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Author: C. Hauer

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REVIEW OF HYDRO-MORPHOLOGICAL MANAGEMENT CRITERIA ON A RIVER BASIN SCALE FOR PRESERVATION AND RESTORATION OF FRESHWATER PEARL MUSSEL HABITATS

HAUER, C.[1]

[1]*Institute for Water Management, Hydrology and Hydraulic Engineering, Department for Water – Atmosphere – Environment, BOKU - University of Natural Resources and Life Sciences Vienna, Muthgasse 107, 1190 Vienna, Austria*

Abstract:

Increases in the fine sediment supply and fine sediment deposits have been highlighted as one of the main pressures affecting the ongoing degradation of Freshwater Pearl Mussel *Margaritifera margaritifera* (L.) (FWPM) habitats. Those impacts, however, have been mostly investigated on a local scale without considering catchment scale boundaries that might decisively influence sediment production over the short to the long term. Hence, the aim of this review study was to reveal the importance of scaling sedimentological and morphological processes especially in terms of the preservation and restoration of freshwater pearl mussel habitats. The focus was on the Austrian territory, where the crystalline catchments of the Mühl- and Waldviertel exhibited site specific characteristics of sediment production and sediment transport. The importance of the variability in the grain size distribution as well as the variability in river morphology for evaluating freshwater pearl mussel habitats are reviewed, especially in terms of the implementation of possible mitigation measures. For evaluating FWPM rivers, a revised sedimentary link concept is discussed, considering the main driving processes to be an increase in the fine sediment supply from tributaries. As possible mitigation measures, structural measures, such as transversal obstructions or boulder placement, and non-structural measures, such as initiation of the overbank deposition of fines and land use changes, are presented. The validation of mitigation is discussed based on monitoring the results of boulder placements and overbank deposits of tributaries after a 10-year flood in 2013. Based on a review of habitat needs of FWPM and the variability of the abiotic environment, it could be concluded that it is necessary to consider the catchment scale approach in the preservation and restoration of freshwater pearl mussel rivers, linked from the headwater tributaries to the selected habitats over the mid to the long term.

Key words: *Freshwater Pearl Mussel, sedimentology, river morphology, mitigation measure;*