



Efficiency of restoration measures – Interaction between discharge and morphodynamik processes in a semi-natural water course at the Danube between Neuburg and Ingolstadt (Germany)

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The Upper part of the Danube was straightened and embanked since the mid of the 19th century and flows between dikes without any contact to its floodplain. Additionally, since the 1970ies barrages are influencing the river continuity and the ground water level of the floodplain negatively and hydroelectric power plants cause massive disruption to the plant and animal life living in and nearby the water.

The presented investigations are part of a large floodplain restoration project that aims to bring back new dynamics to the floodplain and reconnect it with the river. The monitoring concept covers the main driving variables, water, groundwater and sediment dynamics, as the key processes for floodplain habitats and species. They give a drive to enliven and resurrect the natural processes in the riparian areas. This project takes place in a project area of 2.100 hectares of riparian forests and consists – in a geomorphological perspective – of two major parts.

1. a permanent flow of water (up to 5 m³/s) bypassing the dam of the power station. The new river will develop on the floodplain partly following old oxbows, but partly eroding its way naturally in the new modelled channel.

2. controlled flooding (up to 30 m³/s) of parts of the floodplain during peak discharge of the Danube (600-1.100 m³/s; statistically one to three times a year).

The project, conducted by the Bavarian Water Authority, actually started at June 2010 with the first opening of the sluice weir. The Floodplain Institute Neuburg and the Department of Physical Geography of the Catholic University of Eichstaett in cooperation with seven other research institutes established a comprehensive and interdisciplinary monitoring program including vegetation, fauna, hydrological and morphological data. This research project is founded by the BfN (Federal Agency for Nature Conservation).

Immediately after the first flooding a new morphological activity has started. The new river banks are prone to lateral erosion and new undercut slopes have developed. The erosion, transport and deposit of sediment will depend on the outflow which is man-controlled and adjusted to the Danube water level. To understand the development of this new river channel the "status quo ante" was recorded by a package of methods. The goals of these applied investigations are to get as much knowledge of the starting conditions in the channel as possible (channel topography and sediment distribution). Therefore methods are ranging from standard grain size analyses over cross section measurements and high resolution aerial photos (taken from a helicopter), up to highly sophisticated terrestrial laserscanning (TLS) measurements using a Riegl LMS Z 420i. This investigation may also contribute to the understanding and monitoring of sedimentation processes and quantification of erosion and sedimentation in a semi-natural modelled channel.

The suggested poster presentation will show first results of the combined methods and planned analyses in the next 2 years, which will show the development of the channel in this field experiment.