



Phosphorus and nitrogen input to the drinking water reservoir of the Upper Sûre River and the role of predams as a tool for reservoir water quality management

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The Upper Sûre forms a rural basin of agricultural and forestry nature, with low population density, located on Devonian schists of the Ardennes Massif. It covers an area of 428 km². The Sûre River supplies a drinking water storage reservoir. Within the watershed nutrient fluxes were measured in sub-basins of different scales and land use types, in order to determine the spatio-temporal dynamics of phosphorus and nitrogen. Most nutrients appear to be transported during storm events, especially particle-bound phosphorus. Therefore, the understanding of the temporal variability of the material erosion from watersheds during storm events is fundamental to estimate the annual lake loadings. Fluxes were obtained by using automatic samplers for the concentration analyses. Recording stream gauges were installed to guarantee a continuous discharge measurement. Export coefficients were determined on three scales: at the entry of the reservoir (306 km²), in several small experimental basins (between 1 and 4 km²), and in three basins of intermediate size (2040 km²). Export coefficients do not reflect the annual variability of the nutrient fluxes, which is important and closely linked to the hydrological regime. In the Sûre River, 80% of the annual nitrogen and phosphorus fluxes were measured between December and February. Nitrate concentrations show seasonal oscillations with maxima during the wet period. During autumn and winter runoff events, concentrations in suspended solids, total phosphorus and particulate phosphorus are characterized by clockwise hysteresis behavior, while quite stable concentrations are observed for soluble reactive phosphorus. In addition, we can point out

that predams are an important tool for reservoir water quality management, especially when the quality of water flowing from an agricultural watershed becomes a major concern.