

Effect of enhanced water exchange on phosphorus dynamics and biological activity in an urban backwater system in Vienna (Austria)

Elisabeth Bondar-Kunze (1,2,3), Stefan Preiner (1,2), Friedrich Schiemer (3), Gabriele Weigelhofer (2) and Thomas Hein (1,2)

(1) University for Natural Resources and Applied Life Sciences, Institute of Hydrobiology and Aquatic Ecosystem Management, BOKU Vienna, Max Emanuelstr. 17, A-1180 Vienna

(2) WasserKluster Lunz GmbH, Interuniversity Center for Aquatic Ecosystem Research, Dr. Carl Kupelwieser Prom. 5, A-3293 Lunz/See

(3) University of Vienna, Vienna Ecology Center, Department of Limnology and Hydrobotany, Althanstrasse 14, A-1090 Vienna

Due to human impacts, floodplains in urban regions are often simultaneously affected by eutrophication, loss of hydrological dynamics and even land use change. In order to mitigate some of these effects in a degraded floodplain within the city limits of Vienna, the "Dotation Lobau" water enhancement scheme, was initiated in 2001.

Our study indicates that this management approach positively affected the urban backwater system, the Obere Lobau. The significance of the effects, however, depends on the historical and current trophic situation of the respective water bodies. A backwater system with eutrophic conditions can shift, after the enhancement of surface water connectivity with lower phosphorus concentrations, to a backwater with stable mesotrophic characteristics. The surface water connectivity introduced particulate phosphorus export up to 30 % increase over the influent loading and dissolved phosphorus up to 14 % increase over the influent loading. However in sections with submersed macrophyte development, which provide enhanced filtering capacities for particulate matter, sediment and phosphorus accumulation is raised. At the same time, water transparency increased resulting in a positive feedback for further macrophyte development. This study highlights that the evaluation of restoration measures should include the dynamics of potential growth limiting factors and ecosystem processes such as gross primary production and community respiration to understand the trophic development of an urban floodplain area, subjected to restoration measures.