

## Abstract

Unfavourable forecasts of climate changes for the coming decades determine, both in the industrial and agricultural sectors, the implementation of a number of measures aimed at mitigating the effects of increasingly observed extreme phenomena such as flood and drought. One of the methods of counteracting these adverse phenomena is the construction of retention reservoirs, including dam reservoirs, which to a large extent constitute the available water resources and contribute to the improvement of the water balance of a specified region. Therefore, the issues related to the implementation and operation of this type of facilities are an extremely important issue.

The aim of this study was to assess the functioning of the Przebędowo reservoir in the early years of operation, in various meteorological conditions. Field surveys including measurements of water levels in the reservoir, groundwater levels in adjacent areas, water discharge measurements of reservoir inflow and outflow and water sampling in the context of parameters determining quality, were carried out in 2015-2018.

The conducted research and the obtained results confirmed that, in addition to meteorological factors, the anthropogenic factor related to the reservoir operation also had a large impact on water levels in the reservoir. The research also showed that there is a relationship between water retained in the reservoir and groundwater in the adjacent areas.

The analysis of the components determining the water balance of the Przebędowo reservoir allowed to show that parameters related to horizontal water exchange, such as the reservoir inflow and outflow had the largest share in the water balance. On the other hand, any significant input of factors related to vertical water exchange, characteristic for septic tanks (precipitation, evaporation from the surface of the reservoir), wasn't found in the water balance.

The conducted research of the parameters characterizing the quality of water, especially in relation to the average values of physicochemical parameters, showed that the waters of the Trojanka River, both at the reservoir inflow and outflow, were classified under good ecological status. It should be emphasized, however, that the results of the research showed a positive impact of the Przebędowo reservoir in relation to the formation of aerobic conditions and the reduction of nitrate concentration at the outflow.

### Keywords:

dammed reservoirs, groundwater, water balances, water quality

