



Baltic Marine Environment Protection Commission

Third Meeting of the Seventh Baltic Sea Pollution Load
Compilation (PLC-7) Project Implementation Group

PLC-7 IG 3-2018

Silkeborg, Denmark, 23-25 May 2018

Outcome of the Third Meeting the Seventh Baltic Sea Pollution Load Compilation (PLC-7) Project Implementation Group (PLC-7 IG 3-2018)

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Outcome of the Third Meeting of the Seventh Baltic Sea Pollution Load Compilation (PLC-7) Project Implementation Group (PLC-7 IG 3-2018)

Introduction

- 0.1 The Third Meeting of the Project Implementation Group (PLC-7 IG 3-2018) took place in the premises of the DCE at Aarhus University in Silkeborg, Denmark, on 23-25 May 2018.
- 0.2 The Meeting was attended by representatives from all the Contracting Parties, except European Union, Latvia and Russia. The List of Participants is contained in **Annex 1**.
- 0.3 The Meeting was focused on the current project activities in accordance with the PLC-7 project work plan, preparation of periodic PLC-reporting of 2017 data, updating of HELCOM Core Pressure Indicator on nutrient inputs (2015), and finalizing the remaining products of the PLC-6 project, particularly the evaluation of effectiveness of measures, scientific report and executive summary..
- 0.4 The Meeting was chaired by the PLC-7 Project Manager, Mr. Lars M. Svendsen, Denmark, and Mr. Dmitry Frank-Kamenetsky, HELCOM Secretariat, acted as Secretary.

Agenda Item 1 Adoption of the Agenda

- 1.1 The Meeting adopted the Agenda of the Meeting as contained in document 1-1.
- 1.2 The Meeting suggested to include also discussion on phosphogypsum stacks into the agenda of the Meeting.

Agenda Item 2 Matters arising from other HELCOM work

- 2.1 The Project Manager and the Secretariat informed the Meeting on relevant outcomes of the HELCOM Ministerial Meeting 2018, HELCOM 39-2018 and PRESSURE 8-2018.
- 2.2 The Meeting took note of the specific priorities of Finnish chairmanship in HELCOM, such as development of a follow-up system for the reduction of nutrient inputs, effects of climate change on nutrient flows in the region and on respond of marine ecosystem.
- 2.3 The Meeting also recalled the analytical errors in monitoring data revealed in Denmark and also in Finland and expressed the hope that it will not prevent successful implementation of the PLC-7 project.
- 2.4 The Meeting also took note of the progress in joint Estonian-Russian monitoring of Narva river. Estonia also informed of current work on establishing of national water quality database. The database will contain information also on effectiveness of measures to reduce nutrient inputs. Estonia welcomes any information on effectiveness of measures which might be used as a reference. Also Estonia will run a new model for source apportionment.
- 2.5 The Meeting took note of the information from Poland that official national representative in PLC-7 project has not been nominated.
- 2.6 The Meeting urged Poland that this year is crucial for the PLC-7 project and invited her to nominate the expert as soon as possible.
- 2.7 The Meeting took note of the information regarding update of the Danish data 2016 and that the data will be reported and quality assured by the end of June 2018. Denmark is also verifying data from 2008 to 2014 which will be corrected and re-reported to the HELCOM PLC-water database for the PLC-7 assessment.

2.8 The Meeting took note of the information that Sweden is currently investing into advancing of WWTP to prevent pollution of the environment by hazardous substances. Also the issues related to microplastics are high in the national political agenda which facilitates regional work to assess inputs of microplastics. Sweden is also working on advancing information on effectiveness of measures to reduce nutrient inputs.

2.8.1 The Meeting took note of the information on INTERREG project application BigRivers4Baltic which is focused on harmonization of methods to evaluate nutrient inputs in river basins of Oder, Nemunas, Vistula and Daugava.

2.9 The Meeting took note of the information that Germany is working on compiling information on effectiveness of measures to reduce nutrient inputs.

2.10 The Meeting took note of the information by the Chair of PRESSURE regarding the meetings relevant to HELCOM PLC work.

Agenda Item 3 Finalizing the PLC-6 project

“7 big rivers” and “Assessment of inputs of hazardous substances”

3.1 The Meeting considered the remaining open issues and acknowledged the urgent work needed to finalize the PLC products for adoption by HOD 54-2018. The deadline for submission of decision documents to HOD 54-2018 is 24 May 2018.

3.2 The Meeting took note of the information on the latest updates of the assessment of hazardous substances and agreed on its submission to HOD 54-2018 for adoption.

3.3 The Meeting thanked Lars Sonesten for successful work and contribution to the PLC-6 project.

3.4 The Meeting discussed the latest updates of the assessment of input by the 7 big rivers and agreed to submit the document to HOD 54-2018.

3.5 The Meeting thanked Antti Räike for the successful work and contribution to the PLC-6 project.

Evaluation of effectiveness of measures to reduce nutrients load and source apportionment based on source oriented approach

3.6 The Meeting discussed a suggestion on a new content of the assessment of effectiveness of measures and agreed that a new draft will be submitted to PRESSURE 9-2018.

3.7 The Meeting also considered the new information provided by the countries and also discussed alternative sources of information to evaluate effectiveness of measures. The Meeting also pointed out that the assessment of potential reduction based on external sources, e.g. EUROSTAT data on WWTP connectivity or application of fertilizers might be used to evaluate potential reduction compared to the reported data on expected reduction.

3.8 The Meeting also discussed the source-oriented source apportionment and how this assessment can be integrated into the chapter on effectiveness of measures.

3.9 A renewed draft of the assessment of effectiveness of measures will be submitted to the PLC-7 IG 4-2018 meeting.

3.10 The Meeting took note of the information on phosphogypsum stacks in the region and their potential impact on the Baltic Sea environment as presented by Seppo Knuutila. The Meeting also discussed the effect of measures to prevent leakages from the stacks on reduction of total P-load on the Baltic Sea and on input by individual rivers.

3.11 The Meeting recalled that PRESSURE has already requested countries to report information on the current state of the load from the sites. The Meeting also recalled that Finland took the responsibility to elaborate a reporting template for the reporting.

3.12 The Meeting suggested to include into the reporting templates questions on the assessment of P-resources in stacks, evaluation of the potential load from stacks as well as information on implemented measures to prevent phosphorus leakage to the environment. The Meeting also suggested to include to the template a section dedicated to environmental monitoring programmes at the sites, including information on location of monitoring stations, frequency of measurements and measured flows and concentrations. In order to assure consistency of the reported data with the PLC assessment data, the information should be reported for the years 2014 and 2017, which are also reference years for PLC-6 and PLC-7 assessments.

3.13 The Meeting agreed that compiled information will allow to estimate total P-input from these sources, evaluate efficiency of applied measures, and justify results of nutrient input assessment.

Overview of methodologies used in the countries for the assessment

3.14 The Meeting took note of the status of compiled information on national methodologies.

3.15 The Meeting agreed that the PLC-group members will review national parts of the compilation **by 24 June 2018** and supply updated versions to the Project Manager, with a copy to the Secretariat (dmitry.frank-kamenetsky@helcom.fi).

3.16 The updated version will be discussed at PLC-7 IG 4-2018 for a subsequent submission of the compilation to PRESSURE 9-2018 for endorsement for publication.

Scientific report on assessment of progress towards national nutrient input reduction targets, extended outline

3.17 The Meeting discussed and elaborated further the structure of the scientific report and agreed on the timeline and procedure for its finalizing in accordance with the recommendations of PRESSURE 7-2017 and PRESSURE 8-2018.

3.18 The Meeting agreed on the suggested structure of the scientific report and distribution of tasks between the authors of the specific chapters. The Meeting also suggested to include into the scientific report a brief background section on nutrient cycles, needs of nutrient reduction, difficulties with data, etc.

3.19 The Meeting also acknowledged that only an initial draft of the report will be presented to PRESSURE 9-2018 and the final draft will be ready by the nutrient reduction workshop in November 2018 and further considered by PRESSURE via correspondence.

Executive summary of the PLC-6 project

3.20 The Meeting considered a concept of the Executive summary (document 3-1) submitted by the Secretariat. The Meeting welcomed the concept and agreed that it will be further elaborated and a draft version of the executive summary will be presented to PLC-7 IG 4-2018 and further to PRESSURE 9-2018.

3.21 The Meeting suggested to highlight and bring forward the main messages from the major products and to shift auxiliary information to margins of the summary. The Meeting also pointed out that:

- The auxiliary information should be separated from main messages by curbing boxes or other means.
- A glossary might be included into the auxiliary information as well as some basic explanations.
- EMEP should be mentioned.
- Links to published PLC products should be included.

3.22 The Meeting agreed that the executive summary will be outlined in pdf-format.

3.23 The Meeting also suggested that the summary will be preceded by short introduction setting the goals in a few words and wrapped up by general conclusions/findings of the project.

3.24 The Meeting invited the authors of the main PLC products (Lars Sonesten, Antti Räike, Bo Gustafsson, Lars M. Svendsen, Seppo Knuuttila) to supply the Secretariat and the Project Manager (dmitry.frank-kamenetsky@helcom.fi, lms@dce.au.dk) with text suggestions of about 200-300 words **by**

2 July 2018. The Secretariat and the PLC Project Manager will update the executive summary, circulate to RedCore 21-2018 and submit to PLC-7 IG 4-2018.

Publication of assessment datasets and detailed assessment results

3.25 The Meeting considered the information prepared for public use.

3.26 The Meeting also discussed the assessment data which are to be publically available as supporting data for MAI and CART assessment. The Meeting agreed that actual and normalized air- and waterborne inputs and total inputs of nitrogen and phosphorus, country per basin, should be available together with flow data.

3.27 The Meeting agreed that the assessment datasets and relevant detailed information will be published at HELCOM webpages on nutrient reduction scheme, the structure of which will be aligned with the structure of the scientific report.

Background information is a substantial part of the PLC-6 report

3.28 The Meeting considered an overview of the data compiled for the chapter.

3.29 The Meeting suggested to utilize background data on connectivity to WWTP and the use of fertilizers for the evaluation of effectiveness of measures. The Meeting also suggested to use the data from EUROSTAT NUTS 2 region to evaluate population connectivity to WWTP with tertiary treatment stage.

3.30 The Meeting welcomed the offer by Sweden to contribute to further elaboration of the background information. The Meeting agreed that the updated version of the background information is to be submitted to PLC-7 IG 4-2018.

Agenda Item 4 Current activities of the PLC-7 project

Results of the intercalibration and draft report

4.1 The Meeting took note of a draft report on intercalibration (document 4-2) and discussed the results of the intercalibration campaign.

4.2 The Meeting recommended to include explanation of reasons to use samples that have been spiked to concentrations corresponding to extreme contamination for intercalibration as well as information on level of detection and level of quantification reported by laboratories.

4.3 The Meeting also suggested to add to the report a short background information on the intercalibration procedure and methods to evaluate reported results. The Meeting also recommended to include into the final report a comparison of the results of current campaign and the one of 2012.

4.4 The Meeting considered necessary follow-up of the results and agreed that the draft report will be circulated to participating laboratories in two weeks to provide missing information.

4.5 The Meeting agreed that DCE will circulate the second draft of the report to the project partners **by 15 June 2018** and invited the partners to comment on it **by 19 August 2018**. The final report will be published after consideration by PLC-7 IG 4-2018.

Progress in update of the PLC-Water Guidelines and progress in drafting the report on statistical methods

4.6 The Meeting considered an overview of updates for statistical methods used in the PLC-7 assessment (**Annex 2**) and discussed the items of the statistical report which have to be included into the updated version of the PLC Guidelines.

4.7 The Meeting agreed to review the description of statistical methods and provide comments in the draft report to the Project Manager **by 20 June 2018**. A final draft of the statistical report will be presented to PLC-7 IG 4-2018.

4.8 The Meeting considered the current state of the PLC-Water Guidelines' revision and agreed on the timeframe and distribution of tasks (**Annex 3**), which will enable submission of the updated draft of the document to PRESSURE 9-2018 for endorsement with subsequent approval by HOD 55-2018 for publication.

4.9 The Meeting also took note of the information on the procedures for filling in data gaps and difficulties faced in normalizing of the data series with large amount of gaps.

4.10 The Meeting took note that some minor inconsistencies between PLC-water database and the last assessment dataset have been revealed. The Meeting invited BNI to contact the national data reporters informing on the revealed inconsistencies **by 15 August 2018**. The Meeting invited national data reporters to verify the data and make corrections in the database.

4.11 The Meeting also welcomed the offer by Finland to negotiate with Russia on possible correction of the data on P-loads by Luga river.

Preparation to the reporting of periodic data 2017

4.12 The Meeting discussed the upcoming cycle of periodic data reporting and reporting templates, clarified questionable issues and agreed on separate reporting procedures for periodic data 2017 and annual data 2017, bearing in mind that these two reporting procedures will be organized almost simultaneously.

4.13 Further, the Meeting discussed and agreed on the need to update metadata in the PLC-water database that will be done within standard procedure of revision of reporting templates.

4.14 The Meeting agreed that as long as annual reporting 2017 will continue as usual, the annually reported data should be withdrawn (disabled) in the periodic templates. The Meeting agreed that only those parameters which are reported periodically and not included into annual templates will be subject for periodic reporting 2017.

4.15 The Meeting agreed that templates should be downloadable from the PLC-Water Database reporting application.

Spatial component of the PLC data 2017

4.16 The Meeting considered spatial PLC (document 4-1) and discuss the updating procedure.

4.17 The Meeting recommended to verify visualization of Danish data on agricultural specific loads and the coverage of mercury data in Finland. Colors for the marks visualizing hydrological and chemical monitoring stations are to be updated for better distinguishing of the sites on the map.

4.18 The Meeting took note that some countries updated their national monitoring programmes which might cause changes of spatial data.

4.19 The Meeting suggested to arrange the procedure to update spatial data to be in line with revision of reporting periodic templates and update of metadata in autumn 2018. The Meeting agreed that the Secretariat will publish national datasets on the PLC-7 workspace **by 1 September 2018** and invite national data reporters to verify spatial parameters and supply updated national spatial datasets to the Secretariat **by 30 November 2018**.

Discussion on phosphorus deposition

4.20 National representatives in the HELCOM PLC-7 project informed the Meeting on any available data on P-deposition on the Baltic Sea and on the data which might be available for the PLC-7 assessments in future.

4.21 The Meeting discussed the currently assumed level of P-deposition on the Baltic Sea and agreed to collect nationally available information on P-deposition. The Project Manager will circulate a questionnaire to the project partners **by 1 June 2018**. The Meeting invited project partners to respond to the questionnaire **by 15 August 2018**.

4.22 The Meeting agreed to come back to the discussion on the need of P-deposition revision at the PLC-7 IG 4-2018 meeting, bearing in mind that this revision is to be reflected in the updated PLC-Water Guidelines.

Agenda Item 5 Data reporting

Result of the 2015 data reporting and update of the MAI indicator

5.1 The Meeting considered the draft update of the MAI indicator and the dataset behind the indicator (document 5-2) and agreed on the version to be submitted to HOD 54-2018 for endorsement and publication.

The status of the annual data 2016 reporting and approval

5.2 The Meeting considered the results of the reporting of the data on nutrient inputs in 2016 (document 5-1) and agreed on the actions and deadlines needed to finalize national datasets to launch the assessment procedure.

5.3 The Meeting was informed that:

- Lithuania: has approved 12 parameters; SCPL00025 and SCPL00052 have been included into Lithuanian loads;
- Finland: sub-catchment SCFI 00023 has been included into unmonitored areas;
- Germany: SCDE00135X to be merged with German part of Oder catchment.

5.4 The Meeting invited the partners to verify and approve the data **by 15 June 2018**. The Meeting requested the Secretariat to contact Poland, Russia and Latvia and clarify open issues with national data reporters by the same date.

Agenda Item 6 Any other business

Public access to the PLC data

6.1 The Meeting discussed about feedback on the public interface of the PLC-Water database and agreed that all spotted errors have been corrected so that the public access to the database can be opened.

6.2 The Meeting recommended to advance filters enabling check boxes to select several counties or several sub-basins. The Meeting also recommended to include areas for monitored sub-catchments and coordinates for monitoring stations in addition to river mouths.

6.3 The Meeting pointed out that all counties, except Poland, have nominated representatives to the PLC-7 Project Implementation Group.

6.4 The Meeting took note that the deadlines for updating of the methodologies and the PLC Guidelines will be postponed to adjust to the PLC meetings.

Agenda Item 7 Future work and meetings

7.1 The Meeting reviewed the list of nominated project contacts and updated it, as necessary (**Annex 4**).

7.2 The Meeting discussed and took note of an updated PLC-7 timetable (**Annex 5**).

7.3 The Meeting welcomed an offer by Sweden to host the PLC-7 IG 4-2018 in Gothenburg on 10-12 September 2018.

Agenda Item 8 Closing of the Meeting

8.1 The Meeting agreed to adopt the draft Outcome of PLC-7 IG 3-2018 Meeting via correspondence. The Outcome will be made available in the HELCOM Meeting Portal, together with the documents considered at the Meeting.

Annex 1 List of Participants

Representing	Name	Organization	E-mail address
Denmark	Lars M. Svendsen	DCE - Danish Centre for Environment and Energy, Aarhus University	llms@dce.au.dk
	Henrik Tornbjerg	Aarhus University - Department of Bioscience	hto@bios.au.dk
	Susanne Boutrup *)	DCE, Aarhus University	sub@dce.au.dk
Estonia	Peeter Ennet	Estonian Environment Agency	Peeter.Ennet@envir.ee
Finland	Antti Raike	Finnish Environment Institute(SYKE)	antti.raike@ymparisto.fi
	Seppo Knuuttila	Finnish Environment Institute(SYKE)	seppo.knuuttila@ymparisto.fi
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Lithuania	Svajunas Plunge	Environmental Protection Agency	s.plunge@aaa.am.lt
Poland	Alicja Pecio	Institute of Soil Science and Plant Cultivation - State Research Institute in Pulawy	alicja.pecio@iung.pulawy.pl
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	Helene Ejhed	IVL Swedish Environmental Research Institute	Helene.ejhed@ivl.se
BNI	Bo Gustafsson	Baltic Nest Institute, Stockholm University	bo.gustafsson@su.se
	Alexander Sokolov	Baltic Nest Institute, Stockholm University	alexander.sokolov@su.se
HELCOM	Dmitry Frank-Kamenetsky	HELCOM Secretariat	dmitry.frank-kamenetsky@helcom.fi

Annex 2 Update of statistical methods for PLC-7

Revision of methods and new ones added:

- Flow normalization in the case of trend in the flow
- How to estimate uncertainties on monitored, unmonitored and total inputs for country pr. basin.
- Detection of change/break-points in time series.
- Non-linear trend.
- Estimation of “last year” input.
- Testing “last year” against the reference period (1997-2003).

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Flow normalization

If the flow time series has a significant trend (as tested by the Mann-Kendall trend test), then divide the time series into two part: 1995-2005, 2006-2015. The relationship between load and flow changes over time, so need to adjust.

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Uncertainties:

This deals with the uncertainty for yearly loads from one river, a sum of inputs from a number of rivers, from a country, to a complete basin, etc.

Danish method:

This is an alternative to the method described in the first report on statistical methods. Can be used in cases where an estimate of the uncertainty of yearly loads are known:

Uncertainty is defined as the sum of the bias and the precision (standard deviation), for one stream:

$$Uncertainty (\%) = \frac{100}{X} \sqrt{(bias \cdot X)^2 + (precision \cdot X)^2}.$$

Measured area of Denmark:

- Measured area: 169 stations (55% of total Danish area).

- $Uncertainty (\%) = \frac{100}{\sum_{i=1}^{169} X_i} \sqrt{\sum_{i=1}^{169} \{(bias_i \cdot X_i)^2 + (precision_i \cdot X_i)^2\}}.$

- Law of propagation of errors. X_i stochastically independent variables

- Precision is defined as the relative standard deviation.

- For TN: Streams divided into these categories
 - 0-50 km²: Bias: -1% til -3%; Precision: 1-3%
 - 50-200 km²: Bias: -0.7% til -3%; Precision: 1-3%
 - >200 km²: Bias: -1% til -4%; Precision: 2-5%
 - Bias: -1 to -4%
 - Precision: 0.7 to 1.2 %
 - Uncertainty: 0.7 to 1.3%.
- For one average station:
 - Bias: -1 to -3%
 - Precision: 3 to 5 %
 - Uncertainty: 3.2 to 5.8%.
- Unmeasured area: Modelling concentrations and runoff in 1286 small catchments.
- L= F(Ndiffuse (model), Retention lakes, Retention stream, Retention groundwater, Point sources)

Components	Bias (%)	Precision (%)
Model	-15 -> 25	12 -> 15
Retention lake	-5 -> 5	40
Retention stream	-5 -> 10	40
Retention total	-5	40
Point source: industry	-1 til -3	1 til 3 -> 5 til 10
Point source: waste water	-1 til -3	1 til 3 -> 5 til 10
Point source: fish farms	-1 til -3	1 til 3 -> 15 til 20
Point source: rain water	-5	40

- Bias: 20 to 28%
- Precision: 0.8 to 2.0 %
- Uncertainty: 1.2 to 2.2%
- For one average small catchment:
 - Bias: 27%
 - Precision: 15 to 20%
 - Uncertainty: 31 to 34%.
- For the total Danish area, combining the two:
 - Bias: 7.4 to 12.8 %
 - Precision: 0.5 to 1.1%
 - Uncertainty: 7.4 to 12.8%

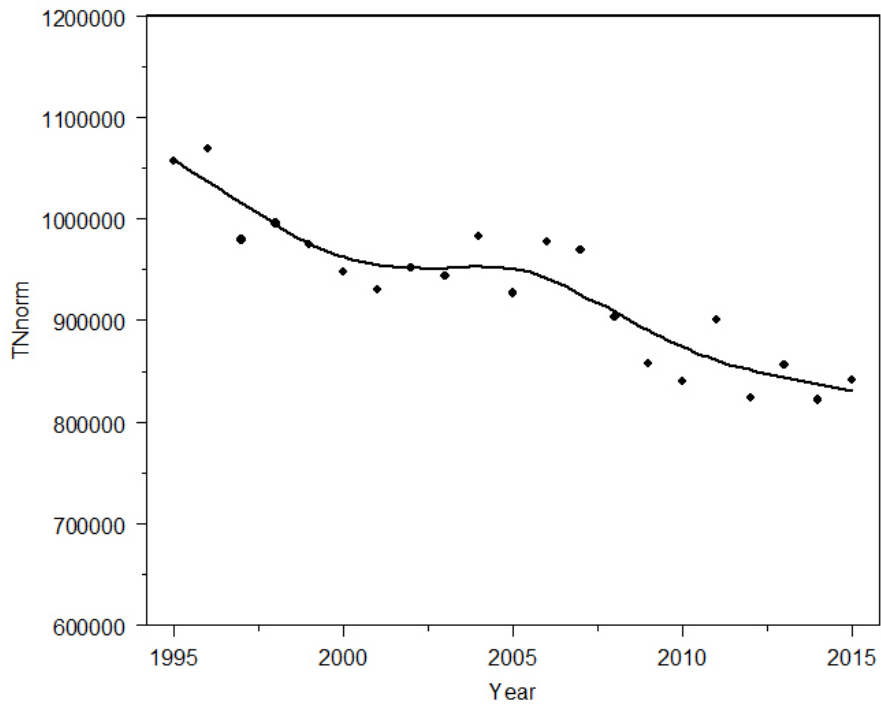
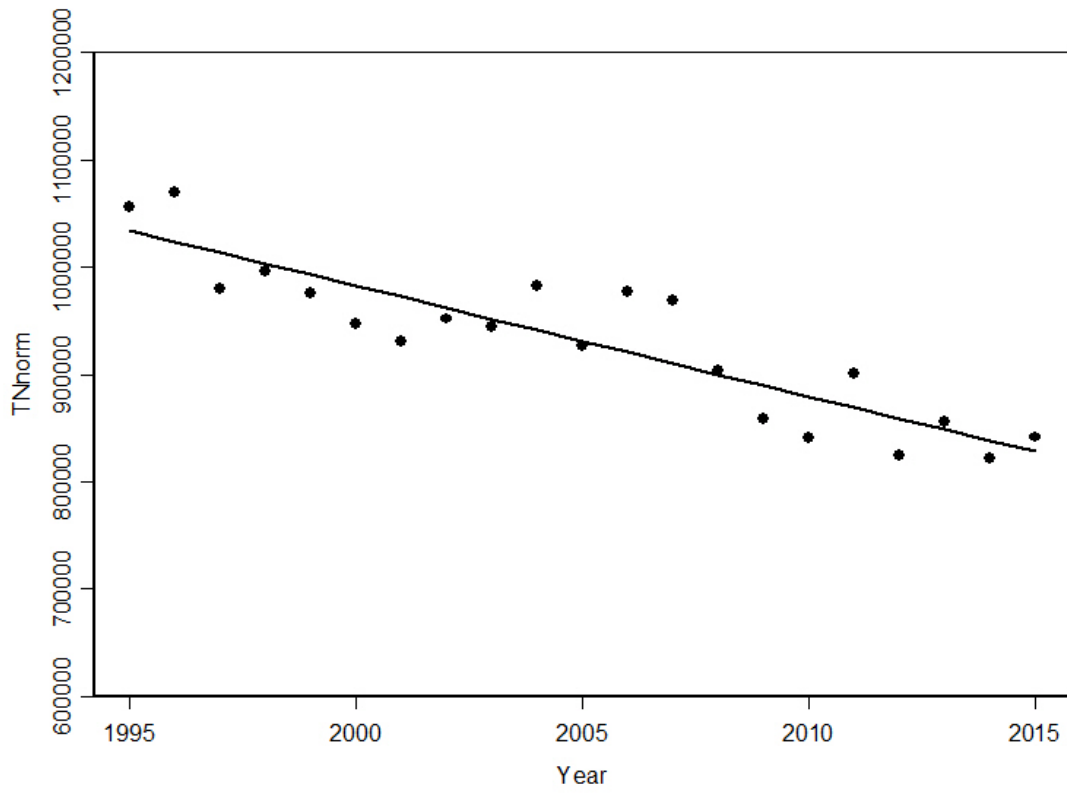
Variation in the full time series (inputs for a number of years)

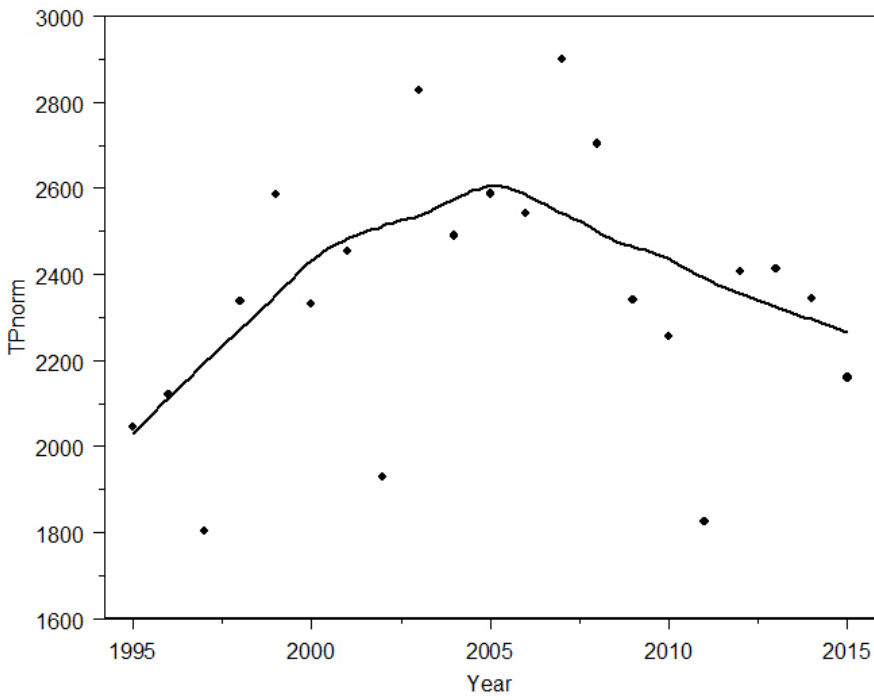
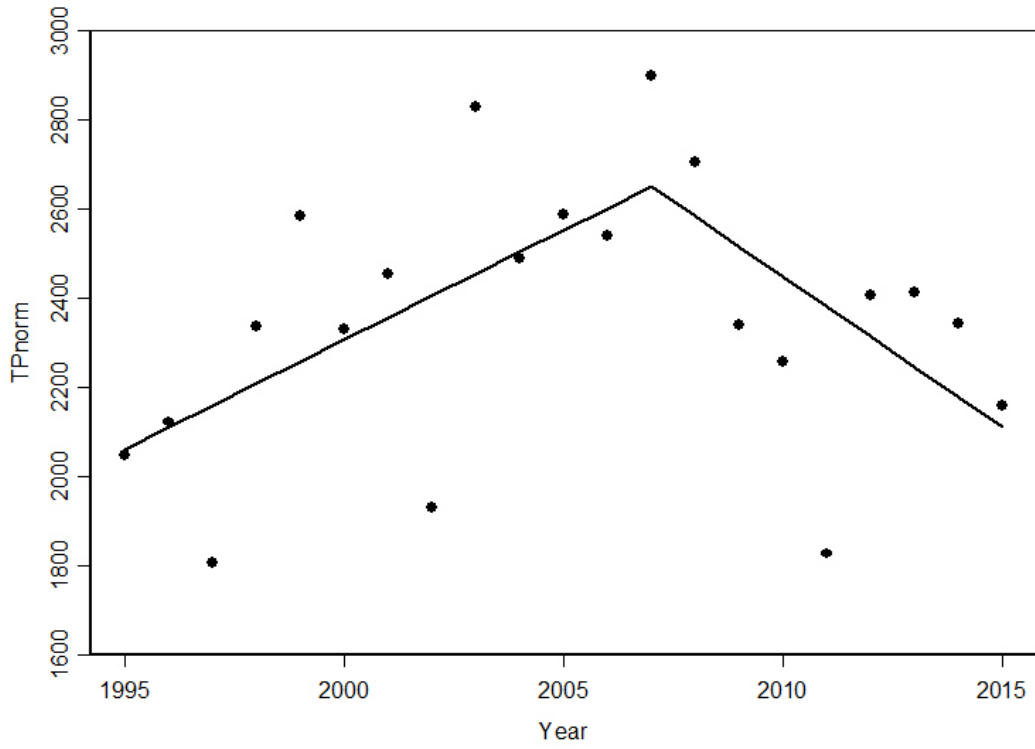
- Total variance in a time series: $\sigma^2 = \sigma_X^2 + \sigma_{Between Y}^2$
- It's the total variance that is used for statistical analyses
How to calculate σ_X^2 ? – equals the precision calculated in %.

Mann-Kendall trend analysis

This statistical method will still be used for at first analysis of possible trends in the different time series.

LOESS (locally weighted scatterplot smoothing) regression as a supplement for detecting non-linear trends and for helping detecting change-points/step trends.





Total change over the period

Will use method based on start – end values. However, others can be applied as well.

Detection of change/break-points in time series

DCE suggest using models with 1, 2 or 3 linear parts for different sections of the time series (it is still possible that no part of the time series includes significant linear trends). Determination of breakpoints will be statistically analyzed by using an iterative statistical process, which will determine the most significant breakpoint (the significance of the breakpoint is evaluated by the change in $-2\log Q$) – or automatically. At least 5 years at the ends, before change-points.

DCE propose to investigate two different breakpoint models:

1:

$$L_{Ni} = \begin{cases} \alpha + \beta \cdot i, & \text{for } i < Y \\ \alpha + \beta \cdot i + d \cdot (i - Y), & \text{for } i \geq Y \end{cases}$$

2:

$$L_{Ni} = \begin{cases} \alpha_1 + \beta_1 \cdot i, & \text{for } i < Y \\ \alpha_2 + \beta_2 \cdot i, & \text{for } i \geq Y \end{cases}$$

Y = a given year and L_N is normalized load and index i indicate the different years in the time series.

Model 1 is continuous at the breakpoint (the two lines are connected) while model 2 has disconnected lines at the breakpoint (a step).

After the first breakpoint is determined, another iterative process looking for a second breakpoint is performed.

Change-points models are an aid for estimating the last year value and to get an idea of the overall trend during the full time series period.

Finally, significance of the slope in the last segment is tested, and if not significant different from zero then we use the model:

$$L_{Ni} = \begin{cases} \alpha + \beta \cdot i, & \text{for } i < Y \\ k, & \text{for } i \geq Y \end{cases}$$

Procedure (for estimating “last year” value)

Analyzing for one change-point:

No: Is there an overall significant trend?

Yes: Fit a linear model

No: Estimate a constant throughout time series

Yes: Analyzing for a second change-point

Yes: Testing the significance of the last segment

Yes: Fit model

No: A constant in the last segment

No: Testing the significance of the last segment

Yes: Fit model

No: A constant in the last segment

Estimation of “last year” input

“Trend method” (examples with one change-point)

$$L_{Ni} = \begin{cases} \alpha + \beta \cdot i, & \text{for } i < Y \\ \alpha + \beta \cdot i + d \cdot (i - Y), & \text{for } i \geq Y \end{cases}$$

$$\widehat{L_{N2014}} = \hat{\alpha} + \hat{\beta} \cdot 2014 + \hat{d} \cdot (2014 - Y)$$

Or

$$L_{Ni} = \begin{cases} \alpha_1 + \beta_1 \cdot i, & \text{for } i < Y \\ \alpha_2 + \beta_2 \cdot i, & \text{for } i \geq Y \end{cases}$$

$$\widehat{L_{N2014}} = \hat{\alpha}_2 + \hat{\beta}_2 \cdot 2014.$$

Or

$$L_{Ni} = \begin{cases} \alpha + \beta \cdot i, & \text{for } i < Y \\ k, & \text{for } i \geq Y \end{cases}$$

$$\widehat{L_{N2014}} = \hat{k}$$

The SE for the estimated input for the last year (2014) has the general form of

$$SE = \sqrt{MSE} \cdot \sqrt{1/n + \frac{\text{last year}^2}{\sum_{i=\text{start year}}^{\text{last year}} i^2}}$$

MSE is calculated for full model (including all years in the time series).

Correction for calculating control value for 2014 ($L_{N2014}(\text{control}) = \widehat{L_{N2014}} + m \cdot SE$).

The m factor is the 95% percentile in a t-distribution with $n-p$ degrees of freedom. The number p is the number of parameters in the final model.

T-tests

Reference period (1997-2003) against last 5 or 3 years will not be done any more.

Instead:

Comparing the 95%-confidence interval for the mean in the reference period against the 95%-confidence interval calculated for the model-estimated value for the “last-year”.

Annex 3

Revision of PLC guidelines – tasks, responsible persons and deadlines

Chapter	Title	Needed revision	When revised?/ Who?
		<p>We need more guidance related to</p> <ul style="list-style-type: none"> - HZS: information on how estimate inputs of HZS from unmonitored areas and main sources of - How to quantify, report and evaluate effect of measures - Which background information to provide, and include reporting format - further elaborate on statistical methods including evaluations of fulfilling MAI and CART - include more guidance related to how to determine uncertainty on inputs, sources etc. - more guidance related to quantification of sources (source apportionment), retention, quantifying inputs from diffuse sources - Further consider parameters to monitor - Need to specify issues related to big rivers - Clarifying chapters and annexes regarding reporting templates and ensure 100 % correspondence between guidelines and reporting formats <p>Consider if we want to include more related to air- deposition.</p>	The division of tasks depends on who are prepared to contribute and take the lead – some proposals are inserted, and the deadline requested
1	Introduction		
1.1	Aim of PLC assessments	Update reflecting PLC strategy	2016/LMS – done
1.2	Aims of the PLC guidelines	Proof	Spring 2017/LMS - done
1.3	PLC data reporting requirements	Update tables 1.1 and 1.2 regarding which parameters to monitor. Refer to revised recommendations	2016/LMS - done
2	Framework and approach of waterborne pollution		

Chapter	Title	Needed revision	When revised?/ Who?
2.1	Overall framework	Adjust to reflect changes in the guidelines, e.g. chapter on which information to provide regarding measures and other background information	LMS – spring 2018 Deadline 20.8.2018
2.2	Quantification of total inputs to the Baltic Sea	Need to consider any additions related to HZS	LSo - spring 2018 Deadline 20.8.2018
2.3	Quantifying sources of waterborne nutrient inputs to the Baltic Sea	Need to consider any additions related to HZS – as we can't expect to make as detailed source quantification as for nutrients	LSo -spring 2018 Deadline 20.8.2018
2.4	Supporting tools	Update if any changes	LMS - spring 2018 Cannot be finalized before the other inputs/revisions are available Deadline 20.8.2018
2.5	Basic definitions	Proof checking	2016/LMS – done
2.6	Division of the Baltic Sea	Proof checking	2016/LMS - done
3	Guidance on monitoring		
3.1	Flow measurements	Proof checking	2016/LMS – done
3.2	Sampling strategy for water samples: site selection and	Any need for adding text related to special needs for HZS	2016/LSo - done
4	Quantification of load from monitored		
4.1	Method for calculation of the load from monitored rivers	Proof checking (flow) Any need for adding text related to special needs for HZS	2016/LMS - done LSo spring 2018 – Deadline 20.8.2018
4.2	Methods for estimating the water flow for rivers where chemical and hydrological stations are not located at the	Any need for adding text related to special needs for HZS	LSo - spring 2018 – Deadline 20.8.2018
5	Quantification of load from point		
5.1	Municipal Wastewater Treatment Plants (WWTP)	Any need for adding text related to special needs for HZS <i>Needs to harmonize with OSPAR HARP</i>	LSo-Ditmar - spring 2018 (in process) Deadline 20.8.2018 LMS - spring 2018 Deadline 20.8.2018
5.2	Industrial Plants (INDUSTRY)	Any need for adding text related to special needs for HZS <i>Needs to harmonize with</i>	Summer/autumn 2017/LSo Dietmar - done <i>Needs to harmonize with OSPAR HARP</i>

Chapter	Title	Needed revision	When revised?/ Who?
5.3	Aquaculture	Needs for updates due to revised recommendations? <i>Needs to harmonize with OSPAR HARP</i>	LMS - spring 2018 (In process) Deadline 20.8.2018 <i>Needs to harmonize with OSPAR HARP</i>
6	Quantifying diffuse losses of nutrients		
6.1	Quantification of the natural background nutrient losses	Update table 6.1 – consider further guidance – background losses HZS (trial exercise)	Seppo - spring 2018 Deadline 20.8.2018 LSO -spring 2018 Deadline 20.8.2018
6.2	Quantification of nutrient losses from diffuse anthropogenic sources	Update methodology overview – more guidance, examples with experienced results from PLC6. Any issues for HZS?	Svajunas and Seppo, Natalja (LSO – HZS) - spring 2018 Deadline 20.8.2018
7	Methods for estimation of inputs from unmonitored areas	Provide more guidance, more examples on methodology and examples of results from PLC 6. Any issues for HZS?	LSO-Svajunas - spring 2018 Deadline 20.8.2018
8	Transboundary rivers	Relevant for HZS	LSO – sommer 2018 Deadline 20.8.2018
8.1	Introduction	Proof readings	2016/LMS – done
8.2	Definitions	Proof readings	2016/LMS – done
8.3	Estimates of actual and net transboundary inputs used in the 2013 Copenhagen HELCOM Ministerial	Consider rewriting based on PLC 6 results	2016/LMS – done
8.4	Necessary information for quantifying transboundary	Proof readings	2016/LMS – done
8.5	Overview of transboundary rivers to take into account in annual reporting	Correct/update table	2016/Secretariat – spring 2018 Deadline 20.8.2018 LMS - done
9	Quantification of nutrient retention (in inland surface waters)	Update chapter based on results from PLC6 – and new knowledge – <i>HZS considered some inputs</i> <i>-include a sub-chapter on retention on transboundary inputs</i>	LMS, Natalja, Ilga, Antti, Peeter, Bo) - spring 2018 Deadline 20.8.2018
9.1	Introduction		
9.2	Quantification		
9.3	Available retention data		

Chapter	Title	Needed revision	When revised?/ Who?
10	Quantification of sources of waterborne inputs to inland waters and to the sea	Provide more guidance, more examples on methodology and examples of results from PLC 6. Any issues for HZS? For preparing PLC8: Major revision including comparing methodologies: for PLC8 – separate project for evaluating to make one common methodology?	Antti, LMS, Helen, Deadline 20.8.2018 LSO – spring 2018 Deadline 20.8.2018 2018-2020/ - not PLC-7
10.1	Source oriented approach: Quantification of sources of waterborne	Provide more guidance, more examples on methodology and examples of results from PLC 6.	Antti, LMS, Helen spring 2018 Deadline 20.8.2018
10.2	Load oriented approach: Quantification on	Provide more guidance, more examples on methodology and examples of results from PLC 6.	Antti, LMS, Sweden -- spring 2018 Deadline 20.8.2018
11	Statistical methods and data validation		
11.1	Introduction	Update	Spring 2018, SEL/LMS Deadline 20.8.2018
11.2	Data gaps	More guidance e.g. also related to HZS?	SEL/LMS - spring 2018 (LSO – HZS) Deadline 20.8.2018
11.3	Outliers	More guidance e.g. also related to HZS?	SEL/LMS - spring 2018 Deadline 20.8.2018
11.4	Uncertainty of inputs (yearly input from a specific country or area)	More methods, guidance and examples on uncertainty on monitoring data, total inputs pr. Catchment, total for CP, on averages, individual point sources, source apportionment, model estimated etc.	SEL/LMS + others - spring 2018 Deadline 20.8.2018
11.5	Hydrological normalization of riverine inputs	Include description of methodology when there is trend in flow	SEL/LMS + Sweden - spring 2018 Deadline 20.8.2018
11.6	Trend analysis and the estimations of change	Including breakpoint analysis and if decided also including non-linear trend test and estimation of changes	SEL/LMS+Sweden- spring 2018 Deadline 20.8.2018
11.7	Testing fulfilment of BSAP reduction targets (MAI and CART)	Describe the methodologies including how to estimate the uncertainty	SEL7LMS - spring 2018 Deadline 20.8.2018
11.8	Mathematical description of the Mann-Kendall	Proof checking	SEL/LMS - spring 2018 Deadline 20.8.2018

Chapter	Title	Needed revision	When revised?/ Who?
12	Quality assurance on water chemical		
12.1	Specific aspects of quality assurance	Proof checking	SUB - spring 2018 Deadline 20.8.2018
12.2	Minimum quality assurance by the	Any need for updating	SUB - spring 2018 Deadline 20.8.2018
12.3	Inter-laboratory comparison test on	Revised and extended after next intercalibration	SUB - spring 2018 Deadline 20.8.2018
12.4	The PLC-6 inter-laboratory comparison test on chemical	Extended with PLC 7 results and also comparing with PLC 6 results	SUB - spring 2018 Deadline 20.8.2018
12.5	Validation of PLC-water chemical data	Update needed?	SUB - spring 2018 Deadline 20.8.2018
12.6	Recommended limits of	Update needed?	SUB - spring 2018 Deadline 20.8.2018
12.7	Values under the limit of	Update needed?	SUB - spring 2018 Deadline 20.8.2018
12.8	Technical notes on the determination of variables in rivers and	Update needed?	SUB - spring 2018 Deadline 20.8.2018
New	Background information and information on measures	<i>New chapter describing the requested background information to be provided by the countries, what should be reported and how (including examples on how the information should be reported)</i> <i>Further sections describing how to quantify effect of measures, and to report information of measures</i>	AR&LMS + Seppo spring 2018 Deadline 20.8.2018
NEW	Introduce how to report and quality assure using PLC WEB-application		consultant (Secretariat and BNI) - spring 2018 Draft available Deadline 20.8.2018
13	Annual PLC reporting requirements	Update reflecting changes in former chapters related to new parameters to monitored, data to collect data and information to report	Secretariat and BNI - spring 2018 Deadline 20.8.2018
13.1	Reporting of the inputs from monitored		
13.2	Reporting of the inputs from		
13.3	Reporting of the inputs from direct		
13.4	Reporting of quality		
13.5	Reporting of the inputs from direct		

Chapter	Title	Needed revision	When revised?/ Who?
14	Periodic PLC reporting requirements	Update reflecting changes in former chapters related to new parameters to monitored, data to collect data and information to report	Secretariat and BNI? spring 2018 Deadline 20.8.2018
14.1	Source-orientated approach: Methodology for quantifying sources of waterborne inputs to		
14.2	Load-oriented approach - reporting riverine		
14.3	Reporting on uncertainty on		
15	References	Update	LMS 2016 - done all spring 2018
ANNEXES			
Annex 1	List of definitions and acronyms	Update	all spring 2018
Annex 2	Annual reporting formats	Update reflecting changes in former chapters related to new parameters to monitored, data to collect data and information to report	Secretariat-and BNI spring 2018 Deadline 20/08-2018
Annex 3	Periodic reporting formats	Update reflecting changes in former chapters related to new parameters to monitored, data to collect data and information to report	Summer-early spring 2017/Secretariat-and BNI spring 2018 Deadline 20.8.2018
Annex 4	Examples of instructions to personnel carrying	Need for update – issues related to HZS	2016/LSo – done
Annex 5	Examples on measurement uncertainty estimations	Title confusing –it is uncertainty due to chemical analysis – need updating? The examples changes to phosphorus examples – and change title. Further consider need of extending for HM's.	SUB spring 2018 Deadline 20.8.2018
Annex 6	Examples on reporting industrial point sources with references to IE Directive and PRTR	Proof reading	Dietmar - done

Chapter	Title	Needed revision	When revised?/ Who?
Annex 7	EMEP assessment of atmospheric nitrogen and heavy metal deposition on the Baltic Sea	Considered how much is needed (only HELCOM relevant issues)?	EMEP –summer 2018 Deadline 20.8.2018
Annex 8	List of HELCOM PLC	Remove it	

Annex 4 Nominated PLC-7 Project Implementation Group members

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Annex 5

Revised overall roadmap 24.05.2018 – for PLC-7 IG 3-2018

Changes as compared with the original table are indicated with italics.

Extra task under PLC-7 project (tasks 12-16) are also with italic.

Table 1: Overview of the main tasks and the planned start and end for each task. “1/2017” indicates first quarter of 2017. The right column indicates “Revised end of task”. Where the deadlines are foreseen to change from the planned PLC-7 project it is marked with italic. Task 12-16 is a new task added to the PLC-7 project.

PLC- 7 task	Start	End	New end
1. Project management (including about 12 project team meetings)	1/2017	4/2020	4/2020
2. Workshops (2 workshops are planned)	1/2017	4/2019	4/2019
3. Monitoring and compilation of national annual/periodical data	1/2017	4/2017	4/2017
4. Reporting of quality assured national annual/periodic data	3/2018	3/2019	3/2019
5. Establishing the periodic assessment data set 1995-2017	2/2019	4/2019	4/2019
6. Assessment of sources of nutrients	4/2019	1/2020	1/2020
7. Assessment of the effectiveness of measures	1/2019	1/2020	1/2020
8. Assessment of inputs of selected hazardous substances	3/2019	2/2020	2/2020
9. Compilation of the executive summary and policy messages	3/2020	4/2020	4/2020
10. Updating guidelines and statistical methodology report	1/2017	1/2018	4/2018
11. Intercalibration on heavy metals and nutrients	3/2017	2/2018	3/2018
12. <i>Finalizing PLC-6 assessment products</i>	1/2017	2/2018	1/2019
13. <i>Update Core indicator on nutrient inputs 1995-2015</i>	1/2017	1/2018	2/2018
14. <i>Update Core indicator on nutrient inputs 1995-2016</i>	1/2018	4/2018	4/2018
15. <i>Update Core indicator on nutrient inputs 1995-2017</i>	4/2019	1/2020	4/2019
16. <i>Update scientific report on progress towards CART 1995-2017</i>	4/2019	3/2020	3/2020