

# Integrated nutrient transport modelling with respect to the implementation of the European WFD: The Weiße Elster Case Study, Germany<sup>#</sup>

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## Abstract

The goal of the European Water Framework Directive (WFD) is to protect and enhance the status of aquatic and terrestrial ecosystems. To reach this objective an integrated methodology for the implementation of the WFD is essential. The methodology presented was developed within an interdisciplinary research project on the highly polluted 4th order Weiße Elster River basin, a large subcatchment of the Saale basin (Germany), which is part of the UNESCO-IHP HELP program. The project focuses on nutrient management in order to achieve a good ecological status of surface waters. The paper focuses on an integrated modelling of nitrogen transport and comprises combined terrestrial and in-stream transport processes. The mitigation of diffuse and point sources pollution is thereby essential to meet the environmental objectives. Land-use scenarios on both organic farming systems and best management practices were analysed and compared with different strategies to reduce point source. The results show that the possible reduction of nitrogen inputs from point sources is much lower compared to the reduction of diffuse inputs from agricultural land use. The results on in-stream nitrogen transformation show that different morphological factors influence the nitrogen retention considerably. The potential of management measures to reduce nitrogen loads by river restoration measures seems to be limited. This is caused by infrastructural facilities that restrict attaining a natural state of river morphology.

**Keywords:** river basin management, nutrient transport, river restoration, SWAT, WASP