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PAST, PRESENT AND FUTURE TRENDS OF NUTRIENT LOADS WITHIN POLISH RIVER CATCHMENTS

Tomasz Kowalkowski
Boguslaw Buszewski
Nichoalus Copernicus University, Poland

ABSTRACT

Eutrophication is identified now as one of the most serious problems in the Baltic Sea environment. Almost 30 % of total emission of nitrogen compounds and up to 50% of phosphorous is discharged via rivers form the territory of Poland. The major anthropogenic source for waterborne nitrogen is clearly agriculture, while the biggest source of phosphorus are point sources, mainly municipalities.

The aim of this research was, therefore the description of the possible actions able to reduce nitrogen and phosphorus river loads with their spatial differentiation. In this study, spatial modeling has been applied for the estimation of potential, application and effects of such actions in the local and regional scale. GIS oriented model – MONERIS has been validated and applied to calculate possible nutrient reduction. Furthermore the comparison of large (Vistula) basin with regional one (Drwęca) has been done with respect to their different character of land utilization.

The investigations show that the efficient reduction of P-emission is possible by combining two actions: full implementation of the National Programme of Municipal Wastewater Treatment with the application of non-phosphate detergents. The possible reduction of total phosphorus emission can be even 30-50 % in 2015 for whole Vistula catchment (comparing with the present state).

The reduction of nitrogen emission is much more complex, because the majority of the N-emission is caused by diffuse sources – mainly agriculture. The most important ways are emissions via tile drainage and via groundwater. In this case the most promising action is to increase efficiency of fertilizers consumption and decrease of soil erosion. These goals can be achieved by widespread implementation of Usual Good Farming Practice and promotion of additional good practices described in Code of Good Agriculture Practice. Such policies lead to substantial decrease of nitrogen surplus in agricultural land, which was identified as the key factor influencing nitrogen river load.