

Sediment management for a living river - the Lahn River case

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Introduction: The Lahn River is a tributary of the Rhine River. With a catchment area of 5,931 km² and a length of 240 km it is located in the three German Federal States of North Rhine-Westphalia, Hesse and Rhineland-Palatinate. The lower part (148 km) is designated as inland waterway but already since 1981 the Lahn River is no longer used for waterborne transport. This change in use of the Lahn River is seen as chance to develop a sustainable overall concept (Lahnconcept) on how to “utilize” a river with changing importance, promoting water-ecological and nature protection as well as touristic and other regional interests.

Therefore, a new national Life Integrated Project, “LiLa – Living Lahn River”, was established in Germany by six authorities, responsible for the Lahn River. The project is meant to be a “blue print” for other smaller waterways after a change in use. The main topics taken into account are: inland waterway management, flood protection, nature conservation, nature protection / biodiversity, as well as recreation leisure and tourism, always with regard to a sustainable socio-economic use. A further topic is the water quality assessment according to the European Water Framework Directive (No. 2000/60/EC, WFD). As the ecological status and potential of the Lahn River quality assessment is rated as “unsatisfactory” or “bad” [1], the project intends to enhance the Lahn River’s ecological status. Depending on the named topics, certain measures, e.g. re-vitalization measures, with influence on the river morphology and thus the sediments, will become necessary. However, as an impounded river and due to its history (e.g. mining industry), relevant amounts of contaminated sediments are stored in wide parts of the Lahn River. As contaminated sediments in turn may be one of the main reasons not to meet the WFD objectives [2], the Lahn sediments can be one possible reason for the bad chemical status of the lower Lahn River [3]. Therefore, a sediment management concept as part of the Lahnconcept will be developed.

Conceptual design: The sediment management concept comprises the determination of the as-is state of the sediment quality and thus the development of a sediment cadastre as well as a sediment monitoring during and after the planned measures of the project (e.g. construction works with influence on the rivers morphology, like those concerning linear patency). In

a first step, 60 sampling sites along the Lahn River (Fig.1) were investigated considering the sediments physicochemical and chemical properties (cf. priority substances, WFD) as well as assessing the sediment toxicity by means of a battery of ecotoxicological bioassays. For establishing a sediment cadastre these investigations will be repeated two times (during the next two years) and completed with biocoenosis studies [4]. The sediment cadastre is supposed to give an overview on remediation needs and possibilities for the sediments of the Lahn River and to identify “pollution hot-spots”, whose removal can contribute to improving the chemical status. It serves as basis for the development of the sediment management concept but also as precondition of the sediment monitoring. Analysis of sediment quality during and after a measure provides information on a possible improvement of the chemical status of the waters.

The sediment management concept will provide support in decision making processes on how to deal with (re-mobilized) sediments.

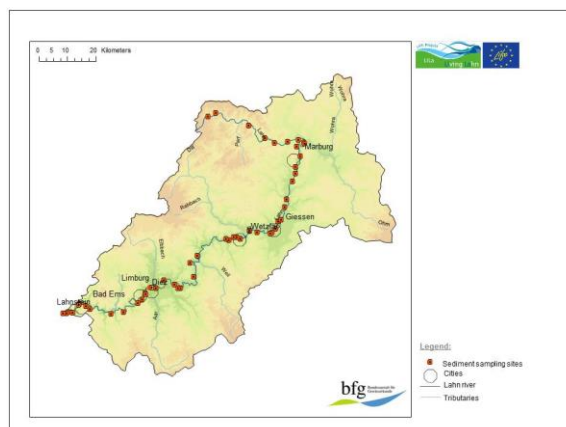


Fig. 1: Catchment area of the Lahn River, with sampling sites (red dots) of the first sediment sampling period in 2016.

References: [1] Hessian Ministry of the Environment, Climate Protection, Agriculture and Consumer Protection, RBMP (2009). [2] Heininger et al. (2015) In: *Sediment Matters* (Eds.: P. Heininger, J. Cullmann), p 201-247. [3] International Commission for the Protection of the Rhine, RBMP (2009). [4] Heininger et al. (2007) *Environmental Pollution* 146: 64-76.