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RESPONSE OF THE FISH COMMUNITY TO OXBOW LAKE RESTORATION IN A LOW-GRADIENT RIVER FLOODPLAIN

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Abstract

The effects of reconnecting three oxbow lakes to the Słupia River (northern Poland) on the fish community were analysed on the background of environmental factors. The ecological effects of restoring the hydrological connectivity of the river-floodplain system (RFS) were analysed in an intermediate time span (from 2008 to 2012). Oxbow lakes that were cut off from their mother river were characterised by a low abundance and relatively low diversity (Shannon index, H') but high species evenness (E) of ichthyofauna. Shortly after the restoration, the number of fish species and their diversity increased, but species evenness decreased. Over time, the number of ichthyofauna species dropped while the biodiversity and evenness indices stabilised. There were no significant differences in the number of species, diversity or species evenness between the studied oxbows. Among 13 abiotic and biotic environmental factors analysed, only the abundance of phytoplankton, zooplankton and benthic fauna and the abiotic factors of pH and conductivity contributed considerably to the performance of fish-environment model in the canonical correspondence analysis (CCA). During the study period, the benthic-feeding species dominated (~53%), and they were accompanied by plankton-feeding fish (~45%). This study shows that oxbow lakes with connections to their parent rivers are essential in retaining the high biological diversity of fish communities and maintaining sustainable fisheries in river-floodplain systems.

Key words: fish assemblages, floodplain lake, hydrological connectivity, restoration

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