Baltic Marine Environment Protection Commission

Working Group on the State of the Environment and Conservation

STATE&CONSERVATION 6-2017

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Background

HELCOM core indicator development is carried out according to the approach where new proposals are first taken up as candidate indicators to be developed and tested. When the candidate indicator has been further developed it can be proposed as a pre-core indicator which also indicates a commitment of continuing the development towards an agreement as core indicator.

A comprehensive overview of the indicators under development was last carried out during State & Conservation 2-2015 (outcome para 4J.14). The aim of the overview was to consider if all proposed pre-core and candidate indicators are still relevant for further development, and to identify priority indicators for further work. At the time no pre-core or candidate indicators were excluded from the list, and some benthic indicators were identified as priority indicators.

The work to develop indicators continued based on these guidance from the State and Conservation WG. The development of indicators takes place by Lead and co-Lead countries through the work of national representatives nominated by the Contracting Parties. The current list of Lead and co-Lead counties is included in Attachment 1.

In practice work has not been ongoing on all of the pre-core and candidate indicators during the last few years. New proposals as candidates have also been made during the last year.

This document presents a current overview of all the pre-core and candidate indicators listed in HELCOM with the aim to consider the further development.

Action requested

The Meeting is invited to:

- take note of the current status of development of pre-core and candidate indicators,
- scrutinize the list of pre-core and candidate indicators and discuss their further development with the aim of updating the list to give an overview of the indicators to be worked on further,
- identify indicators of high priority.

Contracting Parties are invited to reconfirm the role or provide new offers as Lead Countries on the development of the indicators (see Attachment 1).

Biodiversity

Indicator	Status	Lead Country	Status of development
Mammals			
Harbour porpoise distribution and abundance	Candidate	Germany	Concept drafted during CORESET II (2013-2015). SEAL 10-2016: Progress impeded by lack of relevant monitoring data, considered relevant to develop further and possibly use SAMBAH data as baseline.
Seal pup weight at weaning	Candidate		SEAL 8-2014 (outcome para 5.18) Proposed as relevant indicator as proxy for overall health of breeding females. Countries where seals breed i.e. SE, FI, EE have not included the parameter in monitoring programmes, however could be included in the future as a cost efficient parameter giving information from live animals (cf. other population condition indicators)
'Marine mammal health indicators'	-		SEAL EG 10-2016 (para 8.12-8.13) considered a proposal from Germany on the further development of HELCOM indicators on marine mammal health. The Meeting supported the further development of new health indicators. Examples of type of indicators have been presented but candidate indicators have not been specified yet.
Birds			
Distribution of seabirds	Candidate		CORESET II 2-2015 Identified as useful and should be considered for further development in the future but was not prioritized in CORESET II project, as the indicator is considered difficult to develop on a conceptual level. Abundance indicators prioritized. No further work has taken place since CORESET II.
Breeding success in guillemots of Gotland	Candidate		State&Conservation 2-2015 BALSAM WP3 meeting January 2015 Breeding success is a good indicator that responds to anthropogenic pressures much faster and clearer compared to 'abundance' indicators. Information in the Baltic Sea is available for colony breeders, e.g. guillemots and auks, to support the concept development. Considered that the indicator could relatively easily be developed. Guillemot breeding success is known to show a clear response to changes in the pelagic food web due to fishing activities. No further development has taken place.
Fish			
Maximum length fish in the pelagic community	Candidate	Sweden	Approach and concept developed during the CORESET II project. Fish indicator workshop May 2016: State of development presented, and complementarity to LFI explained. Priority was given to LFI. State&Conservation 2-2015 (outcome para 4J.10) proposed to be shifted to pre-core, but not supported. No progress during 2016.
Benthic habitat			
Cumulative impact on benthic biotopes	Pre-core	Co-lead EE, FI, DE, LV, LT, SE	HOD 51-2016 (outcome para 6.18) Presented for agreement as core indicator although no threshold value has yet been proposed, the shift to core indicator was not supported. Co-lead countries developed the concept further actively during 2016 as the indicator has been identified as a priority for development by State and Conservation WG. Indicator development presented to IN-Benthic. Difficulty in developing regional maps of benthic biotopes at sufficient resolution has been a main obstacle to operationalization.
Condition of benthic habitats	Pre-core	Estonia	State&Conservation 5-2016 (outcome para 4J.42) Indicator requires further work before shift to core indicator.Lead Country Estonia continues developing the indicator in 2017 e. A

			HELCOM workshop is planned to be held in May/June 2017 to further develop the indicator. The indicator was identified as a priority for development by State and Conservation WG.
Lower depth limit distribution of the macrophyte community	Pre-core	Co-lead EE, FI, DE, LV	State&Conservation 2-2015 (outcome para 4J.12) Concluded that for HOLAS II purposes national WFD indicators should be used, since the regional indicator approach developed in CORESET II was not foreseen to be operationalized in time for the HOLAS II project. State&Conservation 2-2015 was of the view that the regional indicator concept, which was developed to be aligned with HELCOM HUB classification should be further developed however work is not prioritized.
Population structure of long-lived macrozoobenthic species	Core	Co-lead FI, DE	CORESET II (2013-2015) compiled information on known case studies. No progress made in 2016, progress impeded by the lack of monitoring data on size distribution. Experts proposed not to continue work on the indicator until more scientific information becomes available, and size is taken up as a parameter in regular monitoring programme activities. Note that the indicator was agreed at 'core' when agreeing on the first set of HELCOM core indicators (HOD 41-2013, para 2.45).
State of hard-bottom communities	Candidate		Sate and Conservation 2-2015 Germany and Finland was of the view that the candidate indicator is a priority to be developed. There is currently no concept of the indicator documented. No further work has been carried out.
Biomass ratio of opportunistic and perennial macroalgae	Candidate	Estonia	Concept first drafted in CORESET II (2013-2015), noted that countries have either coverage or biomass monitoring and no approach for bringing the data together was found at the time. 2016 - Lead Country Estonia worked to clarify if both biomass- and coverage monitoring data can be used. Work did not progress sufficiently to develop a proposal to be considered by State&Conservation 5-2016, and thus there is currently no full indicator concept drafted.
Pelagic habitat			
Diatom/Dinoflagellate index	Pre-core	Germany	HOD 51-2016 (outcome para 6.18) Proposed to be shifted to core indicator, shift not supported but HELCOM-38 agreed that the indicator could be tested in the Eastern Gotland Basin in the HOLAS II project. The indicator has been developed through a Lead Country approach during 2016 and development was presented at PEG 2017. Tested in HOLAS II
Phytoplankton community composition as a foodweb indicator	Candidate	Finland	HOD 51-2016 (outcome para 6.18) Proposed to be shifted to core indicator, shift not supported. Main issues noted as requiring further development is data availability as reported to COMBINE and the documentation of the expert judgement steps in the concept. The concept, including a proposal for a threshold value, has been developed by the Lead Country during 2016 and development was presented to PEG 2016.
Phytoplankton species assemblage clusters based on environmental factors	Candidate		State&Conservation 2-2015 Shift to pre-core was not supported. The approach drafted in CORESET II (2013-2015) did not develop a final regional concept. Work on other phytoplankton candidate indicators has since been prioritized. No further development of the concept in 2016.
Phytoplankton taxonomic diversity	Candidate		CORESET I (2010-2013) The indicator concept is based on the BSEFS. Some of the parameters intended for use in the indicator have since been taken up in the eutrophication-indicators related to phytoplankton blooms.

			No further work has been done.

Eutrophication

Indicator	Status	Lead Country	Status of development
Phytoplankton spring bloom intensity based on chl-a	Pre-core	Finland	IN-EUTROPHICATION 7-2017 (p. 83): Lead country Finland informed the meeting that the indicator still lacks threshold values. Development has not been carried out due to resource constrains. Development of other pre-core and candidate indicators for eutrophication was prioritized.
Cyanobacterial bloom index	Pre-core	Finland	HOD 51-2016 (outcome para 6.17) Proposed to be shifted to core indicator, study reservation by DK. Main issues to be resolved is the applicability of the satellite data approach for the south western parts of the Baltic Sea. The indicator is agreed be tested in HOLAS II and the results to be considered as interim. Proposed threshold value endorsed by State&Conservation 5E-2016 (outcome para 3.2)
Shallow water oxygen	Pre-core		HOD 51-2016 Agreed to be shifted from candidate to pre-core indicator. Concept has been developed during 2016 (outcome para 6.20). Germany withdrew from the Lead Country role (outcome para 6.26). State&Conservation 5-2016 (outcome para 4J.64-4J.66) was of the view that significant work is still needed on the indicator before operationalization. IN-EUTROPHICATION 7-2017 (p. 79): The meeting took note that currently there is no lead country, but a group of volunteers dividing the tasks (DE, FI, EE, PL, SE). The meeting agreed that the group of volunteers will continue work via correspondence.
Deep-water oxygen consumption	Candidate	Sweden	IN-EUTRO 7-2017: The meeting did not discuss the indicator due to time constraints. Development of other pre-core and candidate indicators for eutrophication was prioritized.

Hazardous substances

Indicator	Status	Lead Country	Status of development
Acetylholinesterase inhibition	Pre-core		CORESET I (2010-2013) A concept was drafted during the project. No further development on the indicator has been done.
Diclofenac concentration	Pre-core	TG Pharma	TG Pharmaceuticals (2017) Further development of pharmaceutical core indicators are included among the ToR
Estrogenic-like chemicals and effects	Pre-core	TG Pharma	TG Pharmaceuticals (2017) Further development of pharmaceutical core indicators are included among the ToR
Reproductive disorders: malformed eelpout and amphipod embryos	Pre-core	Co-leads SE, FI	State&Conservation 5-2016 (outcome para 4J.49) Finland and Sweden proposed that the indicator is taken up in HOLAS II as a supplementary indicator in the assessment units shared by the countries, and would be willing to agree on the proposed threshold value. EN-HZ 6-2017 discussed the availability of data for the indicator for HOLAS II purposes, noting that some data points are available.

EROD activity	Candidate	Sweden	CORESET II (2013-2015) Indicator report was presented to STATE & CONSERVATION 2-2015 for shift to pre-core status and proposal on a GES boundary was included, however the proposal was not endorsed. No further work has been made in 2016.
Lysosomal membrane stability (LMS)	Pre-core		CORESET II (2013-2015) The indictor was not significantly developed during the project and was not presented for agreement. No further work has been made since CORESET II.
Fish disease index	Pre-core		CORESET I (2010-2013) An outline was made during the project, drafting the indicator concept. No further work has been made since CORESET I.
Micronucleus test	Pre-core		CORESET I (2010-2013) An outline was made during the project, drafting the indicator concept. No further work has been made since CORESET I.
PCB and dioxins in fish safe to eat	Candidate		CORESET I (2010-2013) The indicator concept has been drafted. No further work dedicated to the indicator has been made since CORESET I. (The development of the core indicator 'PCB and dioxin and furan' has reached an adoption of a threshold value based on human health EQS value. The use of food safety thresholds has also been considered, noting that such thresholds would be relevant an indicator like this).

Litter

Indicator	Status	Lead Country	Status of development
Beach litter	Pre-core	Poland	HOD 51-2016 Proposed shift from pre-core to core indicator was not supported. State&Conservation 5-2016 endorsed, in principle, the proposed indicator concept and the proposed interim definition of GES. Further work is on-going through the HELCOM SPICE project in cooperation with the EN-Marine Litter on analyze available data aiming at defining a baseline for beach litter in the Baltic Sea region. A descriptive approach will be used in the 'State of the Baltic Sea' report.
Litter on the seafloor	Pre-core	Co-leads Denmark, Sweden	HOD 51-2016 (outcome para 6.20) Agreed to shift the indicator from candidate to pre-core. State&Conservation 5-2016 was of the view that data in trawls during fish stock surveys is to be complemented so that data from shallow water areas and the northern areas of the Baltic Sea can be included in the indicator concept. Further work is on-going through the HELCOM SPICE project in cooperation with the EN-Marine Litter on exploring the possibilities to define a baseline for litter on the seafloor. A descriptive approach will be used in the 'State of the Baltic Sea' report.
Microlitter in the water column	Candidate	Finland	State&Conservation 5-2016 (outcome para 4J.67) Noted the progress made during 2016 on the indicator development. Further work is on-going through the HELCOM SPICE project in cooperation with the EN-Marine Litter on compilation, treatment and analysis of microlitter data available in the Baltic Sea region and identification of the best option for setting up a regional database for microliter.

Underwater noise

Indicator	Status	Lead Country	Status of development
Continuous low frequency anthropogenic sound	Pre-core	Poland	State&Conservation 5-2016 (outcome para 4J.62) Noted the progress made during 2016 and endorsed the indicator concept and assessment protocol. EN-Noise to further consider the concept related proposal to monitor higher frequencies, for instance, 2kHz and 10 kHz, and to further develop the assessment protocol to ensure appropriate approach for areas where specific sound sensitive species occur. A descriptive approach will be used in the 'State of the Baltic Sea' report.
Distribution in time and space of loud low- and mid-frequency impulsive sound	Pre-core	Germany	HOD 51-2016 (outcome para 6.20) Agreed to shift the indicator from candidate to pre-core indicator. State&Conservation 5-2016 noted the developed concept and that a proposal for a threshold is not yet available however could be further developed by considering the frequency and distribution of the impulsive noise events that will not have an adverse impact on elements of the marine environment. A descriptive approach will be used in the 'State of the Baltic Sea' report.

Attachment 1. Continued development of HELCOM indicators: Lists of Lead/co-Lead countries and nominated national experts

This document is thematically organized and includes information received as of 2017-02-16 and includes information on Lead countries, co-lead countries and appointed national experts to develop HELCOM indicators.

Please submit further information and updates to the Secretariat (ullali.zweifel@helcom.fi).

Contact Lists of HELCOM Expert Groups/Project relevant for indicator work

Contents

Mammals

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Distribution of Baltic seals			Denmark	Anders Galatius, Jonas Teilmann
			Sweden	Tero Härkönen, Olle Karlsson
Population trends and abundance of seals	**Sweden**	**Tero Härkönen**	Denmark	Anders Galatius, Jonas Teilmann
Nutritional status of marine mammals	**Sweden**	**Karin Hårding,** Tero Härkönen, Charlotta Moraeus, Britt-Marie Bäcklin,	Finland	Kaarina Kauhala
Reproductive status of marine mammals	**Sweden**	**Karin Hårding,** Tero Härkönen, Charlotta Moraeus, Britt-Marie Bäcklin,	Finland	Kaarina Kauhala

Candidate indicator	Lead Country	LC representative	Co-Lead Country	CLC representative
Harbour porpoise distribution and abundance	**Germany**	**Helena Herr, Sacha Viquerat**	Denmark	Anders Galatius
			Finland	Penina Blankett, Olli Loisa
			Poland	Iwona Pawliczka
			Sweden	Julia Carlström

Birds

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Abundance of waterbirds in the breeding season	**Germany**	**Volker Dierschke**	Finland Sweden	Jukka Rintala Fredrik Haas
Abundance of waterbirds in the wintering season	**Germany**	**Volker Dierschke**	Finland Sweden	Markku Mikkola-Roos Fredrik Haas

Coastal Fish

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Abundance of coastal fish key functional groups	**Sweden**	**Jens Olsson**	Finland	Antti Lappalainen
Abundance of key coastal fish species	**Sweden**	**Jens Olsson**	Finland	Antti Lappalainen

Pelagic habitats – zooplankton

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Zooplankton mean size and total stock	**Sweden**	**Elena Gorokhova**	Finland Latvia Estonia	Maiju Lehtiniemi Solvita Strake Aarno Põllumäe

Pelagic habitats – phytoplankton

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Seasonal succession of functional phytoplankton groups	**Estonia**	**Andres Jaanus**	Finland Latvia Sweden	Harri Kuosa Sirpa Lehtinen Iveta Jurgensone Marie Johanssen, Siv Huseby

Pre-core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Diatoms/ dinoflagellates index	Germany (tbc)	Norbert Wasmund	Estonia Finland Latvia Poland Sweden	Andres Jaanus Harri Kuosa Sirpa Lehtinen Iveta Jurgensone Janina Kownacka Marie Johanssen, Siv Huseby

Candidate indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
"Phytoplankton community composition as a food web indicator".	**Finland**	Sirpa Lehtinen Harri Kuosa	Lithuania Sweden Latvia Estonia Poland	Irina Olenina Chatarina Karlsson Siv Huseby, Marie Johansen Iveta Jurgensone Andres Jaanus Janina Kownacka
Phytoplankton species			Finland	Harri Kuosa Sirpa Lehtinen

			Latvia	Iveta Jurgensone
assemblage clusters based on environmental factors			Sweden	Marie Johanssen Andres Jaanus

Benthic habitats

Pre-core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Cumulative impact on benthic biotopes			Estonia Finland Germany Latvia Lithuania Sweden	Kristjan Herkul, Georg Martin Samuli Korpinen Aarno Kotilainen Thorsten Berg Alexander Darr Juris Aigars Darius Daunys Antonia Nyström-Sandman
Condition of benthic habitats	**Estonia**	**Georg Martin,** Kristjan Herkul	Finland Germany Latvia Lithuania Poland Sweden	Samuli Korpinen Alexander Darr, Rolf Karez Juris Aigars Darius Daunys Andrzej Osowiecki Antonia Nyström Sandman, Anna Westling, Nicklas Wijkmark
Lower depth limit distribution of the macrophyte community			Estonia Finland Germany Latvia (Sweden)	Kaire Torn, Georg Martin Samuli Korpinen Kolja Beisiegel Juris Aigars (Mats Blomqvist)

Candidate indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Biomass ratio of opportunistic and perennial macroalgae	**Estonia**	**Georg Martin**	Sweden	

Eutrophication

Core indicators	Lead Country	LC representative
DIN	**Germany**	
DIP	**Germany**	
Oxygen debt	**Sweden**	
Water transparency	**Finland**	
Chlorophyll a	**Finland**	
Total nitrogen concentrations	**Germany**	
Total phosphorus concentrations	**Germany**	

Pre-core indicators	Lead Country	LC representative
Cyanobacterial surface accumulations	**Finland**	
Shallow-water bottom oxygen		

Hazardous substances

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representatives
Hexabromocyclod odecane (HBCDD)	**Sweden**	**Sara Danielsson**	Finland	Jaakko Mannio
Metals	**Poland**	**Tamara Zalewska**	Denmark Finland Sweden	Martin M Larsen Harri Kankaanpää Sara Danielsson
Polybrominated biphenyl ethers (PBDE)			Finland Sweden	Jaakko Mannio Sara Danielsson
Perfluorooctane sulphonate (PFOS)	**Sweden**	**Sara Danielsson**	Finland	Jaakko Mannio
Polyaromatic hydrocarbons (PAH) and their metabolites	**Germany**	**Ulrike Kammann (PAH metabolites)**	Finland Sweden	Harri Kankaanpää Sara Danielsson
Polychlorinated biphenyls (PCB) and dioxins and furans	Germany (tbc)	**Detlef Schulz-Bull**	Finland Sweden	Jaakko Mannio Sara Danielsson

TBT and imposex	**Sweden (tentatively)**		Denmark	Martin M Larssen, Jakob Strand
			Finland	Jaakko Mannio
White-tailed eagle productivity	**Sweden**	Peter Hellström	Finland	Toni Laaksonen

Pre- core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Acetylcholinesterase inhibition				
Diclofenac concentration			Denmark	Jakob Strand
			Finland	Kari Lehtonen
Estrogenic-like chemicals and effects			Denmark	Jakob Strand
			Finland	Kari Lehtonen
Lysosomal membrane stability (LMS)			Denmark	Jakob Strand
			Finland	Kari Lehtonen
Reproductive disorders: Malformed eelpout and amphipod embryos			Denmark	Jakob Strand
			Finland	Kari Lehtonen,
			Sweden (on amphipod embryos (Monoporeia))	**Brita Sundelin**
Fish Disease Index (no work done in CORESET II)			Denmark	Jakob Strand
			Finland	Kari Lehtonen
Micronucleus test (no work done in CORESET II)			Denmark	Jakob Strand
			Finland	Kari Lehtonen

Candidate indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
EROD activity				

Radioactive substances

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Radioactive substances: Cesium-137 in fish and surface waters	**Poland**	Tamara Zalewska	Finland	Meerit Kämäräinen

Oil pollution

Core indicators	Lead			
Oil-spills affecting the marine environment	IWGAS			

Marine litter

Pre-core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Beach litter	**Poland**	**Wlodzimierz Krzyminski**	Denmark Sweden	Jakob Strand Per Nilsson, Eva Blidberg
Litter on the seafloor			Denmark Sweden	Jakob Strand Per Nilsson

Candidate indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Microlitter in the watercolum	**Finland**	Outi Setälä	Denmark Germany	Jakob Strand Elke Fischer

Underwater noise

Pre-core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative
Continuous low frequency anthropogenic sound	**Poland**	**Zygmunt Klusek**	Denmark Finland Germany Sweden	Jakob Tougaard Jukka Pajala Jens Fisher Mathias Andersson, Emilia Lalander
Distribution in time and space of loud low- and mid-frequency impulsive sounds	**Germany**	**Maria Boethling Ilona Buescher**	Denmark Finland Sweden	Jakob Tougaard Jukka Pajala Mathias Andersson, Emilia Lalander

Additional indicators

Core indicators	Lead Country	LC representative	Co-Lead Country	CLC representative	Working arrangements
Abundance of salmon spawners and smolt	**Finland**	**Tapani Pakarinen,** Atso Romakkaniemi			Taken forward under FISH WG *Note: When operational, the indicator is proposed to be updated in cooperation with ICES WGBAST*

Abundance of sea trout spawners and parr	**Finland**	Tapani Pakarinen			Taken forward under FISH WG *Note: When operational, the indicator is proposed to be updated in cooperation with ICES WGBAST*
Number of drowned mammals and waterbirds in fishing gear	**Germany**	Sven Koschinski Volker Dierschke	Poland Sweden	Tomasz Linkowski (tomasz.linkowski@mir.gdynia.pl) Julia Carlström (Julia.Carlstrom@nrm.se)	Taken forward under Fish Group and State & Conservation WG (e.g. target development)"
Proportion of large fish in the community	**Sweden**	Michele Casini, Håkan Wennhage	Germany Finland	Christian Pusch Thurid Otto Antti Lappalainen	Taken forward under FISH WG *Note: When operational, the indicator is proposed to be updated in cooperation with ICES WG BFIFS. Elaboration of data flows will take place through BalticBOOST.*
Trends in arrival of new non-indigenous species	**Finland**	Maiju Lehtiniemi	Germany Latvia Sweden Denmark	David Johannes Christian Buschbaum Kai Hoppe Solvita Strake Ann-Britt Florin Ulrik Berggreen	Proposed to be taken forward under TG BALLAST

Candidate indicators	Lead Country	LC representative	Co-Lead Country	CLC representative	Working arrangements
Maximum length fish in the pelagic community	**Sweden**	Michele Casini			Taken forward under FISH WG