



## Baltic Marine Environment Protection Commission

Workshop on methodologies to assess the implementation  
of the HELCOM nutrient reduction scheme  
(MAI/CART assessment)

MAI-CART WS 1-2017

Stockholm, Sweden, 6-7 March 2017

### Outcome of the Workshop

#### Introduction

With regard to the decision of PRESSURE 5-2016 (Outcome, paragraph 8.23), document 8-3 of HOD 51-2016 and invitation by the Baltic Nest Institute, Stockholm University, the Workshop on methodologies to assess the implementation of the HELCOM nutrient reduction scheme (MAI/CART assessment), was held in “Juristernas hus” at the Stockholm University campus on 6-7 March 2017.

The List of Participants is attached as **Annex 1**.

The Programme of the Workshop is contained in **Annex 2**.

#### PLC data collection and quality assuring

The quality of PLC products depends on the quality of the compiled data. The participants discussed the datasets collected by the PLC-6 project and evaluated their completeness and reliability. The participants also stressed the need for the Contracting Parties to timely deliver the PLC data to allow sufficient time for compilation and data quality assurance at the HELCOM level.

Specifically, the participants noted that flow normalization procedures could not smooth out the high variability in loads for some rivers. The importance of appropriate monitoring of nutrient concentrations and flows in rivers was highlighted. In order to provide reliable data, monitoring should be organized in accordance with the PLC-Water Guidelines that recommends regular measuring at least 12 times a year. The participants took note of the information by the PLC Data Manager that recently reported data 2013/2014 almost comply with these requirements, while old estimations might be based on a few measurements per year. Also, experts pointed out that in case of rivers with specific hydrological regime or high variability in nutrient concentration, sampling schedule might need to be adjusted taking into account the specific properties. Nonetheless, experts highly appreciated the work done during the last decades and emphasized that the quite unique database consists of data covering a period of 20 years of continuous observations for approximately 150 rivers.

The Workshop also noted that the data quality depends on thoroughly performed quality assuring and approval procedures at the HELCOM level. In case of delay in data reporting the time for assuring the data quality is limited and procedures prescribed by the HELCOM Guidelines might not be performed appropriately, thus resulting in lowering of data quality. Timely reporting of the national data is a prerequisite of the reliable assessment dataset. The experts pointed out that data deviating remarkably from the preliminary MAI assessment presented at the Workshop will be critically considered and further consulted with the countries.

#### Provisional assessment of input by big rivers

The participants welcomed information on the preliminary results of nutrient inputs by the seven biggest rivers discharging into the Baltic Sea. However, they noted a low correlation between flow and load in some of the rivers and concluded that it should be thoroughly considered to identify reasons that caused these deviation. The participants suggested that one of the reasons might be significant contributions by point sources.

The participants further discussed the use of the data on assessment of nutrient inputs by the big rivers, noting that this information is viable for elaboration of national programmes of measures in accordance with the WFD requirements. However, the participants pointed out difficulties in correlation of the measures and management plans for fresh waters with the ones set for marine environment and also noting a lack of tools to establish a link between environmental targets for marine environment and upstream measures.

The Workshop also took note of the information by Sweden on national studies that revealed several lakes turned from phosphorus sinks to sources of phosphorus and thereby also influence the water quality in the Baltic Sea. The implementation of requirements according to the WFD in Sweden is estimated to serve for reaching eutrophication related goals for the marine environment. Germany informed of similar estimations for national environmental targets. Finally, participants concluded that new HELCOM PLC database enables comprehensive analyses of riverine inputs.

### [Influence of the new data on atmospheric deposition](#)

The Workshop discussed new data on atmospheric nitrogen deposition, presented by EMEP, and that the update of the EMEP model and its underlying emission data resulted in a remarkable revision of the data used in previous assessments. Deposition of nitrogen obtained with the new model was in average more than 20% higher than the one previously used. The participants discussed how the new data on atmospheric deposition of nitrogen in the reference period could influence the HELCOM nutrient reduction scheme.

The participants concluded that the maximum allowable inputs were computed independently from the atmospheric input data. The input data was used only for model calibration. A deviation in about 5% of total nitrogen input caused by revision of the atmospheric input would not bias the results of modelling and it is not considered that recalculation of the allowable inputs is needed because of these revised data. Bearing that in mind, the participants concluded that there was no need to revise the targets stipulated by the HELCOM nutrient reduction scheme.

The participants pointed out progress in reduction of NO<sub>x</sub> emissions and that such reductions had not been achieved in emissions of ammonia which indicates that there ought to be room for reduction measures in the agricultural sector being the primary source of ammonium emission.

The Workshop also discussed the reduction under the requirements of the Gothenburg Protocol and that they could be projected to the year 2030, taking into account potential reduction caused by implementation of NECA in the Baltic and North Sea. The Workshop also took note of a suggestion by Germany to arrange a compliance check for implementation of the Gothenburg protocol by HELCOM countries. Some participants expressed a concern that the countries outside HELCOM, being remarkable contributors to the nitrogen deposition in the region, might not implement the required reductions. The participants also suggested that the compliance check could be done for non-HELCOM countries from the list of top 10 contributors. Though, even if they missed their Gothenburg Protocol targets by a noticeable amount, it would not have a significant effect on the total N-load to the Baltic. Thus, the feasibility of such a check depends on demanded resources.

### [A discussion on new updates of the progress indicator towards MAI](#)

The Workshop welcomed provisional information on updates of the HELCOM core indicator on inputs of nutrients – progress towards MAI. However, the Workshop was informed that the assessment dataset used for the preliminary evaluation had not yet been approved by all countries, and that the assessment results might be updated. These updates might be especially visible in sub-basins with inputs close to MAI. The participants pointed out a significant increase of the P- load to BAP and a significant reduction of P-input to GUF. The latter supposed to be at least to some extent be achieved due to measures on improvement of water treatment implemented in St. Petersburg, but it may also be a result of improved estimates on loads from unmonitored areas.

The Workshop also took note of the concern of a Lithuanian participant regarding the nutrient fluxes from the Gulf of Riga to the Baltic Proper. The Workshop discussed the exchange of nutrient fluxes between sub-basins of the Baltic Sea and recalled that this exchange was taken into account when MAI were computed.

### Statistical analysis of the assessment data

A new approach based on statistical analysis of trends with break points was introduced to the Workshop. After considering a number of examples with the new approach, the participants suggested to use this approach only when the break point can be validated and explained by implemented measures or other known phenomena. Otherwise, the break points might reflect only erroneous data or changes in monitoring methodologies. In general the participants agreed that the approach provides a sensitive tool for the assessment of achieved progress, and that the assessment results are closer to really reported values than those obtained with linear trend analysis in cases where the trend is not linear, but pointed out that the outcome from the break-point analysis should be further communicated with countries to verify the observed changes in trends.

The Workshop took note of the remark by Sweden that indicating the status of Bothnian Bay in terms of meeting MAI as statistically uncertain is in principle not correct bearing in mind that the sub-basin does not have a reduction target nor reduction measures to be implemented.

### Discussion on progress towards CART assessment

The participants clarified that the values used for input ceilings have not been modified bearing in mind that the reference input data were recalculated due to revision of information on airborne inputs.

Discussing the provisional data on country-wise inputs of nutrients to sub-basins, experts noticed continuous increase of P-inputs to the Gulf of Riga from Latvia in recent years. The participants assumed that one of possible reasons for such a phenomenon could be the lack of proper monitoring data in the previous years.

Examples on the progress towards CART, evaluated using three different methods, were presented by DCE. The methods were based on 3- and 5-year averaging of the input data and statistically adjusted values for the latest year. The experts concluded that statistically based evaluation, taking into account break points in trends, is the most sensitive method reflecting the recent changes. But this method is also very sensitive to erroneous or any other outstanding data and could provide a biased picture. 5-year averaging provides rather steady information which does not reflect recent changes. 3-year averaging is more sensitive than 5-year and also corresponds to the approach used for the MAI core indicator.

The participants pointed out the importance of using real input values and not only percentage to evaluate achieved progress, noting that high percentage could reflect changes in very small real values and vice versa.

The Workshop briefly discussed normalization procedures used in the assessment and noted that all the rivers were normalized individually, while in previous years a normalization per basin was applied. Experts also noted that only a couple of rivers indicate systematic increase of the flow that might be a result of climate change. The other rivers do not show any systematic changes, which can also partly be a result of regulated flows.

In finalising the discussion on provisional results of CART assessment, the participants pointed out the importance to identify sources of nutrients showing the highest reduction. The Workshop also recalled that a unified methodology ought to be used for the assessments, otherwise the results for different countries might be incomparable.

### An example of using extra reduction

The Workshop was informed on the basic principles of using extra reduction and an example of calculation based on the old assessment dataset was given. Analysis of the latest data was not possible, as the data on extra reduction and missing reduction are still not available.

The participants suggested to use extra reduction in simple pair of basins as spreading the effect to other basins brings a lot of uncertainty into the estimates.

The Workshop expressed a concern regarding the principle that the methodology for accounting extra reduction should only be applied for basins close to achieving GES, noting that achieving GES in term of eutrophication takes much longer time than achieving MAI. That principle can make the methodology inapplicable at foreseeable time. However, the participants agreed that the methodology can be tested by individual countries that have reached extra reduction in a particular basin.

### Outlining CART policy message

The Workshop discussed the previous agreements regarding the contents of the CART policy message and concluded that the visualization used in the previous assessment (2015) in general reflects required information. Also, the participants agreed that the outline of the policy message should not be changed in each assessment in order to keep the results comparable. Thus, the Workshop agreed that the country-to-basin matrix used in the previous assessment will form a basis of the policy message.

The participants suggested that the matrix can be accompanied by a table containing the values of achieved reduction and its percentage in the total reduction.

The Participants also suggested that the policy message could contain a section with one bar diagram for each country illustrating reduction achieved in all basins. The other information considered to be valuable for the policy message is a projection of the reduction achieved in 2021, estimated with a current pace of the progress.

## List of Participants

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## Programme of the Workshop

Day 1 – Monday, 6 March 2017

Convener: Lars Sonesten, Chair of HELCOM Pressure Group

10.00-11.15

**Welcome words and setting the scene.**

**Establishing the nutrient input dataset to the Baltic Sea used for the MAI/CART follow-up assessment (assessment dataset)**

**1. Data on waterborne input reported by countries (PLC annual and periodic reporting)**

**(Secretariat with PLC Data Manager and RedCore DG)**

**National data reporters and assurers are invited to present information on national procedures related to data reporting and quality assuring as well as suggestions on how to improve them in the PLC-7 project.**

- What is reported by the Contracting Parties on waterborne inputs in the period from 1995-2014 (riverine, diffuse, direct, transboundary, retention and flows, etc.).
- Quality assurance of reported waterborne data.
- Data verification: filling in data gaps, corrections of suspicious data and approval by the Contracting Parties of waterborne input data for the assessments.  
(Chair of RedCore DG to give examples of filling in data gaps)

**2. Calculation of net inputs – actual and normalized**

**(Bo Gustafsson, BNI with contribution by Søren E. Larsen, DCE)**

**Sweden will contribute to the discussion on the uncertainties of nutrients input and flows.**

- How water- and airborne inputs are divided by country and Baltic Sea sub-basins (net input per Country) and divided in riverine, direct, atmospheric and total nutrient inputs to Baltic Sea sub-basins.
- What is the difference between actual nutrient inputs and normalized inputs – and why and how do we normalized water- and airborne inputs?
- What is the uncertainty on nutrient inputs and flow data and how is it estimated/calculated?

[11.15-11.35 – Coffee break](#)

11.35-12.50

**3. Airborne inputs (atmospheric deposition of nitrogen and its sources) (Jerzy Bartnicki, EMEP)**

- Changes in airborne N input data and how does it influence the reference data for nutrient input assessment;
- Estimation of phosphorus deposition (contribution by Lars M. Svendsen)

## Implementation of the HELCOM nutrient reduction scheme. MAI/CART follow up

### 4. Draft updated HELCOM Core indicator on input of nutrients 1995-2014

(Lars M. Svendsen, Søren E. Larsen, DCE and Bo Gustafsson, BNI)

- Assessment of fulfilment of MAI and the use of actual data versus normalized ones.
- Nutrient inputs to the Baltic Sea sub-basins in 2014.
- Evaluation of trends in nutrient inputs to sub-basins and estimation of changes in inputs – including introducing evaluation of breakpoints in time series.
- Results of assessment of progress towards fulfilling MAI and their visualization.
- Accounting for uncertainties in nutrient inputs in the assessment.

[12.50-13.45 – Lunch](#)

13.45-15.00

### 5. Data on transboundary waterborne inputs (Bo Gustafsson, BNI)

- Transboundary inputs: how are data obtained, how are inputs divided between countries, estimating retention to quantify net inputs to the Baltic Sea. Discuss unresolved challenges with transboundary nutrient input data, and possible initiatives to obtain improved estimates of transboundary inputs.

### 6. Estimation of input of nutrients via selected big rivers

(Finland with BNI and DCE and contribution to the discussion by Germany)

- Introducing the big rivers, as e.g. Daugava, Göta älv, Kemijoki, Oder, Nemunas, Neva and Vistula.
- Nutrient inputs from the big rivers in 2014.
- Trend and changes in inputs from the big rivers during 1995-2014.

[15.00-15.30 – Coffee break](#)

The discussion will be convened by Anders Alm, WWF.

15.30 – 16.00

Wrap up of the day and conclusions

16.00 – 18.00

An open discussion on technical and methodological aspects of assessment of nutrient inputs and the HELCOM nutrient reduction scheme follow-up.



Day 2 – Tuesday, 7 March 2017

Convener: Lars Sonesten, Chair of HELCOM Pressure Group

09.00-10.15

**Implementation of the HELCOM nutrient reduction scheme. MAI/CART follow up**

**7. National input ceilings and long term trends 1995-2014**

**(Lars M. Svendsen and Søren E. Larsen, BNI)**

- How were national input ceilings derived from MAI and CART and accounting of transboundary inputs in their identification?
- Methodology for and results of trend analysis and changes in inputs from countries to sub-basins during 1995-2014.

**8. Approaches to assessment of the progress toward fulfilment of CART**

**(Lars M. Svendsen, Søren E. Larsen, DCE; contribution by Bo Gustafsson, BNI regarding reference input)**

- Use of normalized data
- Use of statistical analysis of time series
- Average of x years or latest inputs
- Taking into account uncertainties in inputs
- Examples of evaluation of progress towards fulfilling CART using 2013-2014 data
- Which reference inputs (1997-2003) should be used, etc.
- How can we take into account, that updated data on water- and airborne inputs will also change nutrient inputs in the references period 1997-2003 as compared with the Copenhagen Ministerial Declaration 2013, which have been the basis for MAI and CART calculation?

[10.15-10.45 – Coffee break](#)

10.45-12.00

**9. Accounting of extra reduction in evaluation of CART fulfillment – first test**

**(Bo Gustafsson, BNI with contribution by countries)**

**10. Outlining of the CART policy messages. What are the main messages to present, and how can we present the main results for policymakers unambiguously?**

**(Secretariat with the Chair of Pressure Group and contribution by countries)**

**Participants are invited to contribute to the discussion by showing examples of using the information on CART implementation for policy purposes at national level.**

- Level of the assessment data aggregation - results shown country per Baltic Sea sub-basin.
- Whether the reduction target is achieved?
- What is the distance from the target, e.g. in tons, percentages, years, before fulfilment with present trends etc.
- What is the trend and changes in inputs?

[12.00-13.00 – Lunch](#)

13.00 – 15.00

Common discussion on the approaches to evaluate progress toward CART and the policy message outline; wrap up of the workshop, conclusions and recommendations.

