

**DEVELOPING AN INTEGRATED GROUNDWATER-SURFACE WATER  
MODELING TOOL FOR THE UPPER BIEBRZA BASIN**

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The Upper Biebrza Basin located in Northeast Poland belongs to the Biebrza National Park, which is added to the RAMSAR Convention list as one of the most important worldwide wetlands. The valley has been formed as an ice marginal valley and is relatively long (40 km) and narrow (2-3 km). The floodplain is filled with the thick deposits of peat (usually 2-5 m) partly underlain by gyttja layer (1-4 m). The valley drains intensively the surrounding morenic plateau and the outwash plain. A prerequisite to integrated water management of wetlands is to build up a proper understanding of the hydrological system. The aim of this study is therefore to identify and quantify the key processes steering the hydrological functioning of the catchment. Important processes in the Upper Biebrza are groundwater recharge and discharge, river discharge and to a lesser extent flooding conditions. Gaining insight in the spatial distribution of these processes, which is essential for understanding protection measures for this wetland, is obtained by adopting a modelling approach. A rainfall-runoff model has been developed, using the GIS-based distributed watershed model, WetSpa Extension (Wang et al., 1996; Liu et al., 2003). The distributed recharge determined by WetSpa was used as an input to the developed MODFLOW groundwater model for the Upper Biebrza Basin (Batelaan et al., 2002). Integration of the two models (loose or tight) in a coupled groundwater-surface water modeling tool is currently under investigation. Simulated groundwater discharge time series show good agreement with measured time series. The adopted methodology will especially be beneficial to better understand the impact of different water management practices.