Optimizing river management: integrated assessment of floodplain interventions

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Introduction
There is a continuous need for evaluation of floodplain interventions with respect to hydro-morphodynamic as well as ecological processes. This requires a method that is fast, and inclusive to support discussions on future interventions.

We present the preliminary results of RiverScape, an automated method that can:
• position and parameterize interventions with respect to terrain height and land cover,
• compute potential biodiversity in a spatially explicit manner,
• automate the quantification of fluvial ecosystem services.

Planning and parameterization
Interventions can be planned for single floodplain sections, or over the full study area. Four types of measures were implemented. Each intervention is parameterized in terms of land cover, roughness, and terrain height.

RiverScape settings for intervention planning

Biodiversity development
The development of biodiversity as a result of the intervention was evaluated using the re-implemented spatially explicit version of BIOSAFE (Lenders et al. 2001).

Evaluation of the biodiversity value of seven taxonomic groups for two different intervention alternatives

Temporal development of biodiversity value can be evaluated to demonstrate the effect of succession and rejuvenation.

Ecosystem services development
Evaluation of ecosystem services, sensu Large and Gilvear (2014), was automated using the RiverScape geodatabase. This gives an overview of 16 services per 5-km long river sections. No monetary values are assigned yet.

Preliminary conclusions and outlook
The RiverScape modules on planning/parameterization, biodiversity, and ecosystem services provide fast access to a wide range of intervention options and ecological evaluation. The next steps will be to:
• add evaluations in terms of flood risk reduction, cost estimates, and uncertainty (Fig. left),
• consider evolution of the intervention over time,
• evaluate effects of land management (Fig. right),

Two dimensions for decision support visualisation: Cost and flood risk. Intervention selection, evolution over time, and uncertainty