Management of sediment quality and quantity in the Danube River Basin

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Introduction: The Danube basin is the largest river basin, in which the European Union legislation is being implemented, covering 801,463 km2 and presently shared by 19 countries (including EU-Member States, Accession Countries and other states that have not applied to join the EU), making it the most international river basin in the world [1].

Methods: A thorough analysis of the characteristics of the Danube River Basin was done in the ICPDR report [2] in line with the article 5 of the EU Water Framework Directive. This Danube Basin Analysis highlighted the significant water management issues. Figure 1 shows that the Danube basin is at risk of failing to achieve the environmental objectives of the WFD due to pressures from hydromorphological alterations, nutrients, hazardous substances and organic pollutants.

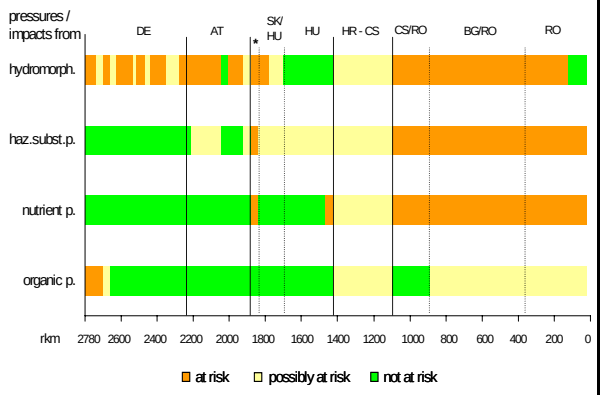

Fig. 1: Causes of risk of failure to meet the objectives of the EU Water Framework Directive in the Danube basin.

Despite it is likely that each of these issues is also linked to sediment, based on the available information to date it has not yet been possible to estimate whether there is also a risk of failure to meet the WFD objectives due to sediment problems. Therefore, a focused analysis on sediment quality and quantity was performed [3].

Results: The sediment study highlighted the major issues of common interest to be addressed at the basin-wide level covering sediment transport, dredging issues and contamination of sediments. The Danube river basin analysis [2] reported on the sediment deficit in the Danube River due to long-term regulation works. Evidence however has been demonstrated in the upper Danube of a restoration of the level of sediment transport. Such discrepancies in suspended sediment flux assessment are partly caused by a high uncertainty of the flux measurement. The interruption of the longitudinal continuum in the Danube led to an increased retention of sediments in the impounded stretches and to the incision of the riverbed downstream the dams. The increased sedimentation in the reservoirs also impacts on the riverine ecology. Diverse dredging activities aiming to the Danube navigation channel maintenance or to optimization of water circulation needed for fish farming in the Danube delta were performed in the recent decades and led to channel incision.
There is only a limited amount of information on the contamination of sediments by priority substances in the Danube basin; the data availability is unsatisfactory especially in the lower Danube. The characterization of sediment quality in the Danube is primarily based on the results of special surveys, such as the Joint Danube Survey organized by the ICPDR.

Discussion: to obtain a more detailed insight into the sediment quantity and quality in the Danube River Basin a set of actions were proposed in the sediment study including the research on the Danube sediment balance, adoption of recommendations on environmental aspects of dredging, collection and evaluation of the existing data on sediment quality and acquisition of missing data. A better level of understanding of the role of sediments is also essential. This knowledge then should help concluding whether sediments should become a significant water management issue in the second WFD implementation cycle.

References: [1] www.icpdr.org; [2] ICPDR (2005) Danube Basin Analysis (WFD Roof Report 2004). Technical Report. ICPDR, Vienna, Austria.; [3] ICPDR 2007. Management problems of sediment quality and quantity in the Danube River Basin. Issue Paper. ICPDR, Vienna, Austria.