Baltic Marine Environment
Protection Commission

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Activities of the Baltic Marine Environment Protection Commission (Helsinki Commission / HELCOM) related to transboundary air pollution

Almost three decades of assessing pollution inputs to the Baltic Sea

Since the establishment of the Convention for the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention) in 1974, HELCOM has been working to reduce the inputs of nutrients and hazardous substances to the sea.

Through coordinated monitoring, HELCOM has, since the mid-1980s been compiling information about the magnitude and sources of nutrient and hazardous substance inputs into the Baltic Sea. By regularly compiling and reporting data on pollution loads, HELCOM is able to follow the effectiveness of measures and the progress towards politically agreed pollution reduction input goals.

The first HELCOM Recommendation[1] on monitoring of airborne pollution load was adopted in 1986 (HELCOM Recommendation 7/1) and has since been revised numerous times. The current valid recommendation, Recommendation 24/1, was adopted in 2003. The first assessment on airborne pollution load to the Baltic Sea covering 1986-1990 was published in 1991[2] and updated assessments have been published at regular intervals, the latest being the Review of the Fifth Baltic Sea Pollution Load Compilation for the 2013 HELCOM Ministerial Meeting.

Cooperation with EMEP

The European Monitoring and Evaluation Programme (EMEP) under the Convention on Long-range Transboundary Air Pollution (CLRTAP) has acted as a data consultant for HELCOM concerning atmospheric pollution inputs to the Baltic Sea since 1998. EMEP MSC-W and EMEP MSC-E model the deposition of nitrogen, cadmium, lead, mercury and PCDD/Fs to the Baltic Sea based on emission data reported by the Contracting Parties within the framework of CLRTAP. Every year, EMEP produces an annual report for HELCOM on emissions of these substances from different sources and the modelled depositions to the Baltic Sea.

In addition, on a case by case basis, HELCOM has contracted EMEP to make more detailed assessments, such as Estimation of atmospheric nitrogen deposition to the Baltic Sea in the periods 1997-2003 and 2000-2006 (in 2008) and Effects of Revised Gothenburg Protocol on Nitrogen Deposition to the Baltic Sea.

HELCOM nutrient reduction scheme – new focus on transboundary air pollution

Eutrophication, caused by excessive inputs of the nutrients nitrogen and phosphorus to the sea, is one of the main environmental problems of the Baltic Sea. Although HELCOM has been working to reduce the inputs of nutrients to the sea for four decades now, a new strategic approach was taken in 2007 with the adoption of the HELCOM nutrient reduction scheme as part of the HELCOM Baltic Sea Action Plan. The scheme is a regional approach to sharing the burden of nutrient reductions to achieve the goal of the Baltic Sea unaffected by eutrophication and consists of two main components:

[1] HELCOM makes Recommendations on measures to address certain pollution sources or areas of concern which are to be implemented by the Contracting Parties through their national legislation.
[2] Airborne pollution load to the Baltic Sea during, 1986-1990. Published in 1991 in the HELCOM Baltic Sea Environment Proceedings series (BSEP No. 39)

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1. Maximum Allowable Inputs (MAI) of nutrients, indicating the maximum level of inputs of water- and airborne nitrogen and phosphorus to Baltic Sea sub-basins that can be allowed to fulfil environmental targets for a sea unaffected by eutrophication;
2. Country-Allocated Reduction Targets (CART), indicating how much nutrient inputs the HELCOM countries need to reduce compared to a reference period (1997-2003).

The MAI and CART have been revised and updated making use of newer and more complete data, improved scientific basis (environmental targets and models) and different allocation principles. According to the new MAI and CART, which were adopted in 2013, the maximum annual nutrient input to the Baltic Sea that can be allowed and still make it possible to reach good environmental status with regard to eutrophication is about 21,700 tonnes of phosphorus and 792,200 tonnes of nitrogen.

The scheme recognizes the contribution of nutrient inputs also from non-HELCOM Contracting Parties, such as waterborne inputs from upstream countries in the drainage area, air emissions from Baltic Sea shipping as well as transboundary air pollution from outside the Baltic Sea region. A quarter of the total nitrogen input to the Baltic Sea is airborne, and of this about 40% originates from sources outside the Baltic Sea catchment area.

In order to address this significant source of nitrogen inputs to the Baltic Sea, the Contracting Parties, in the Baltic Sea Action Plan, agreed that their governments make use of the assessments of the inputs and effects of airborne nitrogen to the Baltic Sea in the revision of the emission targets for nitrogen under the 1999 Gothenburg Protocol of the CLRTAP and the EU Nitrogen Emission Ceilings (NEC) Directive.

The 2013 nutrient reduction scheme takes into account expected reductions of 18,720 tonnes of airborne nitrogen from non-Contracting Parties, assuming full implementation of the 1999 Gothenburg Protocol by 2020, as well as reductions of 6,930 tonnes of airborne nitrogen inputs from shipping over thirty years.

The elaboration of the nutrient reduction scheme as well as the development of a system for follow-up on progress towards reaching the reduction targets has involved close cooperation with EMEP and revision of their data deliverables to HELCOM. Nowadays the EMEP data products include more details (inputs from each HELCOM country to the different Baltic Sea sub-basins) as well as normalized annual depositions. This has allowed for better inclusion of atmospheric inputs in the revised (2013) nutrient reduction scheme and countries have even been allocated reduction requirements to distant basins based on their contribution of atmospheric inputs. Improved data on atmospheric inputs allows the HELCOM Contracting Parties to account for reductions in atmospheric emission towards reaching their reduction targets, something that is important especially for those countries whose inputs are predominately from airborne sources. The use of normalized input data also allows for better evaluation of the effectiveness of measures since it reduces the influence of meteorological conditions and hence reduces interannual variation of inputs.

The full implementation of the HELCOM nutrient reduction scheme (and reaching a good eutrophication status in the Baltic Sea) is dependent not only on actions taken by the HELCOM Contracting Parties, but also on successful implementation of commitments under other legislative frameworks. It is worth noting, however, that full implementation of the 1999 Gothenburg Protocol (and EU NEC directive) by CLRTAP Contracting Parties may not necessarily directly result in the reaching of the HELCOM nutrient reductions scheme targets. Germany has presented[3] information of possible different scenarios for implementing nitrogen emission reduction measures under the Gothenburg Protocol in Germany and their results suggest that depending on where in Germany measures are taken there are different effects on deposition to the Baltic Sea and hence reaching of their HELCOM reduction targets.

[3] Document 9-9 of the Meeting of HELCOM LOAD 7-2014

Assessment of atmospheric inputs of hazardous substances

Transboundary atmospheric inputs of hazardous substances are also of relevance for the Baltic Sea and of interest to HELCOM. The Baltic Sea Action Plan identified 11 hazardous substances or substance groups of specific concern to the Baltic Sea substances.

HELCOM is currently developing "state indicators" for assessment their presence in the marine environment, but it is equally important to also develop "pressure indicators" which assess trends in the inputs of these substances to the sea. Mercury, cadmium and PCDD/Fs (which are included on the list) are already assessed for HELCOM by EMEP MSC-E. Work is on-going to identify other substances for which atmospheric input is an important pathway to the marine environment and in 2015 EMEP MSC-E will present (on a test basis) data products on air emissions and atmospheric deposition of PCB-153.

Conclusions

There has been good cooperation between HELCOM and EMEP, and HELCOM has benefited from the work being carried out under CLRTAP. Although implementation of the 1999 Gothenburg Protocol will result in reductions in atmospheric deposition of nitrogen to the Baltic Sea, reaching the HELCOM nutrient reduction targets will only be possible if nutrient reduction measures are implemented in a way that takes into account emission sources that affect the Baltic Sea.

With best wishes for continued fruitful cooperation.