The functional vegetation diversity of mining subsidence reservoirs for ecosystem services development at post-mining lands

Edyta Sierka¹ and Barbara Stalmachova²

¹University of Silesia in Katowice
²Vysoka skola banska - Technicka univerzita Ostrava Katedra environmentalniho inzenyrstvi

January 3, 2023

Abstract

This paper tried to define the role of vegetation diversity as an environmental factor, which determines functions and services served by water reservoirs ecosystems originated as an effect of land subsidence in post-mining areas. The aim of this study was to conceptualise: i) whether the mining subsidence reservoirs, despite their similar origin, differ in the level of species diversity; ii) whether water and substrate quality and metric characteristics of subsidence pools affect the diversity of vegetation; iii) which functional groups of species contribute to ecosystem services provided by these objects. The study was conducted in Central Europe in the Czech-Polish coal basin. The species composition of vegetation, diversity (species richness (S), Shannon-Wiener (H') and Simpson index (λ)), participation of dominant species and belonging to functional groups (FG) was assessed in 10 reservoirs formed in subsidence. The values of services provided by the ecosystems in mining subsidence reservoirs by the indicator method were used. The results showed that despite similar origins subsidence pools differ when it comes to the level of diversity S, H' and λ. In contrast, there is no difference in terms of the average share of various FG. Vegetation diversity was substantially affected by the size and depth of reservoirs, humidity, C/N ratio, the concentration of P total in the soil, and water clarity. The importance and value of ecosystem services provided by the studied mining subsidence reservoirs and their vicinity were estimated at 647,486.90 $[^\text{roku}]^{-1}$.

Hosted file