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STABILIZING EFFECT OF WWTP DISCHARGE ON WATER QUALITY AND FISH ASSEMBLAGE STRUCTURE. A CASE STUDY

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Abstract

We examined the effluent from a municipal (Nyíregyháza, Hungary) wastewater treatment plant (WWTP) on hydrophysico-chemical properties and on diversity, community structure, and stability of fish assemblages at the recipient low flow channel system during a two-year period. The WWTP outflow increased significantly the nutrient concentrations (e.g. NO₂ and NO₃ concentrations increased to 4x and 8x respectively), and the regime (with the permanent ~0.23m³/s load) at the recipient channel sections. The wastewater outflow not only altered, but stabilized the physico-chemical variables measured, and the water regime in the recipient channels. Thus the natural, periodic fluctuation of the environmental variables was diminished in the study period. The WWTP outflow caused significant changes in the fish fauna as well. High abundances and taxa richness were found in the stocks inhabiting the charged watercourse sections. At the same time, species composition and relative abundances of fish stocks proved to be more constant at the impaired sites. Our results show that the WWTP outflow caused altered, but significantly more stable environmental conditions. These alterations were favourable for the emergence of a more diverse and more stable fish community on the recipient channel sections. Hence, the dynamic variability in fish assemblage structure that is characteristic of natural lowland stream was not apparent in these perturbed, semi natural habitats.

Key words: community variability, environmental stability, lowland watercourses, municipal discharge

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