Abstract

The paper presents an analysis of 20 physicochemical elements in the Bobrza River water sampled above and below the treated sewage discharge point. Sitkówka mechanical and biological sewage treatment plant with a value of 289,000 People Equivalent discharges on average 51,000 m³ of treated sewage daily, which makes up 29% of mean daily flow in the Bobrza River. On the basis of hydrochemical analyses it was stated that the discharge of treated sewage led to worsening of 18 out of 20 studied water quality indices in the Bobrza River. In the river water below the sewage discharge statistically significantly higher values of electrolytic conductivity, dissolved solids, calcium, magnesium, sodium and potassium were registered. A decrease in dissolved oxygen content in the water and increase in its electrolytic conductivity caused a change of water quality class in the Bobrza River from the maximum potential to potential below good. On the other hand, increase in concentrations of dissolved solids and sulphates caused a change of the water class from the maximum potential to good potential. Statistical factor analysis (FA) made possible a reduction of a set of 20 physicochemical elements to four mutually orthogonal factors explaining 95% (above the treatment plant) and 96% (below the treatment plant) of the internal structure of primary data. The first factor is connected with point source pollution (sewage discharge), the second describes oxygen conditions in water, the third results from seasonality and is responsible for the pollutants from natural sources, whereas the fourth factor has not been unanimously defined yet.

Key words: environmental monitoring, pollutants, sewage discharge, water quality