



Influence of the hydrotechnical structures on the changes of total suspension transport - illustrated by the example of the Koronowski Reservoir on Brda River

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Artificial water reservoirs fulfil many functions. The most important are: flood control, retency, energetics and recreation. All of them play a significant role in water management. Division of the Brda River in the 60's of the twentieth century and construction of a dam had influence on the circulation of matter in the whole water ecosystem.

Koronowski Reservoir, also known as Lake Koronowskie, is located in the central Poland. It was created by soil dam on the 49.115 km of the Brda River. The surface, while normal backing up level - 81,5 m above sea level, amounts to 16.0 km² and a volume of 81.0 million m³ which classifies Koronowski Reservoir in fifteenth place in the country. Construction of the dam made it possible to obtain a back up of the Brda River to 18 m. Water outflow by lateral canal to Samociążek caused an additional 7 m water fall. Total 25 m difference in levels allows to produce annual average of 40.841 GWh of electricity which classifies power plant Koronowo in the top ten producers of energy from natural sources in Poland. Water, which is not used for creating energy (59.4 million m³) is the base for development of water recreation on Koronowski Reservoir.

The research showed that the artificial reservoirs reduce the amount of suspended load in the stream channel below the reservoir. Research included: making the actual detailed bathymetric plan, in order to calculate the volume of water stored in the reservoir, carrying on hydrometric observation (measurement of water flow) on the inflows and outflows from the reservoir in order to specify the hydrological balance, measuring the concentration of indicators in order to identify the suspended load in the water, specifying the balance of suspended material in Koronowski Reservoir in full hydrological year.

On the basis of researches of Koronowski Reservoir it can be concluded that: Koronowski Reservoir reduces suspended material concentrations in the water (the overall amount of total suspension inflowing to reservoir is higher than outflowing), The Brda River is the main source of supplies of the total suspension to the reservoir and the seasonal variability of suspended material is on discharge in inflows. There is a little variation of discharge in the Brda River during the hydrological year which affects on the small diversity of the suspended material. Also the reduction of total suspension in Koronowski Reservoir results in improvement of the water quality of the Brda River. The strong morphometric variation is the reason why two zones are marked out: limnetic with a strong accumulation of sediments and fluvial with a small deposition of sediments. The limnetic area (basins of reservoir and river mouths of inflows i.e. Brda, Kamionka, Sępolna, Krówka and Kręgiel) is characterized by strong aggradation of total suspension The morphometric variation (shallows and depths) affects on the spacial differences in the accumulation process. Koronowski Reservoir is in the phase of filling with suspended material including total suspension.