

## **NUTRIENT RETENTION IN THE DANUBE RIVER BASIN - TO WHICH EXTENT CAN RIVERINE WETLANDS CONTRIBUTE?**

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Within the EC-daNUbs project the MONERIS emission model, the Danube Water Quality Model and the Danube Delta Model were used and developed respectively to quantify nitrogen and phosphorus emissions and their related pathways as well as the retention in surface waters in the whole Danube catchment. Results were used to develop proper management strategies controlling nutrient emissions to surface water and especially to the Black Sea.

Retention in the Danube catchment was proved to be a crucial factor to reduce nutrient emissions to the Black Sea. For nitrogen a total retention of 40% and for phosphorus even 65% of the annual load was estimated. Particularly small watersheds (>30% of N and >50% of P) contribute to nutrient retention on catchment scale, due to their high area related share but even in consequence of the favourable basic conditions, like river morphology and flow conditions. Analogically, the potential nutrient retention of the Danube delta is high (30% of N and 25% of P entering the smaller side arms). Nevertheless the total retention is limited by the amount of nutrients transported into the Danube delta side arms (rather than 10% of total Danube load). 90% of the Danube waters cross the Delta through three main branches where due to short residence times (1-2d) in-stream processes can not cause significant losses and storage of nutrients (VAN GILS et al., 2004).

Results support that riverine wetlands can effectively contribute to nutrient retention on catchment scale. Van GILS, 1999 highlighted that the restoration of 17 riverine wetlands could cause an annual load reduction of rather 5% for nitrogen and phosphorus. Nevertheless case studies are needed to prove nutrient retention capacities of riverine wetlands taking into consideration the complex hydrogeochemical and biogeochemical interactions affecting retention and remobilisation processes. From the nutrient management point of view important aspects concerning the functionality of riverine wetlands are: the behaviour under different hydrological conditions, the long term storage and more practical the design of adequate monitoring strategies.

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