Document title	Future work on HELCOM indicators - Benthic habitats and seafloor
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Background

The following document contains a brief topic summary that addresses the overall aim of indicator work and assessments on the given topic. It outlines the current status and gives an indication of the work needed to adjust/develop the identified indicators. Potential avenues of cooperation are also described. Where possible the information has been compiled based on responses received from the HELCOM indicator questionnaire process and revised based on comments received at the 1st HELCOM Indicator Workshop. This is particularly the case for the section on the aims of the work, which was a focus of attention at that 1st indicator workshop.

The opening lines of the aim section has been updated based on responses from the expert input request. The reasoning behind the changes made are that the previous aims summary had focused on requirements in MSFD Descriptor 6, whereas criteria under Descriptor 5 also require assessments of benthic communities (although secondary criteria). For example, the assessment of D6C5 should also take into account pressures from D2, D3, D7 and D8, so the summary should also include other pressures than physical disturbance and loss. The updated text lines are shown below and underlined in the document:

The overall aim is an assessment of the Baltic Sea seafloor habitats and the biota inhabiting them, to quantify the impact on and loss of the seafloor due to human induced pressures, including but not restricted to physical disturbance, physical loss and eutrophication effects. Indicators need to target the integrity of physical and biological seafloor components (habitats and biotopes). This will include using information on species sensitive to the pressures and on benthic biogenic structures.

Action requested

The Workshop is invited:

- to take note of the information and use it as needed to support the discussion
- provide comments or corrections as needed

Benthic habitats and seafloor

Future work on HELCOM indicators – towards the 3rd Holistic Assessment of the Baltic Sea 2023.

Indicators under discussion

1. *State of the soft-bottom macrofauna community
2. *Cumulative impacts on benthic biotopes
3. Condition of benthic habitats
4. Other indicators

*Completed indicator questionnaires received.

Other indicators were discussed during the previous meeting of IN-BENTHIC.

These indicators appear in the additional document that considers the HELCOM indicator-policy match and scoring (Document 17 - HELCOM indicator-policy matching and draft scoring, and annex).

Aim

The overall aim is an assessment of the Baltic Sea seafloor habitats and the biota inhabiting them, to quantify the impact on and loss of the seafloor due to human induced pressures, including but not restricted to physical disturbance, physical loss and eutrophication effects. Indicators need to target the integrity of physical and biological seafloor components (habitats and biotopes). This will include using information on species sensitive to the pressures and on benthic biogenic structures. This information contributes to the robustness and the informative values of the assessment. Indicators used apply reference criteria and corresponding reference values derived from those criteria, as well as appropriate threshold values. The assessment needs to consider spatial extent of loss/disturbance requiring status for specific spatial assessment areas (e.g. area of loss per habitat type), thus the assessments need to be able to use relevant ecological (spatial) scales that are compatible with those under the Baltic Sea Action Plan (BSAP), the EU Water Framework Directive (WFD), EU Marine Strategy Framework Directive (MSFD) and Habitats directive (HD).

Short term aims include that the indicators should be developed further to be fully operational, conform to the requirements of the EU Commission Decision 2017/848/EU, and include the widest spatial coverage for the next assessment period. The application of an integrated assessment, supported by the outcome of relevant processes (e.g. the EU TG Seabed), should also be carried out to provide an overview of the environmental status of the seafloor as a whole.

General introduction and current status

The soft-bottom macrofauna community indicator was updated and utilised in the 2018 State of the Baltic Sea report and the oxygen debt indicator was used to complement the overall integrated assessment. An initial assessment of activities that can cause disturbance and loss was also carried out in the 2018 State of the Baltic Sea report. The soft-bottom macrofauna community indicator is operational and applied in open sea assessment areas at a relatively wide spatial coverage, though southerly areas are generally less well covered and there is also a need to develop and/or approve threshold values in some areas. Coastal areas remain to be addressed. Further developments have taken place (and are ongoing) related to the cumulative impacts and condition of benthic habitats indicators, mainly in the form of case studies, and discussion at IN-BENTHIC 2-2018 considered that further discussion was valid on combining soft and hard-bottom macrofauna communities under the

condition of benthic habitats indicator, while the Population structure of long-lived macrozoobenthic species indicator was consider to be out of date and should not be further developed (Outcomes paragraph 6.9 and 6.2, respectively).

Relevant species (regional lists of species for the assessment)

The HELCOM HUB classification system and the EUNIS approaches for defining habitat types are relevant for such assessments. Some relevant species may be considered in the following lists, though compilation or a regionally agreed list of important species and habitat types may be relevant. A recent reference list of MSFD species and habitats compiled by the Joint Research Council (JRC) covers these species for the Baltic Sea region, accompanied by the JRC Technical Report documenting the approach used (Document 13 - Supporting information - JRC's reference lists of MSFD species and habitats, and annexes). These species are also linked to the 2012 HELCOM Check List (Document 14 - Draft HELCOM species list matching, and annex) and matched against (EU) 2016/1251 Table 1D. *Please note that both of these documents can be considered as 'drafts' at this stage, and updates or corrections by experts from the Contracting Parties will be warmly welcomed.*

Development/adjustment work

A suitable set of indicators should provide an overview of human impacts on the physical and biotic components of the seabed (and benthic habitats), linking activities to these pressures and the impact on biota. Further work is needed to develop existing indicator concepts as well as suitable approaches to bring together an overall assessment of benthic habitats and impacts on the seafloor.

Condition of benthic habitats: The condition of benthic habitats indicator proposal has been developed and tested in Estonian waters and further work including testing in other countries and regional agreement is required.

Cumulative impacts on benthic biotopes: In principle it is applicable in all areas of the Baltic Sea, but not applied yet. Application is dependent on the level/depth of data available and where high data depth is available the assessment can be adapted to finer or broader scales based on national, BSAP or other policy requirements. The indicator is not operational yet, but the general assessment procedure being developed is in agreement with the Commission Decision (EU) 2017/848. Further development is required including regional or subregional agreement on threshold values (though an approach for threshold value setting does exist and tentative interim values could be proposed and applied). The following aspects would enhance the indicator development: more, and more detailed biotope maps (minimum level 4 of HELCOM HUB classification), further case studies to examine application across the region, improved understanding of quantitative relationships between cumulative impacts and species/biotopes (including matching scales of biotopes and impacts), database optimisation (especially of maps and data details required), cooperation to develop modelled and validated impact assessments based on pressure data, refinement of assessment scale to a grid scale so that differently scaled pressure data can be combined, and data calls should be used in advance of any indicator update/assessment to ensure that data availability is assessed in advance (reducing variation or assumption and improving confidence overall).

State of the soft-bottom macrofauna community: The indicator is operational, but gaps in spatial coverage exist and the indicator is only applied in open sea HELCOM assessment units and at a depth of 60 m or less within those assessment units (the oxygen debt indicator providing an assessment in deeper areas). Threshold values missing for Bornholm Basin, Arkona Basin, and Belt Seas, and intermediate threshold values are currently applied in the Eastern Gotland Basin and the Gulf of Finland. The Sound and Kattegat are currently assessed by OSPAR and have not been addressed so far in HELCOM work. The following aspects have been identified as areas needing adjustment work:

improved threshold value setting methodology, consideration of how to accommodate natural salinity and temperature variation, an improved understanding of environmental variable and human impacts, understanding of most effective policy relevance (e.g. MSFD D5C8, D6C3, D6C5 and D4C1), develop average condition assessment per HELCOM assessment unit that is currently applied to consider spatial aspect (e.g. area of that unit affected), develop the assessment of broad habitat types within those assessment units (i.e. not just all soft habitats), optimise and standardise data reporting, format and availability via the HELCOM COMBINE database (currently not usable for indicator assessment and relies on national experts and data request), and explore possibilities to combine with hard-bottom indicator into condition of benthic habitats indicator. Defining relevant pressures and pressure-response relationships would also be valuable and testing the indicator along a pressure gradient could provide insights into impacts, major drivers and co-varying aspects (such a study could be in the form of an international research project).

Note: many of the above issues or potential obstacles also have resource implications.

Potential obstacles

Resource allocation for and organization of a research project to tackle the issues described above, including further test cases may influence development, and improved mapping will be critical. Processes for threshold values setting in EU groups (e.g. via TG SEABED) is an ongoing parallel process.

Cumulative impacts on benthic biotopes: Resources are required for additional test cases as well as for expert engagement and development. Regular data flows need to be established to ensure sporadic data calls are avoided, including clear guidelines on the data needs, and resources are needed for data preparation and interpretation from the HELCOM Map and Data Service (MADS). Data information should be improved concerning the level of detail as well as temporal and spatial resolution (e.g. fishing intensity data in quarterly resolution in addition to yearly data to consider recovery times between fishing events). In particular, data and information on monitoring of hard bottoms should be included, which is currently lacking in many areas. The assessment of potential impacts caused by different pressures should be aligned with monitoring data and also monitoring strategy including potential back-coupling mechanisms for considered pressure-state relationships as far as possible.

Frequency

Every 6 years to match BSAP-related reports and MSFD cycles.

Potential for cooperation

Further development of the indicator should be promoted by lead/co-lead countries in association with EN BENTHIC. Cooperation with OSPAR would be beneficial for further developments of both benthic indicators (OSPAR BH3 and HELCOM cumulative impact on benthic biotopes), in particular relating to harmonization of indicators for those countries, which have to meet the demands in both regional conventions of OSPAR and HELCOM. Cooperation with OSPAR BHEG and ICES Benthos Ecology Working Group (BEWG) would be desirable. Following and taking part in other regional and EU initiatives related to benthic habitats will also provide added value (e.g. ICES BEDPRESS, TG SEABED).

Other issues

The workshop is invited to document other aspects they consider to be relevant to the development of this specific indicator category.

A number of issues raised previously (though not an exclusive list) that may be relevant for discussion include: integration rules, appropriate coordination with MSFD CIS processes, and appropriate coordination with OSPAR.

The following ongoing processes and groups may be relevant for future work on this theme: 1) the ICES Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT), 2) the work and report of the ICES Workshop on scoping for benthic pressure layers D6C2 - from methods to operational data products (WKBEDPRES1), 3) the work of Workshop to scope the physical loss pressures on the seabed D6C1/C4- from methods to operational data products (WKBEDLOSS, report due shortly), and 4) the work and output of ICES WKBEDPRES2 (September/October 2019). Furthermore, work taking place in the HELCOM ACTION project, particularly work package 2, may be relevant.