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Joint Danube Survey

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Fact Sheet 4

# Significant Water Management Issue 2 – Nutrient 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 nutrient pollution. It is part of a series of four fact sheets, each dealing with one specific SWMI.

## Overview of main pressures

Nutrient pollution, particularly by nitrogen (N) and phosphorus (P), can cause *eutrophication* -- an enrichment of water causing an accelerated growth of algae and higher forms of plant life that produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned. N and P emissions cause eutrophication in many surface waters of the Danube River Basin and contribute to eutrophication in the Black Sea north western shelf. For the period 1988-2005, the Danube was estimated to introduce on average about 35,000 tonnes of P and 400,000 tonnes of inorganic N into the Black Sea each year. The present level of the total nutrient load in the Danube River system is considerably higher than that in the 1960s, but lower than in the late 1980s. Recent investigations show that the ecological situation in the North Western Black Sea coastal area has improved significantly since the early 1990s.

## Main sources of nutrient pollution

As with organic pollution, nutrient pollution is mainly caused by emissions from agglomerations (cities and towns), industry and agriculture. Atmospheric deposition is also significant. Many industrial facilities, especially in the chemical sector, are significant sources. Nutrient pollution results from point sources and diffuse sources.

Nutrient pollution from point sources is mainly caused by emissions from insufficiently or untreated wastewater into surface waters (from agglomerations, industry and agriculture). The operation of secondary and tertiary treatment levels at wastewater treatment plants (WWTPs) is of particular

importance for the elimination and reduction of nutrients. The emission of phosphates via household detergents is also important. P emissions due to laundry and dishwasher detergents in the DRB are estimated at 15,7% of total P emissions. In response, an EU regulation from 2011 banned the use of phosphates and limited the content of other phosphorous containing compounds in consumer laundry detergents as of 30 June 2013. Similar restrictions will apply to automatic dishwasher detergents for consumers as of 1 January 2017.

Emissions from the agricultural sector are a significant diffuse source of nutrient inputs, especially from mineral and organic fertilisers and livestock manure. Nitrates in particular leach easily into water from soils that have been fertilised with mineral fertilisers or treated with manure or slurry. While the use of fertilisers dropped significantly after the economic collapse in the early 1990s in almost all Danube countries, new measures could become necessary to prevent a rise of pollution in the future.

In the framework of the DRBM Plan, nutrient emissions into the river system were estimated using the MONERIS (MOdelling Nutrient Emissions in RIver Systems) model, which combines point source emissions with emissions resulting from different diffuse source pathways. MONERIS results show that, altogether, 733 kt of N and 55 kt of P in total are annually emitted into the DRB. For N pollution, the input from agriculture is the most relevant (totalling 43% of total emissions). For P, emissions from agriculture are the second largest source after input from urban settlements.

Sources of nutrient pollution from atmospheric deposition include transport, the combustion of oil and derivates, agriculture (livestock farming) and industry. It is diverse in different regions of the DRB and stems partly from sources outside the DRB. The share for N is high (39%) but less so for P (13%).

### SWMI Vision for nutrient pollution

A balanced management of nutrient emissions via point and diffuse sources in the entire Danube River Basin District where neither the waters of the DRBD nor the Black Sea are threatened or impacted by eutrophication.

### 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” (add link). With regard to nutrient pollution, it concludes:

Nutrient removal is required to avoid eutrophication in many DRB surface waters and the Black Sea North Western Shelf, in particular taking into account the character of the receiving coastal waters as a

sensitive area under the UWWTD. The nutrient loads discharged from the DRB are an important factor responsible for the deterioration and eutrophication of parts of the Black Sea ecosystem.

The DRBM Plan highlighted that the nitrogen load to the Black Sea will reach a level that is below the present state but still far above (40%) that of the 1960's and therefore, the management objectives and the WFD environmental objectives on the basin-wide scale will not be achieved by 2015. For phosphorous, the respective management objective and the WFD environmental objectives on the basin- wide scale will not be achieved by 2015, as the level will be still 15 % above the level in the 1960's.

However, information on the last three years' efforts shows that all Danube countries have taken major steps on the implementation of the JPM as agreed in the DRBM Plan.The implementation of the Nitrates Directive in EU Member States, an improved application of the concept of BAT in non EU Member States and the reductions in nutrient pollution achieved in UWWT with nitrogen and phosphorus removal for agglomerations >10,000 PE, will reduce nutrient pollution considerably. The introduction of limitations on phorphorus in detergents, i.e. a phosphorus limitation in laundry detergents by 30 June 2013 and in dishwasher detergents in January 2017, is seen as a cost effective and necessary measure to complement the efforts of implementing urban wastewater treatment and reach the level in the 1960ies for phosphorus.

The Joint Danube Survey 3 (JDS3) will be sampling a total of 68 sites on the Danube River. An effort was made to have most of the same sampling points that were monitored during the JDS1 and JDS2 to ensure comparability of results. Samples will be tested for nutrient pollution and a number of other parameters both on-board the expedition's research vessels and at laboratories on the mainland.