

# MULTI-YEAR INVESTIGATIONS OF ORGANIC MATTER IN THE WATERS OF LAKE STARODWORSKIE, AFTER PHOSPHORUS INACTIVATION

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## Summary

The investigations regarded a small (6 ha) but deep (23.3 m) Lake Starodworskie, located in Olsztyn. In 1994 and 1995 the lake experienced a two-phase phosphorus inactivation with aluminium sulphate. The favorable effects of the treatment were observed for approximately three years. The examinations of 1997–2004 revealed a tendency to increase all observed indexes of organic matter. The surface water was dominated by the allochthonous matter (biochemical oxygen demand (BOD)/chemical oxygen demand ( $\text{COD}_{\text{Mn}}$ )  $\approx 0.5$ ) and the conditions were favorable for blue-green algae blooms (low N/P ratio). The correlations between dissolved organic carbon (DOC) and  $\text{COD}_{\text{Mn}}$ , alike between particulate organic carbon (POC) and  $\text{COD}_{\text{Mn}}$ , were significant ( $r = 0.696$  and  $r = 0.637$ , respectively,  $p \leq 0.01$ ). The correlations between BOD and chlorophyll a content ( $r = 0.4317$ ,  $p \leq 0.05$ ), POC and chlorophyll a, and BOD and DOC ( $r = 0.4622$ ,  $r = 0.5100$ ,  $r = 0.5000$ , respectively,  $p \leq 0.01$ ) indicate that not only the phytoplankton was a source of organic matter in the surface water layer of Lake Starodworskie but that an important role was played also by primary production and the rate as well as direction of the dead organic matter transformations. Concentrations of BOD,  $\text{COD}_{\text{Mn}}$ , and organic phosphorus increased along with the depth which was especially evident in the water below 15 m. Simultaneously, due to the anaerobic conditions, organic nitrogen was low or close to zero. The study also revealed that the ratio between POC and DOC increased, especially at 1 m and 5 m depths, and that deeper down the increase was smaller.