



## **Assessment of the aquatic habitat quality of the mountain streams in Eastern Slovakia by bioindication**

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In 2008 was implemented topographical and ichthyological research on the chosen streams on the east of Slovakia. For hydraulic modeling was used RHABSIM model which is component of the IFIM (Instream Flow Incremental Methodology). IFIM is an interdisciplinary decision-making system, which has arisen as a result of the knowledge that most fish species prefer certain combinations of water depths, flow velocities, hiding places and materials of a riverbed.

The research was aimed at the relationship between the quantitative parameters of ichthyofauna as a bioindicator and the ratio of habitat suitability. In the IFIM methodology the relationship between abiotic and biotic characteristics is represented by the habitat suitability curves of various fish species. Fish are the best bioindicators that most sensitively indicate the quality of a stream microhabitat. The habitat suitability curves of particular fish species are determined for the two most important abiotic characteristics – flow velocity and water depth. From our research, it follows that the technique of processing for the habitat suitability curve is a very important factor that significantly influences the whole process of habitat modeling.

The assessment of the habitat quality proves the appropriate input for water-management planning and decision-making, e.g. determination of the minimal (ecological) flow, river restoration planning, or the assessment of the river regulation influence on the quality and quantity of its biological guilds. It can also be used as a substitute of the ichthyofauna biodiversity assessment. These models provide a basic overview of time and spatial interaction of physical and biological components of the river system. This methodology can even be used for modeling the unaffected character of stream according to the EU framework directive 2000/60/EC.

Modeling of the aquatic habitat quality using the RHABSIM model requires the simulation of the velocity field verified for two water levels at least. Velocity field in particular cross-section was measured by hydrometrics. The Weighted Usable Area (WUA) is the final outcome of the IFIM. It is a direct function of a discharge, and it represents the suitability of the whole study area divided into the microhabitat level. From the shape of the WUA is possible to read minimal flow of the channel section of the stream.

Minimal flow was assessed based on the knowledge about flow impact on the biological environment of the stream. These information was characterized by relationship between fish population and their habitat. Minimal flow, as well as the river topography, counts among the basic abiotic characteristics of the streams habitat, which are determinant for the preservation of the optimal aquatic biota.

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