

Master thesis HS 2016



Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie

Leitung: Betreuung:

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Mitigation of fish stranding risk under hydropeaking scenarios: a modeling approach

River reaches downstream of hydropower plants regularly experience severe discharge reductions due to production shutdowns. Such rapid dewatering processes may result in harmful, even lethal conditions for some biological species. Swiss guidelines for the mitigation of the intermittent flows recognize two crucial hydro-morphological controls on fish stranding risk, namely the dewatering rate and the wetted area variation. The goal of this MSc-thesis is to use the 2D version of the numerical model BASEMENT to model and quantify such controls in a case-study site. The investigated reach will be Lundesokna River (Norway), for which a set of topographical and hydraulic data are already available.

The specific goals of the thesis are: i) setup the numerical simulations and calibrate the model using field data; ii) simulate the current hydropeaking scenario evaluating the stranding risk in the framework of the Swiss guidelines; iii) simulate and discuss possible alternative dewatering scenarios to reduce stranding risk.



Fig. 1- Left: Atlantic salmon (*Salmo salar*); right: example of 2D mapping of maximum dewatering rate evaluated with the numerical model.

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