

## Projekt- <u>oder</u> Masterarbeit FS 2015



Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie

Leitung: Betreuung:

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## Flow Structures at Fish-Friendly Guidance Screens

## Strömungsuntersuchung an Leitrechen für Fischabstiegsanlagen

Hydropower plants and dams can block or delay up- and downstream fish migrations and thus cause a decline in species population. Downstream fish passage through turbines or over spillways may significantly increase fish mortality during downstream migration periods. Therefore the implementation of protection systems stopping fish from entering turbine intakes has a high priority in regard to ecologically upgrading HPPs. For that reason VAW conducts research on louvers and horizontally-oriented bar racks, so-called 'fish-friendly' guidance screens to adapt and advance them in regard to safe fish passage and a successful economical implementation.

The goal of the study is to quantify small- and large-scale turbulent flow structures around a fish-friendly guidance screen and relate these structures to fish behaviour. Furthermore, the effects of the screen on the downstream flow field will also be investigated in relation to head loss and hydropower production.

Within this MSc-Thesis, velocity measurements around a bar rack oriented at an angle 15° to the flow direction will be conducted in a 1.5 m wide, 1.2 m high and 30 m long laboratory flume (Fig.1a). A high resolution Laser Doppler Anemometry (LDA) system (Fig. 1b) with a 3D positioning system will be used to measure flow velocities. The results of the experiments will contribute to design a hydraulically efficient and fish-friendly guidance structure.



Fig. 1: Experimental setup including (a) laboratory channel and (b) LDA system (VAW)

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## Notice:

Experimental work with LDA system, Communication is in English, Thesis in German or English, For MA single work, for PA group work