

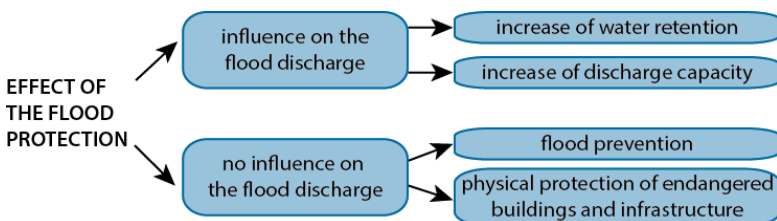
M.Sc. thesis

Categorization and modelling of flood protection measures for risk-based optimization

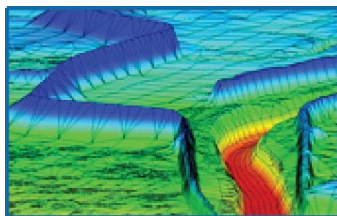
Michael Ellinger, August 2015

Background

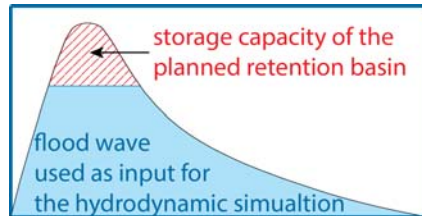
Recent occurrences of severe floodings in central Europe demonstrate that the elaboration of more efficient flood mitigation concepts is still of high relevance even in the most developed countries of our world. Meanwhile new challenges to the correct dimensioning of new protection measures are emerging because of the current uncertainty on future climate change. These requirements are met by the application and improvement of risk-based approaches for the identification of optimal solutions.



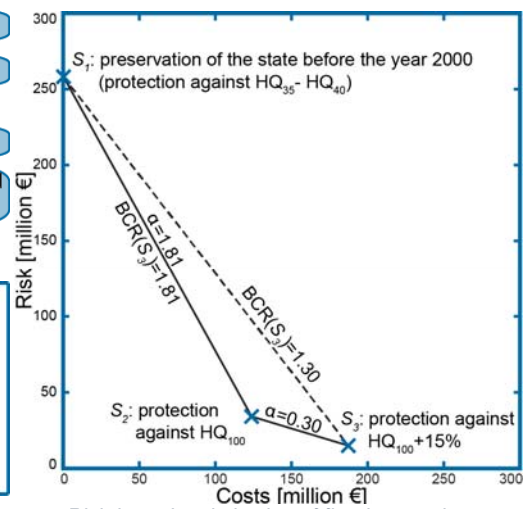
Categorization of measures regarding their effects on the flood process



Implementation of dike structures into hydrodynamic models



Modelling the effects of retention basins as modified flood waves



Risk-based optimization of flood protection strategies for the lower Mangfall valley

Methodology

This Master's Thesis introduces a new categorization scheme for flood protection measures with particular regard to their risk-based optimization. On this basis, the optimization parameters of the distinct measures and the common simulation techniques are analyzed. Together with a state-of-the-art approach for the risk-based optimization of flood protection strategies, the given methodology is applied to the case study of the lower Mangfall valley in Bavaria.

Results

The novel categorization scheme as well as the findings obtained with regard to the optimization parameters and the modelling of flood protection measures might serve as basis for further scientific research. Besides, the case study enables an initial appraisal of the flood risk for the lower Mangfall valley. The results prove the cost-effectiveness of a new flood management concept which is currently designed and realized by the Water Authority Rosenheim.

Data and hydrodynamic models provided by Water Authority Rosenheim

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