NUMERICAL MODELING OF MATERIAL FLUXES ON THE FLOODPLAIN WETLAND OF PILICA RIVER, POLAND

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Numerical 2D hydraulic model from The University of Mississippi -The National Center for Computational Hydroscience and Engimeering has been used for prediction and better understanding of the sedimentation processes on a floodplain of the Pilica River. Study site has area 26.6 ha, and is located on the Pilica River left bank floodplain 4.5 km SW of Sulejow town. The sedimentation process have been measured in the field using 12 sediments traps placed at the characteristic parts of the terrain in a 5 transects. Traps have been exposed in the field for about 2 years, giving the information about amount of sediments accumulated in g/m2 year. NCCHE2D model has been used to simulate the suspended sediments transport at steady flow. In the wetland area there is a plan to introduce willow plantations which should enhance sedimentation capacity of the floodplain and increase the self-purification mechanisms of the river. Two scenarios have been assumed of natural vegetation cover and vegetation cover altered by introduction of willow plantations Results for the simulations of flow have shown that the introduction of even relatively small area of the willow plantations considerably reduce the velocity field inside such a crop cover. It has been run simulation of suspended sediments transport, and results compared to the material masses accumulated at the sediments traps. It has been found that there is a relevant correlation between accumulated at the traps masses of material and calculated by the model sediments transport rate. Presented approach can be used for spatial planning and application of ecohydrological methods in water management. Research has been done in the framework of US-Poland Technology Transfer Program of US Agency for International Development (US-AID)