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HYDROPOWER IMPACT ON WATER QUALITY: A CASE STUDY (THE MICHALICE RESERVOIR, POLAND)

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Abstract

In this article, we discuss the impact of hydropower plants (HPPs) on water quality (WQ), as this issue is of growing interest among researchers in the world. The article analyzes the impact of a small HPP on the Michalice Reservoir on the Widawa River (Poland) on selected physicochemical properties of water. A comparative analysis of the results of our research and those obtained in HPP studies in Lithuania and Malaysia was also carried out. It has been shown that the concentrations of $P\text{-}PO_4$, $N\text{-}NH_4$ and turbidity increase below the Michalice HPP (by 39.3%, 430% and 130%, respectively, compared to the median value at the measuring point above the HPP), while the concentrations of $N\text{-}NO_3$ directly below the dam increase (by 95.4% compared to the median above the HPP). The results obtained for the Michalice Reservoir are similar to those from Lithuania and Malaysia – at some distance from HPPs, the turbidity of water increases. In contrast, the concentrations of $N\text{-}NO_3$, $P\text{-}PO_4$ and $N\text{-}NH_4$ below the HPPs decrease. Moreover, it was found that the main WQ problem in the Michalice Reservoir is the high pollution of the Widawa River catchment, which results from its agricultural use, its geological structure, the high share of endorheic (drainage) areas and the uncontrolled sewage discharge. Our assessment of WQ in the reservoir HPP may be the starting point for further research on rational, sustainable water management at hydropower facilities.

Keywords: dam reservoir, ecological status, environmental effects, hydropower, water quality

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