Baltic Marine Environment Protection Commission

2nd Meeting of HELCOM expert network on hazardous substances   EN-HZ 2-2016
Teleconference Meeting, 28 June 2016

Document title	Notes from online meetings on applying the MIME R-script on HELCOM core indicators
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Agenda Item	3 – Follow up on the progress on implementing the R-script developed by OSPAR MIME for HELCOM core indicators
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Background

The first meeting of the HELCOM expert network on hazardous substances (EN-HZ 1-2016), held 2-4 February 2016, recommended using the method developed in OSPAR MIME in HELCOM core indicators (point 7). The meeting noted that the script may need modifications and need to be tested. To achieve this the meeting identified that experts developing the approaches together with the HELCOM and ICES Secretariats should communicate on the tests that are needed.

Two online meetings have been held (31 March and 16 June) where Co-Chairs from HELCOM EN-HZ and OSPAR MIME together with the R-script developer Rob Fryer and the HELCOM and ICES Secretariats have discussed the needed development steps and tests to be carried out. This document summarizes discussions and findings of those two online meetings.

Action required

The Meeting is invited to take note of the information, in particular the need to report uncertainties and link measurements to the ICES station dictionary for the script to work well, and discuss the planned next steps.

Notes from online meetings on applying the MIME R-script on HELCOM core indicators

1st meeting 31 March

The aim of the meeting was to discuss next steps in applying the R-script developed by OSPAR MIME in the HELCOM core indicators, as it was previously agreed at the HELCOM BalticBOOST workshop on the hazardous substance assessment (2-4 February) that the script can be used. Some adjustments to the code were believed to be needed, and it was considered important to have close communication and sharing of experiences in the future between OSPAR and HELCOM on the further development of the code, e.g. by using a github to develop the coding in parallel in a collaborative and transparent way (see https://github.com/ICES-dk). The workshop requested that next steps would be identified to plan for the work.

Discussion

The R-code is based on two steps, 1) a trend analysis per station and 2) a meta-analysis of stations of a substance in a given area (OSPAR sub-region). So far the aim has been to apply the code in step 1 for HELCOM core indicators, however applying step 2 in the HELCOM indicator assessment protocol as well might be appropriate and could ensure consistency in results. The OSPAR sub-regions are spatially larger areas than the HELCOM assessment units, however the same principle might be relevant.

The code has function for each compartment. An adjustment to the code that might be needed is the addition of a matrix for a substance or applying Baltic Sea specific conversion factors for species or basis. A first estimation is that it would take about half-a-day to code for such an adjustment, checking if the code work using the data would take longer, and an even longer period would be needed if there is a need to explore how to convert data. There might be a need for both HELCOM and OSPAR to adjust the code to account for conversions to trophic level 4 for biota data.

Testing the approach is best done for one or two core indicators, applying the whole protocol to data to identify any potential problem areas. Testing could be done for whichever substance that provides the longest and most extensive data set, however considering the tight schedule of needing to deliver core indicator evaluations early 2017 it was agreed to focus testing on the core indicators. Testing the approach will be done for the indicators 'Polychlorinated biphenyls (PCB) and dioxins and furans' and the indicator 'Metals (Cd, Hg, Pb)', as these are believed to provide the most extensive dataset out of the core indicators. The extraction is to be done using the agreed parameters of the indicators (Table 1.)

If future data reporting was done using more strict checks aligned with the core indicator parameter needs, the analysis would become faster and there would not be a need to apply conversion factors which are a source of error. Also in the future there will be a need to apply conversion factors to older data. For the purposes of HOLAS II conversion factors are likely to be needed as the data that has been reported is not directly suitable for the analyses.

2nd meeting 16 June

A first test of the first step of the script on metal and PCB data extracted from COMBINE using the data selection criteria applied for OSPAR was presented and considered.

The results can be viewed: http://dome.ices.dk/HELCOM2015/main.html

Follow up of next steps:

Next steps agreed at first online meeting	Follow up at second meeting
Rob to share a description of- and the R-code to show which basis are used and what data is excluded from the OSPAR analysis	Shared to ICES
Rob and Hans to look at what extraction fields are needed from the database as some fields in the current extraction are not used in the code-calculations	For test run the same as used in OSPAR were used. Found to be maybe a bit too strict, as it seems like a lot of data has been excluded
Hans to check if FI, RU, EE, LV, LT, PL report to COMBINE using the station dictionary station names or if for these Contracting Parties the stations are to be inferred in the indicator based on latitude and longitude (if the station reporting is not consistent then it inferring the station is the best option)	No data for RU available. 5 extraction methods tested based on stations, no significant change made. SE, DK use the station name to identify the station in the station dictionary. FI, LV, LT have not marked stations as 'temporal', and stations need to be otherwise identified. In OSPAR reporting according to a station name in the station dictionary is a requirement. To apply the R-script this same check is needed for HELCOM. It would simplify the process if countries reported in accordance with station names. **To be checked by ICES if not reporting to station names generates an error or a warning.** *Some problem between project/monitoring stations in the station dictionary. There is a field in the station dictionary where it is possible to identify two stations as the same station or one as being a smaller entity within another station. The UK has not used this properly and has not been an issue until now, but now would be the time to sort it out.*
Hans to make a data extraction for the two test indicators based on the format agreed with Rob	Delivered, and new extraction also made with less strict exclusion criteria however not yet analysed.
Rob to read in the data and run it in the current code, to compile information on how much data is excluded e.g. based on wrong basis reported. I.e. run the current code on currently available data to get an idea of the data suitability	The extraction and run-through is shown in http://dome.ices.dk/HELCOM2015/main.html DK, DE, SE only information available, extraction criteria (look-up table) were probably too strict as only stations marked as temporal monitoring stations used.
second skype meeting to discuss the outcome first test step, conclude on whether there is a big problem with data getting excluded or if the code works well. Agree on how to complete the test to apply the trend analysis and the meta-analysis for the two indicators.	No big problems encountered. Agreed to re-run the 1st step analysis using an extraction that has excluded less data and based on this step also test the 2nd step for the meta analysis of stations in an assessment unit.

Conclusions from testing the time trend R-script on data extracted for the metal and PBC indicators

The script seems to be **working well in principle** for the two test indicators. It should be possible to apply the script to all core indicators related to concentrations of hazardous substances.

The **selection of data** to be used in the analyses follows strict criteria as applied in OSPAR. This has resulted in several datapoints being omitted, and a new extraction with more lenient criteria has been made and will be tested shortly.

To run the R-script the measurements need to have an associated **uncertainty value**, and the test run identified that this was not always available. It is highly recommended that this value is reported associated with every measurement value. If the uncertainty value is not included then it can be estimated from 1) uncertainties based on other measurements from the OSPAR dataset or 2) QUASIMEME data files from 2011 however these files lack information from several HELCOM countries and labs. For legacy data the QUASIMEME records are aimed to be used.

For a **biota measurement** value there has to be information on the species, the matrix (tissue) and the basis for it to be included in the analysis. HELCOM data included values for three species not included in data from OSPAR, e.g. a large amount of Common guillemot egg data. For the first test run, the same matrix and basis selections for the fish and shellfish species were made as used in OSPAR. For example lipid basis was used for herring, for other species wet weight. Herring muscle used for mercury and organic compounds. Eelpout and herring liver data for organics and lead should be treated the same way. All CB measurements seem to be included in the analyses, and OSPAR exclusion rules e.g. for the period April-July did not exclude any of the data.

When the updated extraction is run through the script the matrices and bases as selected by experts developing HELCOM core indicators are to be used, which seems to be close to the OSPAR selections.

Next steps:

- Asap: assessment unit level 4 image to be produced to visualize the stations available for the two test indicators when new extraction data is run through the script by Rob against GES boundary values provided in Table 1 using species, matrix, basis as indicated in table 2
- 28 June; EN-HZ 2-2016 on-line meeting to consider the findings of the testing, discuss the identified problems that the R-script is best run when data is referencing the station dictionary and that uncertainty should be reported where at all possible
- Autumn; consider the findings of testing the 2nd step on the two test indicators and agree on how to process all indicators