THE INFLUENCE OF CATCHMENT AREA MANAGEMENT FOR TROPHIC STATE OF WYDMIŃSKIE LAKE

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Summary

The research carried out as part of this study was aimed at broadening the knowledge about the influence of external and internal factors on the trophic state of water reservoirs based on a case study carried out on the example of Wydmińskie lake. The analyzes were conducted for three full hydrological years - from November 2015 to October 2018. As part of the research, the impact of the catchment management on the lake, the impact of meteorological conditions (precipitation and air temperature) on the dynamics of the concentration of chemical substances in the reservoir, and in particular on its trophic state, was assessed. Moreover, the load of the lake with loads of nutrients (nitrogen and phosphorus) from the catchment area and the trophic state of the lake's ecosystem were determined on the basis of the physical and chemical properties of the tested water, bottom sediments and accumulated nutrients in coastal vegetation. During the interpretation of the obtained research results, statistical studies were used in the following programs: Statistica ver. 13.3 PL, Canoco 5 and Microsoft Excel. The conducted research has shown that meteorological factors (precipitation sums and air temperature) significantly regulate the dynamics of chemical substances concentrations and the physical properties of lake waters. It was also found that the main sources of pollution of the lake are inflow of water from drainage networks draining agricultural land, and the forest area in the immediate catchment contributes to the reduction of pollutant runoff to the reservoir. However, no significant negative impact of residential buildings in Sucholaski and Wydminy on the quality of the lake ecosystem was demonstrated. It was found that bottom sediments, like water, can be an important indicator of the impact of the catchment management method on the water ecosystem. Also, the coastal vegetation accumulates large amounts of nitrogen and phosphorus compounds during the growing season. This contributes to the reduction of these compounds in the lake water, however, after the end of the growing season, the plants partially release previously accumulated nutrients. Taking into account the management of the catchment area, with particular emphasis on the coastal zone of the lake and the chemical composition of the waters, it was shown that the reservoir is characterized by a high trophic state.