



Document title	Cyanobacterial Bloom Index
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Background

The document below provides a template filled by indicator leads to provide an overview of progress to STATE & CONSERVATION 15-2021. Key aspects such as methodologies, spatial extent changes, assessment scales and threshold values are presented, identifying ongoing work and other relevant issues towards HOLAS III. This process builds on the prior review of indicator development carried out under STATE & CONSERVATION 14-2021 (summarised in [document 4J-16 Rev.1](#), and detailed within numerous documents under agenda item 4J). The focus of these development works is the completion of indicator development and adjustment work for HOLAS III by the end of 2021, as previously agreed under HOD 57-2019 ([document 4-20](#), [Outcomes paragraph 4.51](#)).

The aspect of threshold values in particular is a key issue as threshold value approval will be carried out at HOD 61-2021, with these same templates being submitted to HOD at the same stage as submission to State and Conservation 15-2021 (to allow for the longer national processes required that culminate in approval at HOD).

The document below addresses a single indicator and as well as the generic 'action requests' relating to endorsement of the proposed application in HOLAS III (and the threshold values proposals, where relevant), specific additional requests or statements are also indicated within the separate sections of the document to help guide where further input/discussion/guidance may be needed.

This template aims to report the indicator development for HOLAS III, allowing for technical guidance and endorsement by STATE & CONSERVATION 15-2021 and also simultaneously to facilitate the threshold value approval process by HOD 61-2021.

At STATE & CONSERVATION 14-2021 invited the indicator lead Finland, with assistance from PEG, to consider and address concerns related to the indicator and provide solutions to STATE & CONSERVATION 15-2021 ([Outcomes paragraph 4J.211](#)). Annex 1 of this document contains a summary of the identified issues and proposed solutions. The text is taken from [document 3-1](#) discussed at IN EUTROPHICATION 21-2021.

Action requested

The Meeting is invited to:

- provide further technical guidance to the indicator leads and experts, including specific requests defined within the document;
- consider and endorse the proposed developments of the indicator for use in the HOLAS III assessment.

Cyanobacterial Bloom Index

Indicator name
Cyanobacterial Bloom Index
Scale of assessment for HOLAS III and rational
<p>HELCOM IN-Eutrophication proposes the indicator to be provided CORE status (presently pre-CORE, tested in HOLAS II).</p> <p>Important note: the indicator describes one aspect of eutrophication that is closely linked to ecosystem services, thus enhancing the links from status to impacts on welfare in the DPSIR / DAPSIWRM framework.</p> <p>Assessment scale as in HOLAS II.</p>
Spatial coverage of the indicator for HOLAS III
<p>As in HOLAS II.</p> <p>A development plan for HOLAS IV increasing the spatial coverage has been made through collaboration with the PEG-group.</p>
Methodology to be applied for HOLAS III and rational
<p>Assessment-unit -specific weighted averaging will be applied for the two indicator parameters. Confidence rating will be assigned according to the approach developed for the eutrophication assessment.</p>
Threshold value setting logic and rational
<p>As in HOLAS II.</p> <p>The logic and rational of threshold-setting will be more thoroughly explained in the indicator report (see below).</p>
Threshold value(s)
<p>As in HOLAS II</p> <p>After further discussion and development work within both IN Eutrophication and PEG no further threshold values are proposed at this stage. The conclusion of this process for HOLAS III purposes is that the indicator will be applied with the threshold values already presented in the version tested in HOLAS II and these existing threshold values were already approved at HELCOM 38-2017 (Outcomes paragraph 4-19).</p>
Other significant issues that need to be addressed or presented to State and Conservation
<p>The working group STATE & CONSERVATION 14-2021 (Outcome 4J.211) noted, that Germany and Denmark have study reservations on the indicator, and invited the indicator lead Finland, with assistance from the PEG, to further consider how to address these concerns.</p> <p>The concerns of Germany have been addressed by PEG and IN-Eutrophication intersessionally, and solved with a development plan extending also beyond HOLAS III.</p>

The study reservation of Denmark has been addressed, and although it could not be lifted, it concerns only some open-sea assessment units, and Denmark is in favor of upgrading the indicator to CORE status (see draft outcome IN-Eutrophication 21-2021 paragraph 3.2).

Latest indicator report or (for new indicators) initially completed indicator template

<https://helcom.fi/wp-content/uploads/2019/08/Cyanobacterial-bloom-index-HELCOM-pre-core-indicator-2018.pdf>

The indicator report will be improved in collaboration with the PEG-group, especially:

- *links / annexes to detailed description on methodology of evaluation, parameter combining and threshold setting*
- *the relationship to the dominating pressures/drivers (eutrophication, climate, hydrography) will be explained more thoroughly*

Annex 1: Issues and proposed solutions to the raised concerns on the indicator

The following text is taken from [document 3-1](#) discussed at IN EUTROPHICATION 21-2021.

Background

The cyanobacterial bloom indicator was developed and tested by the EUTRO-OPER -project in 2013-2015 and included into the HOLAS II eutrophication assessment with Pre-CORE status.

STATE & CONSERVATION 14-2021 (Outcome 4J.211) noted, that Germany and Denmark have study reservations on the indicator, and invited the indicator lead Finland, with assistance from the PEG, to further consider how to address these concerns to STATE & CONSERVATION 15-2021 in the effort to resolve any remaining issues prior to HOLAS III.

This document provides a summary of the discussions between the PEG group and the indicator lead Finland, aiming towards resolving the concerns leading to the study reservations. The discussions were conducted intersessionally.

An editable word-version of the indicator report is contained as an annex to this document (Annex 1). Any comments together with possible proposals from the Meeting will be included into the final indicator report by the lead country Finland. The published version of the pre-core indicator report is also available [online](#).

Issues for improvement

As basis of discussion, Germany had provided a list of issues / questions to be addressed. These were discussed together, and solutions by and/or beyond HOLAS III are suggested.

Issue / questions	Suggested solution for HOLAS III	Work required beyond HOLAS III
Spatial coverage	<p>How will the Bay of Mecklenburg be assessed for HOLAS III – only based on biomass data or are there also satellite data available? If only biomass data are the basis, a brief justifying addition as to why use (in this case) only one of the two parameters is sufficient for evaluation would be useful.</p> <ul style="list-style-type: none"> - will be explained in the fact sheet - explain in fact sheet whether one parameter can stand alone 	<p>Check whether an assessment of Kiel Bay, Western Gotland Basin and Gdansk Basin could be developed.</p> <ul style="list-style-type: none"> - long-term time-series missing, thresholds should be set using another method eg. quartiles (contact Jeanette cc. Janina regarding biomass data) - (we will also look into whether this

		can be done by HOLAS II)
The satellite data only cover the surface of the water, which means that the volume below is not taken into account and is therefore too inaccurate.	Satellite data must be accompanied by cell counts (where possible from integrated water samples), both, biomass and satellite data need to be presented together. It needs to be ensured that the indicator takes into account these two data sets for HOLAS III.	<ul style="list-style-type: none"> - EO-parametre (missing for Bay of Mecklenburg): data is available, threshold has not been set due to long-term data not being available; we can look into whether thresholds can be set using another method. - Biomass-parametre (missing for Kiel, WGB and Gdansk basins): see previous row
Combination of biomass data and satellite data. HOLAS II used simple averaging without weighing.	For HOLAS III weighing needs to be discussed further. Germany suggests a higher weight for the in-situ biomass data compared to the satellite data. <ul style="list-style-type: none"> - Take this discussion to the IN-EUTRO September meeting; no document, but mention in agenda that discussion will come up 	
A new assessment area "Pomeranian Bight" has been delineated.	How will this be considered in HOLAS III? Is it necessary to derive new threshold values? Are satellite data available for the new assessment area?	
Detection of surface accumulations of cyanobacteria by satellite depends on cloud cover and weather situations of calm wind und delivers therefore random results about the occurrence, length and intensity of cyano accumulations. Also, the time of measurement in the daily cycle influences the satellite data.	At least a validation against in-situ data is necessary. How will the satellite data be validated in HOLAS III (ground truthing)? <ul style="list-style-type: none"> - Birgit Heyden with help of Jeanette will look into threshold setting of biomass data - Laura Hoikkala & Vivi will help where needed; also look into satellite data - if new thresholds show to be difficult to set by HOLAS III deadline, then the old one for BOR will be used 	

<p>Confidence rating – there was no method for confidence rating in HOLAS II.</p>	<p>Will there be confidence rating in HOLAS III and what method will be used.</p> <ul style="list-style-type: none"> - methodological: how well are both parameters used - spatial & temporal&accuracy, EO: should be determined by SYKE when calculating indicator, using similar procedure as ICES - spatial&temporal&accuracy, biomass: should be estimated using ICES protocol by the experts who calculate environmental fact sheet values (Jeanette, Birgit eg. PEG group) - (Dead-lines for confidence assessment is May 2022) - By September 7th: the confidence protocol will be described in the cyano indicator fact sheet 	
<p>Improving the indicator fact sheet – lots of information in HOLAS II was rather vague (e.g. based on what parameters was the CyaBi calculated and how were they combined?)</p>	<p>There should be a more detailed explanation of the assessment methodology in HOLAS III in the indicator fact sheet.</p> <ul style="list-style-type: none"> - SYKE will update and improve fact sheet - detailed information might not be needed, but a link to those is important; use examples - comments on fact sheet would be appreciated! DL. 9 Aug 	
<p>Unclear how target values have been derived and calculated. Has the 200 µg/L biomass level been considered as a “sustainable bloom level” in target setting?</p>	<p>More detailed explanation needed. How have the target values been derived (possibly explained in a separate document)? How are EQRs calculated?</p>	
<p>Relationship to pressures</p>	<p>For HOLAS III the relationship between eutrophication and the cyanobacterial surface accumulations needs to be explained in detail.</p> <ul style="list-style-type: none"> - Text on eutrophication- and non-eutrophication -related pressures on cyanobacterial 	<p>Further research is needed to understand the impact of climate change on the CyaBi.</p>

	blooms will be added to fact sheet - comments and proposals would be highly appreciated! DL. 9th Aug	
Satellite data focus on chlorophyll-a but there are other relevant pigments (c-phyococyanin, c-phycoerythrin, B-carotene, xanthophylles) that the satellite does not detect	Used Chl a measurement: Is it safe to distinguish from other possible algal blooms? - Vivi will get a comment from SYE EO-experts by IN-EUTRO-meeting in September; however in any case not possible by HOLAS III	

An editable version of the indicator report for comments and proposals is contained as an annex to this document (Annex 1). These comments, together with possible proposals from the Meeting will be included into the final indicator report by the lead country Finland.

ANNEX: Indicator report

The indicator report can be found [online](#) and as an annex (Annex 1) to this document.