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**PRELIMINARY CHARACTERISTICS OF THE WATER CHEMISTRY OF LAKE CZARNE LOCATED IN CATCHMENT OF DRWĘCA RIVER**

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Lake ecosystems undergo many complex chemical, physical and biological transformations. Directions of those transformations are determined by water composition, which in turn is shaped by several factors: geological structure and types of land use in a watershed, capacity of the soil sorption complex, weathering and solubility of minerals present in a watershed, atmospheric conditions.

Lakes with high inflow of minerals and organic compounds from catchment area have an elevated risk for eutrophication. Under natural conditions, this process will be slow and prolonged. However, human civilization has made a significant contribution to the degradation of water and eutrophication acceleration. Lakes adjacent to urban and agricultural areas, in particular, are usually eutrophicated due to receiving municipal sewage and industrial wastewaters and nutrients from leaky septic tanks and agriculture.

Excessive nutrients load contributes to the violation of the existing balance and increases, at least in the initial phase, the intensity of primary production. Clear growth of organic matter usually leads to disturbances of oxygen settings, and sometimes even to complete deoxygenation of the environment, due to the consumption of oxygen in the decomposition of organic matter. The appearance of oxygen losses in water over bottom sediments during stagnation periods leads to a reduction of redox potential, and consequently to the release of reduced ions from sediments into the near bottom water. In this situation, bottom sediments cease to be a nutrients trap, and in particular phosphorus – the most important factor causing eutrophication.

The next negative phenomena are: change of water colour, smell and taste, low transparency, surface high oxygenation and anaerobic condition in bottom layers of water, appearance of hydrogen sulphides.

Lake Czarne near Platyny Village is an example of a lake that has not been studied until today. Therefore, it was decided for scientific as well as practical purposes to elaborate on the collected material on the Czarne (drainage basin of Drwęca and Wisła rivers) water chemistry.

The main goal of study is to characterize the hydrochemical properties of Lake Czarne (3.9 ha, 5.1 m) and its trophic condition.

The data obtained in the study allowed to qualify Lake Czarne reservoir about fourth degree of the stability by Patalas (1960). As evidenced in the study, Lake Czarne is moderate eutrophic reservoir. The lake waters were characterized by an enough high content of nutrients, up to 0.253 mg P dm<sup>-3</sup> and 5.10 mg N dm<sup>-3</sup>. The high fertility of the lake was exhibited also by the values of BOD<sub>5</sub> reaching 12.4 mg O<sub>2</sub> dm<sup>-3</sup> and low transparency – mean value 0.6 m. In the peak of the summer stagnation oxygen profile is represented by the clinograde curve typical for eutrophic lakes. The surface layers of water were well oxygenated, while below 2 meters of depth to the bottom there were very low concentrations of oxygen – less than 1 mg O<sub>2</sub> dm<sup>-3</sup>.

The study has revealed that Lake Czarne water is not well buffered, as shown by the alkalinity values: 0.8 – 1.6 mval dm<sup>-3</sup>. Total hardness of the reservoir water varied from 80.1 to 100.1 mg CaCO<sub>3</sub> dm<sup>-3</sup> which is typical for medium soft water. The hardness was determined mainly by the calcium content. Moderate high trophic state of analyzed lake is manifested by the values of electrolytic conductivity (166 – 217 μS cm<sup>-1</sup>) indicating the degree of mineral pollution in the lake. Despite the waste water input, the amount of chlorides is rather low, to 13.5 mg Cl dm<sup>-3</sup>.

Czarne Lake is a valuable water ecosystem with moderate trophic status, which should be protected against excessive inflow of organic and mineral compounds from the catchment.