

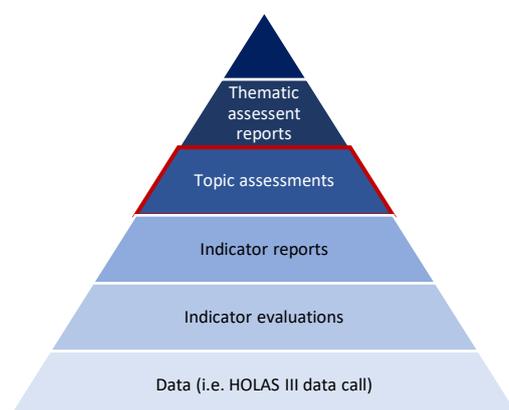
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<b>Document title</b>	Assessment of benthic habitats for HOLAS III
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## Background

The HOLAS III assessment is structured to ensure robust results and traceability across the several steps which are integral to a holistic approach. Each step represents a progressively more integrated assessment result to be included in the holistic assessment report State of the Baltic Sea (Fig. 1). This document presents the plan for assessment of benthic habitats as submitted to HOD 61-2021, which builds on the relevant indicator reports/evaluations and in turn constitutes a chapter in the Thematic assessment report on Biodiversity (red highlight in Figure 1 indicates which step in the process is addressed by the content of this document).



**Figure 1. Conceptual overview of the HOLAS III assessment structure and the progressive integration of results.**

A closely related document, ‘assessment of benthic habitats for HOLAS III’ was discussed by State and Conservation 15-2021 ([document 3J-26](#)). State and Conservation 15-2021 discussed the need for improved clarity on the process towards HOLAS III, noting that the final constellation of available indicators (still undergoing approval processes, i.e., at HOD 61-2021) and the specific nature of the available indicators would also have an impact on the final approach to assess benthic habitats in HOLAS III.

State and Conservation 15-2021 also proposed a way forward that included a ‘key contributors’ meeting to update the existing document for submission to HOD 61-2021, followed by a Targeted Assessment Methodology Workshop in spring 2022 at which details could be finalised, with the endorsement of the final approach taking place at State and Conservation 16-2022 ([Outcomes paragraphs 3J.118 – 3J.121](#)).

This document represents the outcomes of the key contributors meeting that included relevant indicator leads and experts involved in previous developments towards an overall assessment of benthic habitats. The document offers a more clarified approach for the assessment of benthic habitats for HOLAS III and the logic behind the proposal.

### Action requested

The Meeting is invited to consider the outcomes of the key contributor meeting and further guidance by State&Conservation on finalizing the methodology and to discuss the division of the tasks.

## The Assessment of benthic habitats for HOLAS III

An 'assessment of benthic habitats for HOLAS III' document was discussed by State and Conservation 15-2021 (document 3J.26). State and Conservation 15-2021 discussed the need for improved clarity on the process towards HOLAS III, noting that the final constellation of available indicators (still undergoing approval processes, i.e., at HOD 61-2021) and the specific nature of the available indicators would also have an impact on the final approach to assess benthic habitats in HOLAS III.

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The following document represents the outcomes of the key contributors meeting that included relevant indicator leads and experts involved in previous developments towards an overall assessment of benthic habitats. The following proposal represents a potential solution for HOLAS III, based on available information, and not an optimal assessment of the status of benthic habitats, and the aim is to provide a starting point for further improvement at the Targeted Assessment Methodology Workshop in spring 2022.

### Relevant indicators available to address benthic habitats in HOLAS III

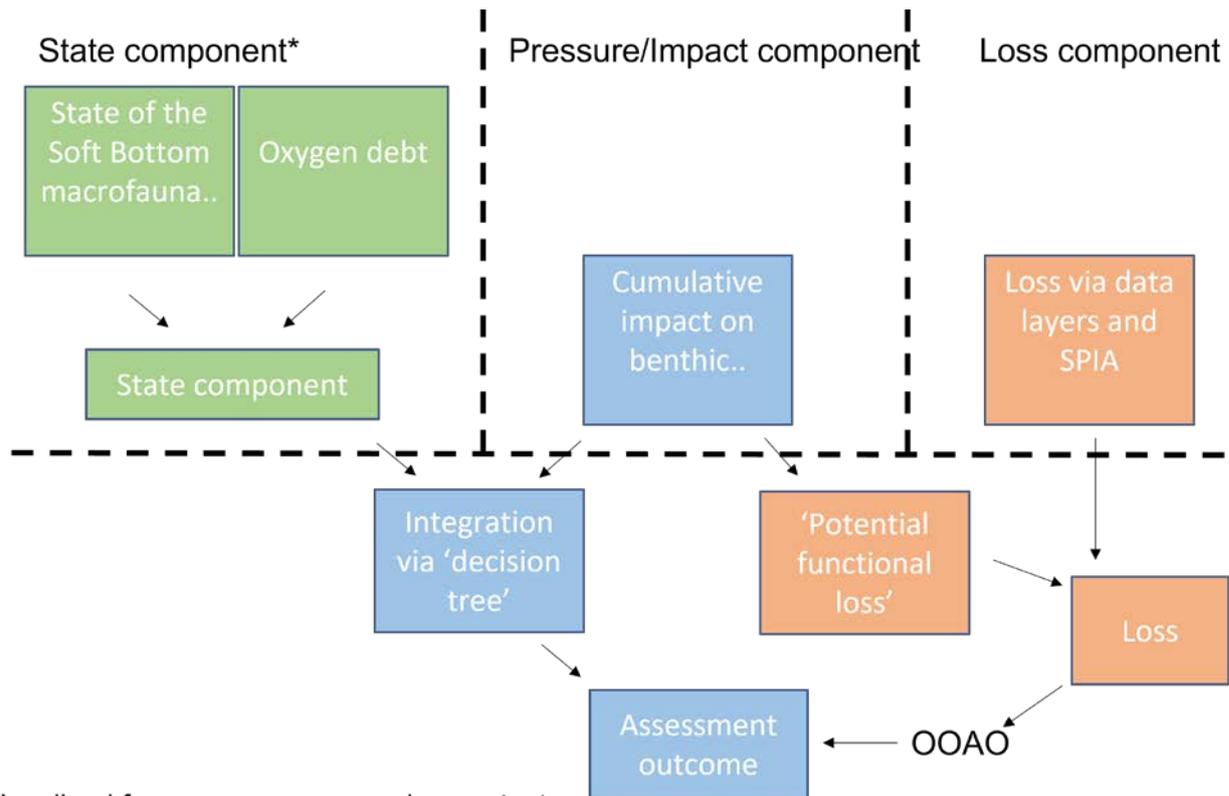
The available indicators that are developed and operational (in cases pending ongoing approval processes) are somewhat limited when addressing the assessment of overall status or condition of benthic habitats. While the existing and operational indicators will be utilized in the overall assessment of benthic habitats for HOLAS III other relevant components will be required and utilized.

Two benthic-specific HELCOM indicators exist, the 'Cumulative impact on benthic biotopes from physical pressures (CumI)' indicator and the 'State of the soft-bottom macrofauna community' indicator. The CumI indicator offers a 'risk' evaluation of potential impact on benthic biotopes due to physical pressures and is currently undergoing approval procedures to be applied as a core indicator for HOLAS III (as endorsed at State and Conservation 15-2021, [document 3J-23](#) and [Outcomes paragraphs 3J.104-3J.108](#)). The 'State of the soft-bottom macrofauna community' indicator is a core indicator that was applied in HOLAS II and will be applied in HOLAS III in the same manner. There is ongoing work taking place to explore possibilities to define additional threshold values, in particular in areas where HELCOM assessment units were divided for eutrophication purposes (e.g. the Bornholm Basin/Pomeranian Bay area) (State and Conservation 15-2021, [document 3J-24](#) and [Outcomes paragraphs 3J.109-3J.114](#)).

As applied in HOLAS II coastal and core indicators of relevance to benthic habitats and collated or developed under EG EUTRO will also be utilized. These include the 'Oxygen debt' core indicator and the WFD coastal indicators, for example indicators on soft-bottom macrofauna, macrophytes, angiosperms and oxygen conditions, as well as water transparency to indicate the potential depth distribution of vegetation. These components offer direct relevance to benthic habitats or represent proxies representative of key benthic habitat components.

### Planned integration or decision-making process to assess overall benthic habitat condition in HOLAS III

The overall assessment of benthic habitats will be addressed via two main channels, a status component and an pressure/impact component.



\*Visualised for open sea areas only, see text

**Figure 1.** Schematic presenting overview of assessment approach. The BEAT integration tool would be used to integrate the state components and the decision tree integration of the state and pressure/impact components with the state components would take place subsequently via a decision tree approach (see text below). Loss is also addressed via a separate channel and reflected in the final assessment overview. \*Coastal areas are described below in greater detail, but the general structure proposed above would be applied.

The state component for coastal areas will be assessed in a similar manner to the approach presented in the schematic above, but will utilize the Water Framework Directive national indicators as listed above and as applied in HOLAS II ([see example from HOLAS II](#)). The information for these indicators is collated under the EG EUTRO group and HEAT integrated assessment.

Should a shallow water oxygen indicator be available for HOLAS III this component could potentially also be considered in coastal areas though the appropriateness of it for integration purposes or as supporting contextual information (i.e. added descriptive interpretation) would need to be considered once the indicator being developed under the eutrophication expert group is available. Issues such as the threshold value setting approach, confidence in the indicator evaluation, level of indicator development, the appropriate temporal and spatial coverage would all need to be considered and it is favoured that the biological components applied in a coastal assessment would be the focus of the main assessment.

The **state component** for open sea areas will be integrated via BEAT. Where an assessment unit is addressed by both indicators (i.e. soft-bottom macrofauna and oxygen debt) then the two components will be integrated based on spatial aspects (i.e. an areas based integration) due to the specific relevance of the two indicators (e.g. the soft-bottom macrofauna community be relevant in areas <60 m deep).

The **pressure/impact component** will be reflected by the outcomes of the CumI indicator, where the gridded information will be aggregated to relevant assessment unit scales.

### Decision tree integration approach

The proposed approach for a decision tree-based integration approach offers a preliminary idea of how such an approach may be applied but would need further development within the expert community towards the proposed spring workshop on this issue. The two components, the state component (overall) and the pressure/impact component, could be integrated via a decision tree process, linked to the outputs of CumI. An example of such an approach could be that if the CumI generated an output category of 'very high' (i.e. equivalent to potential functional loss) then for the given assessment unit a One-Out-All-Out (OOAO) would be applied and good status would not be possible to achieve. Where CumI generated an output category of 'high' (i.e. markedly above the threshold value) the status assessment of the given assessment unit would be downgraded in its status assessment value (e.g. a % reduction or a drop to a lower status classification, i.e. reflecting that the potential impact of pressures would not result in good status) and a specific parallel confidence assessment would also be generated based on the confidence generated from the CumI assessment and the underlying state components. Where CumI generated an output category of 'moderate' (i.e. above the threshold value, as one of the CumI m1, m2 or m3 classes) the status assessment of the given assessment unit would be downgraded in its status assessment value to reflect the potential impact of pressures. Where CumI generated an output category of 'low or very low' (i.e. below the threshold value) the status assessment would not be adjusted, however to ensure transparency the parallel confidence assessment would also reflect underlying aspects such as data quality. The differences in spatial scale of the two indicator evaluations will also need to be considered in this process and is a key aspect for future development to make such integrations more comparable.

### Addressing loss in the assessment

Loss will be addressed directly via data layers reported to HELCOM and the summary of this will be developed, as in HOLAS II, via the Spatial Pressures and Impact Assessment (SPIA) – a further development from the BSPI and BSII tool Baltic Sea Pressure and Impact Index tool). In addition, potential functional loss generated via CumI will also be used in an appropriate form, functional loss being derived from levels of pressures that when cumulated are deemed by the methodology to be so significant that they result in potential loss of biotopes. It will be evaluated whether this functional loss can be used directly in the assessment or via incorporation into SPIA.

### Accompanying confidence assessment

A confidence scoring will also be applied for the overall integrated assessment (a confidence map in the assessment being provided in conjunction with the overall integrated assessment status). This accompanying assessment of confidence defines the 'quality' or 'optimal suitability' of the underlying components integrated into the final assessment of benthic habitats, reflecting the uncertainty of the assessment applied. This will be applied based on the existing BEAT confidence assessment structure that addresses the confidence due to temporal confidence, spatial confidence, methodological confidence and confidence of classification of the indicator assessments (i.e. the underlying data behind the indicator evaluation per assessment unit).

Where components within the assessment or integration process are considered sub-optimal then a greater uncertainty in the assessment result will be reflected by a lower final confidence evaluation. Thus, the overall parallel confidence assessment will reflect the underlying components of the overall assessment of benthic habitats.

### Additional contextual supporting information and possible test cases for HOLAS III

In addition to the above assessment it will also be critical to involve the relevant experts in the HELCOM Benthic habitats Expert Groups when drafting the thematic assessment report text on this chapter.

Supporting contextual information could include: any further development of other indicators or test cases of relevance, and other reference materials, such as peer-reviewed scientific publications or relevant national/regional project reports. In addition, it is proposed, though there are resource implications, that a series of test cases should be carried out to explore the comparability of the CumI outputs with relevant state indicator component. These comparability tests would for example select small or localised areas/regions that are well sampled for state indicators (e.g. some areas with a high sampling station density in the [State of the soft-bottom macrofauna community](#), see 'results figure 2' of report) to explore if the potential impacts on state derived via CumI (i.e. from physical pressures) do correspond to changes in state or are reflected in the current status.