



## **Description and evaluation of decisive morphodynamic parameters for successful spawning including different case studies of austrian rivers**

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The meaning of spawning grounds and its sustainable existence for successful reproduction were recognized more and more by scientists and fishing agencies in last years. The complex interaction between stream pattern morphology (channel width, depth, velocity, discharge, channel slope, roughness of channel materials, sediment load and sediment size) and spawning areas were seen as one of the major processes for a successful rehabilitation of regulated rivers. In this work different case studies of river rehabilitation and restoration are presented compared to natural river sections. Whereby the focus was set on monitoring and analyses of the spawning grounds of main fish species. The results of the comparison between natural and restored river section exhibited, that for the longitudinal profile similar patterns of mesohabitats (pools, riffles and runs) were developed over the monitoring periods (3 years) in the restored areas compared to morphodynamic unrestricted and natural river sections. Riffles, which were used by salmonids and rheophilic cyprinids for spawning, were found in all case studies of river restoration after the monitoring periods. The difference and decisive fact for successful reproduction compared to uninfluenced river sections was that during river regulation the bankfull discharge capacity (bankfull flow increased) and the Cross sectional shape in areas of riffles had changes. These changes affect riffle stability and sustainability for higher discharges (above mean flow) so that the erosion of cobbles out of the riffles starts earlier (discharges) compared to natural river sections. The stability of spawning grounds, which has to be guaranteed for 4 weeks

in case of *Chondostroma nasus*, during high flow, is therefore more found in unrestricted rivers than in restored river sections. These processes should be recognized for planning river restoration projects in future.

**Key words:** *spawning grounds, Stability, Salmo trutta, Chondostroma nasus, riffles, meso-habitats;*