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Weighted Usable Volume - Habitat Modeling

The real world calculation of livable space

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Habitat research goes back for several decades. The importance of diversify available habitat for aquatic biota has been shown by many authors throughout the last years. In order to understand complex natural river structures and to analyze functional interactions between aquatic biota and abiotic components of the environment many methodologies were developed with the main goal to provide practical tools for river management.

Within these models normally the “Weighted Usable Area” (WUA) for aquatic organisms under specified environmental conditions are calculated. But, weighted usable area as a result of mean velocity data in verticals or transects do not describe the real world situation of velocity distributions in rivers cause of data smoothing.

Instream flow modelers are nowadays increasingly utilizing 2D and 3D hydrodynamic modeling approaches to assess aquatic habitat versus discharge relationships. Out of technical increase of instrumentation, resolution and sampling strategies, new possibilities out of the use of acoustic Doppler or laser 3D profilers open new vistas within hydraulic and habitat modeling. As an example the linkage between energy intake and

use, which is used in bio-energetic models, necessitates a very detailed description of the study site with a 3D velocity field.

For further development in habitat modeling, the use of WUV (Weighted Usable Volume) as a result of a special velocity distribution, which describes the real world of living space without data smoothing consequentially is a must.

The new **HA**bitat **MO**delling **SOFT**ware (HaMoSoft) has been developed to analyze basis data (like measured velocity fields or velocity results from 3D hydraulic models, geometry, substrate and cover) with a 3D output value termed "Weighted Usable Volume" (WUV). The great difference to the existing habitat models is, that the measures or simulated velocity basis data will not be reduced to mean values in verticals or transects.

The spatial velocity distribution (measured or simulated point or cell velocities) will be used with the whole information. Equivelocity contours in transects and/or horizontal layers will be calculated out of measured or simulated point/cell velocities for further use in the new habitat calculation model. Within this 4 parametric habitat analyzing software, using and combining velocity distribution, depth, substrate and cover, the real world of habitat distribution is analyzed spatially. The analyzed WUV describe the real world situation of living space within nature like rivers and streams.