

Significant Water Management Issue 3: Hazardous Substance Pollution

About the Joint Danube Survey 3: The Joint Danube Survey 3, also known as 'JDS3', is the world's biggest river research expedition in 2013. Its main goal is to produce highly comparable and reliable information on water quality and pollution for the entire Danube River and many of its tributaries and to raise awareness about the importance of the Danube and sustainable water management. The International Commission for the Protection of the Danube River (ICPDR) coordinates the implementation of JDS3. Launched on August 14, 2013 from Regensburg, Germany, the boats of the JDS3 will travel 2,375 km downstream the Danube River, through 10 countries, to the Danube Delta in Romania and Ukraine until late September.

About the Significant Water Management Issues: The EU Water Framework Directive (WFD) requires that all EU waters reach at least good status by 2015 (or at the latest by 2027). The Danube River Basin Management Plan (DRBMP) 2009 and its Joint Programme and Measures (JPM) focus on four Significant Water Management Issues (SWMIs) that affect the quality of rivers and lakes as well as transboundary groundwater bodies, namely: pollution by organic substances, pollution by nutrients, pollution by hazardous substances and hydromorphological alterations. This Fact Sheet presents an overview of the pressures, vision, measures and expectations for hazardous substances pollution. It is part of a series of four fact sheets, each dealing with one specific SWMI.

Overview of main pressures

Hazardous substance pollution can remain in the environment for a long time and bio-accumulate, seriously damaging riverine ecosystems and consequently impacting water status and human health, even in low concentrations. Types of hazardous substances include man-made chemicals, naturally occurring metals, oil and its compounds, endocrine disruptors and pharmaceuticals.

The WFD has a list of 33 *priority substances* of which 11 are *priority hazardous substances*. These are to be subject to cessation or phasing out of discharges, emissions and losses according to a timetable that shall not exceed 20 years. At present, a new EC Directive amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy is under discussion, introducing a number of additional priority substances.

Main sources of organic pollution

Sources of hazardous substances are industrial effluents, storm water overflow, pesticides and other chemicals applied in agriculture as well as discharges from mining operations and accidental pollution. For some substances, atmospheric deposition may also be a source. Manufacturing industries are responsible for large emission loads of a number of hazardous substances, including heavy metals and organic micro-pollutants.

Regarding agricultural pesticides, information within the Danube countries showed that 29 relevant

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active ingredients were used in pesticide products – of these, only three pesticides are authorised for use in all of the Danube River Basin countries, while seven are not authorised in any of the countries. Pesticides are frequently detected in surface water and groundwater in the Danube River Basin and pose a serious hazard to the environment and human health.

Within the Danube River Basin, accidental spills of hazardous substances have severely affected the aquatic environment and water quality. Accidents often have severe immediate as well as localised ecological consequences. Pollution from sites contaminated by former industrial activities or from waste disposal is also significant – here floods pose a risk of re-mobilising substances for entry into water bodies. The ICPDR has elaborated a basin-wide inventory of potential accident risk spots (ARS Inventory). In total, some 650 risk spots have been recorded and 620 evaluated. As a result, a hazardous equivalent of about 6.6 million tonnes has been identified as a potential danger in the Danube catchment area.

SWMI Vision for hazardous substances

No risk or threat to human health and the aquatic ecosystem of the waters in the Danube River Basin District and Black Sea waters impacted by Danube River discharge.

DRBM Plan 2009 and its implementation

The DRBM Plan 2009 includes a Joint Programme of Measures (JPM) where the coordinated visions, management objectives and measures of basin-wide importance for the first WFD cycle 2009-2015 can be found (<http://www.icpdr.org/main/activities-projects/river-basin-management>).

In 2012, the ICPDR published an “Interim Report on Progress in the Implementation of the Joint Programme of Measures in the Danube River Basin” (<http://www.icpdr.org/main/publications/reports>). With regard to hazardous substances pollution, it concludes:

In the DRBM Plan it was estimated that the management objectives and WFD environmental objectives will not be achieved by 2015 regarding hazardous substances. However, there is a need for more monitoring data on hazardous substances, as well as information on sources and relevant pathways. Therefore, the Danube countries have worked to improve the present lack of knowledge on the sources, pathways, discharges and losses of hazardous substances and contributed to the development and testing of a guidance document for preparing an inventory of emissions, losses and discharges of priority substances. The results of testing will facilitate the production of the new ICPDR “List of priority substances” and the basin-wide inventory of emissions, losses and discharges of priority substances.

However, the significant uncertainty in our current knowledge of pressures due to hazardous substances, as well as their impact on water status, is ongoing and needs to be improved in the future. It is expected that the planned investigation in the frame of Joint Danube Survey 3 will give a first



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overview of the concentrations of hazardous substances in the urban waste water system. Together with the in-stream investigations and the bank-filtration analysis, a better understanding of the pressures and impacts of hazardous substances will be possible. To ensure a useful differentiation of the results, additional information on the point and diffuse sources of hazardous substances (industrial plants, agriculture and agglomerations) and the treatment facilities have to be collected. For the Danube River Basin, the expected inventory of emissions, losses and discharges of priority substances should be the basis for ICPDR actions to achieve comparable results.

The Joint Danube Survey 3 (JDS3) has an ambitious program for monitoring both the WFD priority substances and the other, so-called emerging substances which are not regulated, but their occurrence in water indicates a potential danger. The collected samples will be analyzed for hundreds of organic substances using state-of-the-art analytical techniques such as GC-MS and LC-HR-MS(MS) and the results of these analyses in combination with the ecotoxicological screening will help to determine the substances specific for the Danube River Basin. The ICPDR will receive substantial support to this activity from the NORMAN network, which is an association of stakeholders dealing with emerging substances.

JDS3 will also be one of the key data sources for the activities of the 7th EU RTD Framework Programme SOLUTIONS project. The Danube case study of the SOLUTIONS project will be used to validate the combined emission, transport and fate modelling of the emerging substances using the comprehensive concentration data. Simplified concepts of (mixture) toxicity prediction will be field-validated using JDS3 data. In a wider perspective, JDS3 data will be exploited to support higher tier ecological risk modelling, considering a multi-stressor situation.