

COHIBA

NEWS 1/09

CONTROL OF HAZARDOUS SUBSTANCES IN THE BALTIC SEA REGION



METSÄHALLITUS 2009

**MORE EFFECTIVE CONTROLS FOR HAZARDOUS SUBSTANCES
A NEW WAY TO EVALUATE EFFLUENT**

INVESTIGATING MISSING LINKS | COST-EFFECTIVE WAYS TO REDUCE INPUTS | BETTER INFORMATION – BETTER POLICIES

MORE EFFECTIVE CONTROLS FOR HAZARDOUS SUBSTANCES

The Baltic Sea contains many problematic pollutants including mercury, dioxins, TBT and brominated flame retardants. But where do these pollutants come from, and how do they end up in the sea? How can we control them?

The project **Control of hazardous substances in the Baltic Sea region (COHIBA)** aims to identify the most significant sources, uses and pathways of various hazardous substances that are problematic in the Baltic marine environment.

Persistent problems

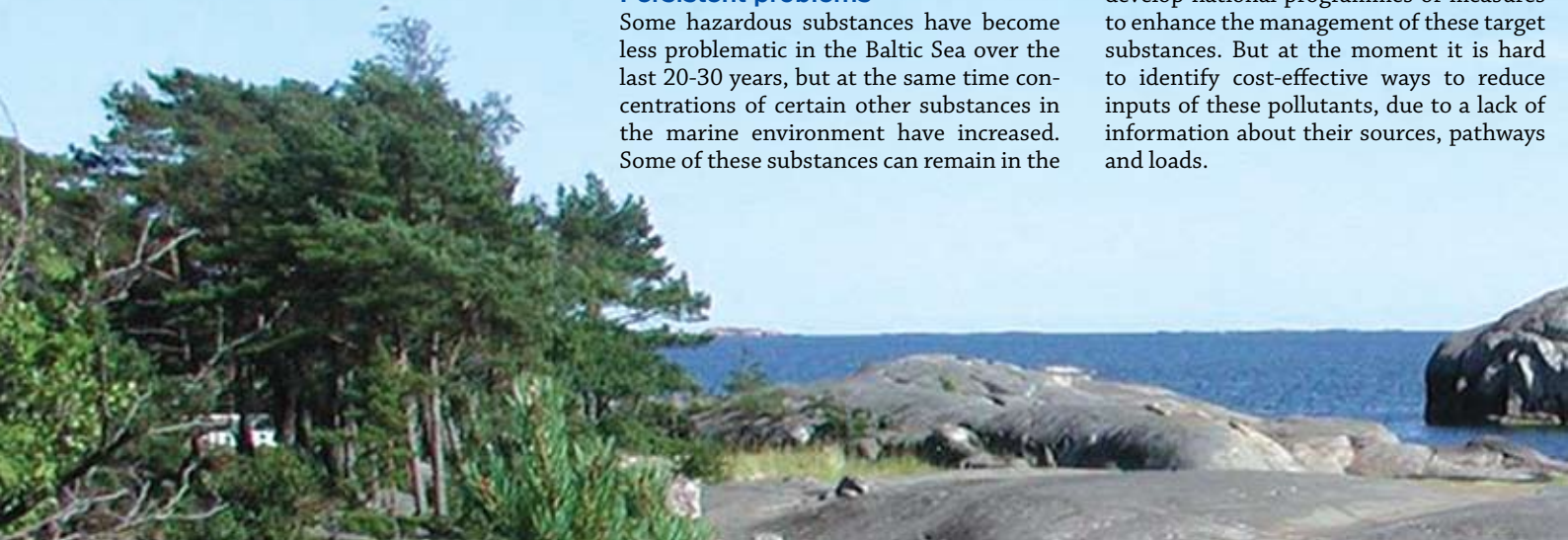
Some hazardous substances have become less problematic in the Baltic Sea over the last 20-30 years, but at the same time concentrations of certain other substances in the marine environment have increased. Some of these substances can remain in the

sea for long periods, accumulating in marine food chains to levels that may be toxic to marine organisms – and eventually also to humans.

11 crucial substance groups

Through HELCOM's **Baltic Sea Action Plan**, the coastal countries have committed themselves to reduce pollution with the goal of a Baltic Sea where marine life is undisturbed by hazardous substances. This part of the plan focuses on a set of 11 groups of hazardous substances.

The coastal countries have agreed to develop national programmes of measures to enhance the management of these target substances. But at the moment it is hard to identify cost-effective ways to reduce inputs of these pollutants, due to a lack of information about their sources, pathways and loads.



INVESTIGATING MISSING LINKS

COHIBA will assess the quantities and the pathways of target hazardous substances between their sources (e.g. in production facilities or the places and processes where they are used) and the Baltic Sea. The project will also estimate the total loads of target substances entering the Baltic Sea. These results will help us to get a better understanding of the links between the sources of the substances and their impacts in the marine environment.

Work package 4: Identification of sources and estimation of inputs/impacts on the Baltic Sea. Led by IVL Swedish Environmental Research Institute.

WHOLE EFFLUENT ASSESSMENT

A NEW WAY

The COHIBA project aims to evaluate the ecotoxicity of effluents throughout the Baltic Sea region, based on the Whole Effluent Assessment (WEA) approach.

At the moment most of the restrictions that limit discharges and emissions are based on concentrations of chemicals. Unlike this conventional chemical-specific approach, the innovative WEA approach aims to determine whether effluents discharged into the Baltic Sea are toxic to aquatic organisms.

Traditional effluent analyses aim to determine concentrations of specific substances or groups of substances, such as PCBs. But most effluents contain varying cocktails of different chemicals, which could either individually or in combination be harmful to marine life.

Some of the chemicals in wastewater effluents have been modified by the human body or by microbes during the treatment process. Chemicals may also have been degraded partially or completely during treatment into other more or less harmful

The COHIBA project aims to:

- identify the most important sources of target substances
- quantify inputs of these substances to the Baltic Sea
- analyse the pathways between the sources of these substances and the sea
- introduce the whole effluent assessment (WEA) approach to monitor the overall impacts of the target substances
- develop cost-effective solutions to reduce discharges
- transfer knowledge and build up the capacities of the region's authorities and industries in order to control the target substances

The COHIBA project also aims to help the EU member states around the Baltic Sea to meet their international obligations under the EU's Water Framework Directive and Marine Strategy Framework Directive.

COHIBA involves 22 partners from 8 Baltic Sea EU countries. Activities will run

in each country through the project period 2009-2011, coordinated by the Finnish Environment Institute.

COHIBA is co-financed by the EU's Baltic Sea Region Programme 2007-2013. The project's total budget amounts to five million euros.

Substances of specific concern to the Baltic Sea

1. Dioxins (PCDD), furans (PCDF) and dioxin-like PCBs
2. Tributyltin compounds (TBT), triphenyltin compounds (TPhT)
3. Pentabromodiphenyl ether (pentaBDE), octabromodiphenyl ether (octaBDE), decabromodiphenyl ether (decaBDE)
4. Perfluorooctane sulfonate (PFOS), Perfluorooctanoic acid (PFOA)
5. Hexabromocyclododecane (HBCDD)
6. Nonylphenols (NP), nonylphenol ethoxylates (NPE)
7. Octylphenols (OP), octylphenol ethoxylates (OPE)
8. Short-chain chlorinated paraffins (SCCP), medium-chain chlorinated paraffins (MCCP)
9. Endosulfan
10. Mercury
11. Cadmium



SAMULI KÖRPINEN | RIKU LUMIARO

TO EVALUATE EFFLUENT

substances. This can make it hard to accurately identify the substances in the mixtures present in effluents.

Testing toxicity on aquatic organisms

Whole effluent assessment aims to detect harmful impacts by directly exposing test organisms to effluent samples in controlled laboratory conditions. The COHIBA project uses various short-term tests to analyse effluents from municipal and industrial wastewater treatment plants. These tests focus on factors including survival rates of the water flea *Daphnia magna*, luminescence of *Vibrio fischeri* bacteria, and green algal growth.

Well-treated effluents should not be acutely toxic. One problem is that many organic chemicals are bioaccumulative, and their impacts might only become evident after longer periods of exposure than are possible in the short-term tests. Longer-term tests involving more chronic exposure enable assessments of impacts on organisms' vital functions or life-cycle stages, including reproduction, growth, and hor-

monal impacts or effects on their genetic material. COHIBA also investigates such effects.

Toxicity-based discharge limits

The ultimate goal of the project is to define toxicity-based discharge limits for effluents discharged into waters in the Baltic Sea region. These "toxicity threshold values" could then be applied by HELCOM in a set of standardised tests to limit effluent toxicity.

This WEA approach is preferable to chemical analysis in that it measures the combined effects of all of the potentially harmful properties of effluents. Another benefit is that routine WEA procedures should be less costly than conducting advanced chemical measurements on effluents, and this should free resources for more detailed studies of identified toxic flows.

Work package 3: Innovative approaches to chemical controls of hazardous substances. Led by the Finnish Environment Institute (SYKE).

Taking water samples in Lithuania.



CENTRE OF MARINE RESEARCH, LITHUANIA



Contamination of sediments – back-side of port growth.

COST-EFFECTIVE WAYS TO REDUCE INPUTS

COHIBA will develop cost-effective solutions to reduce toxic discharges. Such measures may include applications of best available technologies, end-of-pipe treatment for emissions and discharges, and possible new restrictions, bans and substitutions for certain hazardous substances.

Reduction measures will be evaluated for each of the 11 target substance groups, and then prioritised in terms of technical feasibility, cost-effectiveness and overall implementability, taking

into account specific situations in different countries.

The project will also produce a report on alternative ways to reduce discharges, emissions and losses of the target substances in the Baltic Sea region, in order to help reach the goals of HELCOM's Baltic Sea Action Plan.

Work package 5: Cost effective management options to reduce discharges, emissions and losses of hazardous substances. Led by the German Federal Environment Agency (UBA).

BETTER INFORMATION – BETTER POLICIES

Many of the public authorities and industrial operators do not yet have sufficient information to enable them to control hazardous substances effectively. One vital goal of the COHIBA project is to increase awareness of these problems among such stakeholders. It is important in this context to bring Western and Eastern experiences together to benefit everyone.

Such awareness-raising must particularly involve training to enhance testing methods, source identification, quantitative estimates, assessments of

impacts in the marine environment, and management tools for reducing loads of the target substances.

To this end the project will organise workshops and seminars in Estonia, Lithuania, Latvia and Poland, with reports also produced on the related training. COHIBA will also publish brochures describing suitable management measures for specific industrial sectors.

Work package 6: Capacity building and knowledge transfer. Led by Baltic Environmental Forum Estonia.

PARTNERS

IN EACH BALTIC SEA COUNTRY

FINLAND

Finnish Environment Institute SYKE
(lead partner)

DENMARK

- City of Copenhagen
- Copenhagen wastewater treatment plants
- Copenhagen Energy
- Technical University of Denmark

ESTONIA

- Baltic Environmental Forum Estonia
- Estonian Marine Institute, University of Tartu
- Estonian Environmental Research Centre
- Tallinn University of Technology

GERMANY

- Federal Environment Agency
- Mecklenburg-Vorpommern Ministry for Agriculture, Environment and Consumer Protection

LATVIA

- Baltic Environmental Forum Latvia
- Latvian Institute for Aquatic Ecology

LITHUANIA

- Baltic Environmental Forum Lithuania
- Centre of Marine Research
- Environmental Protection Agency
- Institute of Botany

POLAND

- Institute for Ecology of Industrial Areas

SWEDEN

- IVL Swedish Environmental Research Institute
- Swedish Chemicals Agency
- City of Stockholm

HELSINKI COMMISSION

RUSSIA - Associated organisations

- St. Petersburg Public Organisation "Business and Ecology"
- St. Petersburg Scientific Research Centre of the Russian Academy of Sciences
- Center for Transboundary Cooperation, St. Petersburg
- Territorial Centre for Lab Analysis and Technical Measurements

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