

## Impacts of climate change on regulating nitrogen retention in the River Weiße Elster in Germany

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**Abstract** In this study, climate scenarios (dry, medium and wet) have been used to characterize changing climatic and flow conditions for the period 2050–2054 in the 4th order River Weiße Elster in Germany. Present and future periods of nitrogen turnover were simulated with the WASP5 river water quality model. Results revealed that, for a dry climate scenario, the mean denitrification rate was 71% higher during summer (low flow period between 2050 and 2054) and 51% higher during winter (high flow period) compared to the reference period. In the 42-km study reach, N-retention through denitrification amounted to 5.1% of the upper boundary N load during summer low flow conditions during the reference period. For the future dry climate scenario, this value increased by up to 10.2%. In our case study, the investigated climate scenarios showed that future discharge changes may have a larger impact on denitrification rates than future temperature changes.

**Key words** denitrification; climate change; river water quality modelling; River Weiße Elster, Germany