USE OF HYDROLOGICAL MODELS FOR FEN RESTORATION - BIEBRZA MIDDLE BASIN CASE STUDY

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Biebrza Wetlands (116 000 ha) occupy a depression of the ice marginal valley, situated in the north-eastern part of Poland. Since 1993 part of this area (60 000ha) is protected in the form of the National Park. For centuries the Biebrza Wetlands formed a natural state frontier, protected by ban on draining of wetlands. But it does not mean that they were no subjects of engineering work or agricultural activity. The most important, took place in 19th century when two main drainage channels and couple of smaller ones were excavated. As a consequence a new, artificial watershed occurred between rivers leading to relatively serious transformations of the habitat conditions in the part of the area named Middle Basin.

The main obstacle for any restoration plan is a complex pattern of land use, land ownership and ecological values of an area, which should be considered as one hydrological unit. The area of the restoration project is about 15 000 ha and can be divided in the three major regions with the specific management questions In order to get the acceptation of the all parties involved for the restoration strategy, accompanying research programme has been established. As a result three hydrological models of the area have been identified. There are: optimization model for control of hydraulic structures, regional groundwater model and hydraulic model of the surface waters. Their aim is to simulate the impact of different restoration measures on hydrological regimes of affected rivers and riparian wetlands.

In order to perform necessary calculations water demand of different type of wetlands, and their water supply system as well as decision criteria has to be established. In the proposed approach hydrological characteristics of particular ecosystems were employed for this purpose. Their type of hydrological feeding describes, in general, the sources of water, yearly average water hydrograph describes the water demands and specific hydrological parameters for different habitats (e.g. flooding frequency, maximum depth of groundwater, average waterlogging period, etc.) were used as the decision criteria. Using the GIS platform, results of the different models were combined and different scenarios of water management were compared.