

Ecological Possibility of Fishery Usage (utilization) of The Coal Mine Waters

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The studies are carried out in The Lublin Coal Basin (Eastern Poland). The waters, collected in a small reservoir (6.0-10.0 ha in the area, max. depth 2.5-3.5 m), originate in the carboniferous and jurassic layers and are of sodium-chloride-bicarbonate character. Their mineralization level amounts to 1801-1903 mg/l (clean carboniferous waters - 8408-10119 mg/l). The range of the concentration of dissolved substances ranges between 1570 mg/l in winter and 2273 mg/l in summer, while that of total suspension between 10.8-45.1 mg/l. The waters are well oxygenated (7.7-13.3 mg O₂/l). The concentration of chlorides in the waters of the reservoir is quite high ranging from 800 to 960 mg/l (in clean carboniferous waters 2040-5866 mg Cl/l). Other mineral components (P, N, Ca, Mg) occur in low concentrations, similar to those in natural inland waters. Trace metals occur in small quantities both in the water and in bottom sediments of the reservoir. Radioactivity of the waters (measured as a content of ²²⁶Ra) is undetectable or very small. The carboniferous waters have the greatest radioactive concentration (333-666 Bq/m³), while jurassic waters show no radioactivity at all.

The reservoir is inhabited by quite rich fauna of invertebrates, which may be treated as an evidence of good ecological conditions occurring there. Fauna is represented by 23 taxa of zooplankton (Rotatoria, Cladocera, Copepoda). 33 taxa of zoobenthos (Oligochaeta, Chironomidae, Mollusca, Coleoptera aquatica). Species typical of fishery ponds and shallow fertile lakes predominate among them. The average numbers amount to 252 ind./l for zooplankton and 4000 ind./m² in the case of zoobenthos.

Ten species of fish occur in the reservoir (3-spined stickleback, dace, goldfish, crucian carp, carp, gudgeon, white brem, perch, sunbleak and pike). White brem and crucian carp are dominant species. The age structure of the fish is differentiated: goldfish is I-VI years old, crucian carp - III-VII, perch - IV-VII, pike and white brem - IV-V years old. Some species achieve quite big length and body weight (for example pike-perch - 69.0 cm and 2.473 g, white brem-18.0 cm and 76 g). As annual gains are concerned they are exceptionally high in the case of carp. The contamination of fish tissues by heavy metals is rather small and corresponds to that of fish living in natural water bodies. The fish have normal nutritive value.

The physical, chemical and biocoenotical properties of the coal mine waters are found to be general suitable for production of many fish species.