NRP 70

Electricity supply

Sustainable Floodplain Management and Hydropower

Overview

Introduction

In Switzerland, around 55% of the electricity is produced by hydropower. Hydropower facilities directly influence the natural flow regime, the main driver of environmental complexity in river floodplains (e.g. hydropeaking, water abstraction and sediment retention).

Floodplains cover only 0.26% of Switzerland's territory. However, 10% of the fauna species found in Switzerland live exclusively, 40% regularly and 80% occasionally in floodplains what reflects their importance for Switzerland's biodiversity.

Overall objective

Providing tools for a sustainable development of hydropower production while optimizing and evaluating ecological floodplain goods and services, and sustaining effective decision-making processes. Four floodplains showing different hydropower and morphological impacts like hydropeaking, residual flow, damming, bedload deficit are subject of this study.

Concept and goals

Sustainable water resource management

Goals

- Indicators
 Evaluation of effectiveness
- Planning criteria
 Management optimization

Field assessment – modeling – remote sensing 4 Floodplains: Urbach, Sense, Sarine, Thur

develop. interactions *Eawag*



g nteratctions of Zurich

Indicator development

Integrating structural (e.g. hydromorphology, fauna) and functional (e.g. respiration) floodplain properties

Main goals

Extend existing sets of mainly structural indicators
 Ecological evaluation of (managed) floodplain

Modeling

Predicting changes in structural and funtional floodplain properties

Main goals

- Extending ecological significance of structural hydraulic indicators and models
- Evaluation of the ecological potential and impacts of (managed) floodplains at the landscape scale

Monitoring

Verifying changes in structural and functional floodplain







properties

Main goals

- Effective assessment at the landscape scale
- Model calibration and spatial explicit quantification of inticators

Stressors

Partners and Collaboration

Partners

- Kraftwerke Oberhalsi AG (KWO)
 BAFU
- Abteilung Naturförderung Kt. BE
- Auenberatungsstelle

Follow-up group

- M. Nietsche (BAFU)
- C. Weber (Eawag)

Integration

- BAFU program «Wasserbau und Ökologie»
 SCCER*
- Woolsey et al. 2005**

Project Team Int. Collaborations

Energy Turnaround

Hydropower management

With increased knowledge of floodplain ecosystem needs and stressor specific indicators, economically feasible managing possibilities of hydropower plants to minimize negative impacts on floodplain shall be developed.

This will improve the environmental sustainability of hydropower plants and increase the acceptance of existing and planned plants within society and politics.



Dynamic flow regime

- W. Gostner
(Patscheider&Partner AG)
- C. Joerin (Kt. FR)

University of Montana
University of Poland

- University of Waterloo

Hydropower Hydropeaking, water abstraction, sediment retention



*SCCER = Swiss Competence Centre of Energy Research **Handbook for evaluating rehabilitation projects in rivers and streams

Contact

Prof. Dr. A. J. Schleiss
LCH - EPFL
P +41 21 693 23 82
E anton.schleiss@epfl.ch

Prof. Dr. M. Schaepman Remote Sensing Laboratories- UZH P +41 44 635 51 60

E michael.schaepman@geo.uzh.ch

Dr. M. Döring Ecohydrology Research Group - ZHAW P +41 58 934 53 09 E michael.doering@zhaw.ch PD Dr. Ch. Robinson
Aquatic Ecology - EAWAG
P +41 58 765 53 17
E christopher.robinson@eawag.ch

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