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Working Group on the State of the Environment and Nature
Conservation

STATE & CONSERVATION!
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Document title	Zooplankton mean size and total stock core indicator – proposal for sub-basin specific GES boundary values
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Background

The GES boundary concept for the indicator, i.e. the method by which the specific values are calculated, was agreed at HOD 48-2015 (paragraph 3.63 of the outcome). State and Conservation 4-2015 considered the progress made on the 'Zooplankton mean size and total stock' in particular the sub-basin specific GES boundaries (paragraphs 4J.21-4J.26 of the outcome). At the annual meeting of ZEN-ZIIM in 2015, GES values were calculated for some sub-basins and the aim is to finalize the calculations for all sub-basins during the ZEN-ZIIM annual meeting in 2016. State and Conservation 4-2016 stressed the importance of countries making data available for the indicator calculation in particular in the south-western assessment units.

The 2016 ZEN-ZIIM meeting was originally scheduled for September/October, but has needed to be rescheduled for 21-22 November 2016 due to a delay in the preparatory work. At State and Conservation 4-2015, it was noted that Denmark will look into the possibility to participate in the 2016 ZEN-ZIIM meeting and provide data for the GES boundary calculation. It was also noted that two ongoing national German research projects collect zooplankton data can be provided to ZEN-ZIIM in order to support the indicator calculations for the relevant assessment units. It was furthermore noted that Poland is working on calculations of GES and indicator evaluations according to the agreed procedure and that the results will be presented to the ICES/PICES Zooplankton Production Symposium, on 9-13 May 2016, Bergen, Norway, based on data from Gotland, Bornholm and Gdansk basins. State and Conservation 4-2016 noted the proposal by Sweden to discuss more closely with Finland about the calculations of the indicator in the Northern Baltic Proper in order to provide guidance to ZEN ZIIM regarding the significant difference between values for the coastal and offshore areas in this assessment unit.

This document presents the progress made to calculate sub-basin specific GES boundary values for the indicator in accordance with the accepted GES boundary concept. The first sub-basin specific GES boundary values were presented as information to State and Conservation 4-2016. This document contains three additional boundary values calculated for the Bornholm Basin, Eastern Gotland Basin and Bothnian Bay.

The [CORESET II version of the full indicator report](#) is made available as reference material on the STATE & CONSERVATION 5-2016 meeting site. The report has not been updated to reflect the latest development on assessment unit specific GES boundary values.

Action requested

The Meeting is invited to:

- endorse the sub-basin specific GES boundary values,
- clarify as relevant the national representation and data availability for the ZEN-ZIIM meeting in November 2016 where the remaining sub-basin specific GES boundary values are to be calculated.

Progress update on Zooplankton Mean Size and Total Stock (MSTS)

Progress made during 2016

During the 2016, the following activities took place within ZEN ZIIM project:

- The taxonomic list was finalized and submitted it to ICES;
- The list of taxa included in indicator-based assessment was finalized and submitted to ICES. A problem recognized in communication with ICES staff is the occurrence of numerous erroneous categories in their database. These categories in most cases do not represent any taxa that are not included in the ZEN taxonomic list, but are misspelled, outdated or ad-hoc groups that should not be considered as valid components of zooplankton. They cannot contribute to MSTS calculations, yet they may complicate the retrieval of data that are needed for such calculations.
- The regional calculations of GES boundary values continued (Table 1);
- Currently, GES boundaries are calculated using the biomass values recommended by COMBINE monitoring guidelines. However, it has been recognized that discrepancies in standard biomass coefficients exist between the national laboratories, which may lead to a situation when national monitoring programmes sharing same assessment area have different GES targets.
- To address the biomass problem, the intercalibration of the zooplankton biomass values for all Baltic Sea areas has been started by hiring a consultant company and providing it with monitoring samples from national ZEN experts. The results are expected in October-November 2016.

The next ZEN-ZIIM meeting is planned in the end of November 2016 (21-22/11). The main tasks are:

- o to explore if GES boundary values can be calculated for the sub-basins still lacking specific boundaries
- o finalize the indicator evaluation for the sub-basins where GES boundaries are available for the assessment period 2011-2015,
- o to revise the outcome of the intercalibration and take a decision on the use of the obtained biomass values.

Sub-basin specific GES boundary values

The sub-basin specific GES boundary values have been calculated by experts involved in the HELCOM ZEN-ZIIM work (Table 1). The method is described in full in the CORESET II version of the core indicator report, provided as reference material on the State and Conservation 5-2015 meeting site, including how the reference period is determined either through chlorophyll or clupeid fish.

ZEN-ZIIM presented for information calculated sub-basin specific GES boundary values for five HELCOM assessment units at State and Conservation 4-2016. At the meeting the importance of making data and expertise available for the remaining sub-basins was underlined. Progress has been made in calculating sub-basin specific boundaries for three sub-basins (Table 1).

Table 1. This table presents the sub-basin specific GES boundary values calculated in accordance with the GES boundary concept adopted at HOD 48-2015. The boundary values marked with light blue were presented at State and Conservation 4-2016 for information, the boundary values marked with light green are presented for the first time.

SB_Code	Name of assessment unit	GES boundary: <i>Target values for mean size ($\mu\text{g wet weight ind}^{-1}$)/total stock ($\text{mg m}^{-3}$). Deviation from these values is assessed using CuSum-LCL (-5σ)</i>	Reference period <i>RefCon_{CHL}: defined using bottom-up approach based on chlorophyll RefCon_{FISH}: defined using top-down approach for clupeid fishⁱ</i>
1	Kattegat	Denmark has gathered the data in existing national databases and they are being processed for GES calculations	
2	Great Belt	No expert with the relevant data participated in evaluation	
3	The Sound	No expert with the relevant data participated in evaluation	
4	Kiel Bay	German experts work on the data extraction	
5	Bay of Mecklenburg		
6	Arkona Basin		
7	Bornholm Basin	13/402	<i>RefCon_{FISH}/ RefCon_{FISH}</i>
8	Gdansk Basin	In preparation. Polish experts are conducting the calculations.	
9	Eastern Gotland Basin	14/294	<i>RefCon_{FISH}/ RefCon_{FISH}</i>
10	Western Gotland Basin	In theory, the indicator should be applicable, however no regular monitoring stations are available in the assessment unit and thus there are no data to develop a GES boundary	
11	Gulf of Riga	in preparation	
12	Northern Baltic Proper (coastal) Northern Baltic Proper (open sea) ⁱ	4.4/208 3.8/101;	<i>RefCon_{CHL}/ RefCon_{FISH}; RefCon_{CHL}/ RefCon_{FISH}</i>
13	Gulf of Finland	9.3/135	<i>RefCon_{CHL}/ RefCon_{CHL}</i>
14	Åland Sea	8.0/62;	<i>RefCon_{FISH} /RefCon_{CHL}</i>
15	Bothnian Sea	9.1/72;	<i>RefCon_{FISH}/ RefCon_{FISH}</i>

16	The Quark	In theory, the indicator should be applicable, however no regular monitoring stations are available in the assessment unit and thus there are no data to develop a GES boundary	
17	Bothnian Bay	26/189;	<i>RefCon_{FISH} / RefCon_{CHL}</i>

ⁱ The selected GES values for mean size and total stock should satisfy reference conditions based on both EQR for chlorophyll and fish feeding conditions if we are to follow the precautionary approach. This means that after calculating indicator LCL for each of the two periods, the higher LCL value is chosen as the GES boundary for the indicator.