

## Master's or Project Thesis HS 2021 Project Based Research Work



Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie

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## The role of engineered logjams in river morphodynamic processes

Wood is a relevant component of river ecosystems and affects both flow conditions and morphological structures. As a river restoration tool, so-called engineered logjams (ELJ; Fig 1) are placed in the river to generate important riverine habitat by creating an upstream pool with slower, deepened water and local scour downstream of the ELJ. The majority of previous studies on ELJs focused on the local changes in flow velocity, water depth, and scour and deposition processes. Depending on the number of ELJs and the river hydromorphological conditions, these structures may not only have local effects but also induce morphodynamic processes at reach scale.



Fig. 1: Engineered logjam at Trinity River, California (photo: DJ Bandrowski, Yurok Tribe)

The objective of this thesis is to study the morphodynamic processes associated with ELJs in rivers using numerical simulation, and their effects on habitat diversity. The software BASEMENT (developed at VAW) will be used to answer the following research questions: (1) How many ELJs are required to create habitat diversity, described by the change in flow velocity and water depth, along the modeled river reach? (2) Can the presence of ELJs induce a change in river reach morphological pattern? (3) How does the ratio between channel width and ELJ width affect the results? The results of this thesis will contribute to an improved process understanding of wood in rivers and may aide ongoing river restoration efforts. This project requires an affinity for numerical simulations and data analysis. General scripting skills are helpful. The prior attendance of the course River Morphodynamic Model-ling is a prerequisite.

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Numerical simulation; Project language: English 1 student for Master or 2 students for project thesis