core indicator
Eutrophication (?)	Bacterioplankton growth rate	Umeå University	
Biodiversity	Trends in soft sediment macrozoobenthic communities in the open sea areas of the Baltic Sea	FIMR	Partly core indicator / may be submitted as BSEF if it is not adopted as a core indicator
Biodiversity	Temporal development of Baltic coastal fish communities and key species	FISH-PRO	Partly core indicator
Biodiversity (?)	Ecosystem regime state in the Baltic Proper and the Gulf of Riga	Baltic Sea Regional Project/ICES WG	
Biodiversity	Unusual phytoplankton events	PEG	
Biodiversity	Shifts in the Baltic Sea summer phytoplankton communities in 1992-2006	PEG	
Biodiversity	Impacts of invasive phytoplankton species on the Baltic Sea ecosystem in 1980-2008	PEG	
Biodiversity	Predatory bird health - white-tailed sea eagle	SMNH	
Biodiversity	Health assessment in the Baltic grey seal (Halichoerus grypus)	HELCOM SEAL EG	Core indicator
Biodiversity	Health assessment in the Baltic ringed seal (Phoca hispida botnica)	HELCOM SEAL EG	Core indicator
Biodiversity	Population Development of Baltic Bird Species: Great Cormorant (Phalacrocorax carbo sinensis)	DE, DK, SE, EE	
Biodiversity	Population Development of Baltic Bird Species:	DE, DK, SE, EE, PL	

	Sandwich Tern (Sterna sandvicensis Lath., 1787)		
Biodiversity	Population Development of Baltic Bird Species: White-tailed Sea Eagle (Haliaeetus albicilla)	DE, FI, SE	Core indicator
Biodiversity	Population Development of Baltic Bird Species: Southern Dunlin (Calidris alpina schinzii L., 1758)	DE, DK	
Biodiversity	Decline of the harbour porpoise (Phocoena phocoena) in the southwestern Baltic Sea	Jastarnia Group	
Biodiversity	Abundance and distribution of Round goby (Neogobius melanostomus)	CORESET project	
Biodiversity	Abundance and distribution of Dreissena polymorpha, Zebra mussel	CORESET project	
Biodiversity	Abundance and distribution of Marenzelleria species in the Baltic Sea	CORESET project	
Biodiversity	Biopollution level index	CORESET project	
Biodiversity	Observed non-indigenous and cryptogenic species in the Baltic Sea	HELCOM Secretariat	