



## **Habitat hydraulic modeling for assessing changes of mesohabitat types in a Greek mountainous river**

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The aim of this study is to describe and assess changes in physical attributes of mesohabitat types in response to different flows in a Greek mountainous river. Hydraulic simulations were applied using two one-dimensional hydraulic models, MIKE 11 and HEC-RAS. The differences between the two models were analyzed by comparing their outputs against in situ measurements. A 200 m reach in Acheloos river was chosen as study site (Mesochora upstream) mainly because it is located in relatively undisturbed conditions (near reference conditions according to the Water Framework Directive) but also because there is intense interest for the construction of small hydroelectric plants in this area and in other mountainous rivers. Transects were typically placed in areas representative of the various habitat types, proportionally determined by a habitat mapping process at a larger stream segment. Each transect was permanently marked with metal rods to allow repeated measurements in time. The channel and floodplain were surveyed to create a digital elevation model (DEM) of the river. A detailed topographic survey with a GPS/GNSS Geomax - Zenith 20 was made using reference stations at geodetic control points for highest accuracy. Also, a gauging station was installed downstream of the reach in order to provide water level data in an hourly step. Hydraulic models were applied over a range of flows and river stages, based on past measurements. For selecting the control transects a thorough analysis of various parameters, such as habitat representativity, streambed slope and substrate types, was applied. In this way the habitat changes were described based on various flow scenarios over time. In a later step the results from the hydraulic models will be combined with fish habitat simulation curves (HSCs) focusing on the integration of mesohabitat and microhabitat types in the environmental flow assessment scheme.