
Document title	Future work on HELCOM indicators - Underwater noise
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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 avenues 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.

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

Underwater noise

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

Indicators under discussion

1. *Distribution in time and space of loud low- and mid- frequency impulsive sounds.
2. *Continuous low frequency anthropogenic sound.

*Completed indicator questionnaires received.

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

A Baltic Sea regional assessment of underwater noise generated by anthropogenic activities that result in either continuous or impulsive sound. Such an assessment should be tied to suitable species that are affected by these noise generating activities during periods of biological significance of their lifetime, and be assessed against suitable threshold values. Threshold values should be linked to appropriate values that represent levels at which no harm to species identified as sensitive to noise occur. Cooperation with relevant institutions (e.g. OSPAR) should take place and the specific feasibility of stages of the development work should be clarified. There is a need to ensure regionally harmonized monitoring and methodologies are applied and that relevant quality assurance is in place. National restrictions on data may also be relevant.

In the short-term assessments should consider an evaluation of pressures and trends, with longer-term developments to address the link with biota.

General introduction and current status

Two main indicators exist for this topic, both of which were used descriptively in the [2018 State of the Baltic Sea report](#). The impulsive sound indicator is not operational, however initial milestones to develop the indicator have been achieved. The continuous noise indicator is not operational either, though the concept has been derived and further work is required to develop a system that would result in a fully operational indicator.

Relevant species (regional lists of species for the assessment)

A list of relevant species sensitive to noise has been compiled (see HELCOM HOD 54, [paragraph 4.30](#)), though threshold values are currently not developed. It may also be relevant to clearly define reference areas and the appropriate definition of such reference areas.

Development/adjustment work

This group of indicators has high relevance and can be directly linked to human activities and certain biodiversity components.

Impulsive noise: A harmonised approach needs to be furthered by considering national developments and revisiting monitoring guidelines to develop the approach fully. Aspects such as how different sources are monitored and reported should be addressed, in doing so ensuring an assessment of current status can be compared to existing evaluations. A broader updated assessment, with all available data, will evaluate how comparable reporting across the region is and where gaps in data

exist. To support better data collection and reporting, the reporting format to the registry of impulsive events has recently been updated based on two years of reporting experience. However, further work is needed on the registry so that it better facilitates the indicator assessment (e.g. information of frequency spectrum), and approaches to carry out indicator evaluation directly from the database should also be explored. Furthermore, the indicator metric (impact days) needs to be developed to include a biological relevance component, and such a metric needs to be adapted to relevant species, the specific amounts in question, and may also need to be revised dependent on specific source (e.g. activity). Such developments may also need to consider temporal aspects such as duration of noise event and event-free recovery periods, and also address how temporal and spatial reporting needs to be appropriately applied so that all noise-generating events are suitably scaled to one another (i.e. a single large but short event does not become overemphasised in assessments). A workshop dedicated to discussion on monitoring standards, appropriate reporting, and impact assessment would be valuable.

Continuous noise: Further development of the concept is required to define assessment requirements and to set up the recently agreed data hosting system. Discussion on how to include higher frequency bands (tentative proposals 2 and 5 kHz third octave bands) should also take place, and the development of suitable threshold values will also be needed. Developments will need to be reflected in the already agreed monitoring guidelines as well as the assessment protocol to ensure best practices are put in place. Importantly, the issue of statistical power in the monitoring data needs to be addressed, i.e. determining how the ability to detect statistically significant trends in the indicators depends on the number of years of monitoring data available.

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

Potential obstacles

Specific source types are commonly not reported to the noise registry due to e.g. data restrictions, lack of data, or matters of national security. Thus the data made available to date are generally very limited and could present significant issues for carrying out a full assessment. While addressed above in development issues, harmonised monitoring and reporting may also act as a potential obstacle. Additionally, the current processes at the EU level and this HELCOM process for indicator development may not have matching timelines (e.g. for threshold value development). The noise registry may also require further development to expand the parameters to be collected to reflect developments taking place.

Frequency

The stage of development means that it is currently too early to define a frequency, though a minimum of 4 years suggested at this stage.

Potential for cooperation

For HELCOM countries that are also EU Member States, work particularly needs to consider guidance given by TG-Noise. Cooperation with OSPAR is also relevant.

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 TG-Noise, appropriate coordination with MSFD CIS processes, and appropriate coordination with OSPAR.

