



Model-based assessment of the effectiveness of Nature-Based Solutions in flood risk reduction: The case of Tamnava River Basin in Serbia

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Urbanization and climate change are making societies around the world more vulnerable to flooding. Effective and sustainable adaptation measures are needed to counteract the impacts of these changes and Nature-Based solutions have gained considerable attention for both mitigation and adaptation methods of flood risk reduction. However, methodologies to evaluate their performance and upscale their implementation are lacking. Performance evaluation in particular is an important process for decision-makers to be able to decide on the most desirable measures to be implemented. The present research aims to develop a methodology for evaluating the effectiveness of NBS in reducing flood risk. The hydrological model (HEC-HMS) and 1D-2D hydrodynamic model (HEC-RAS) were coupled to create probabilistic inundation depth maps. A detailed flood damage model is then built and applied to estimate damage with and without the measures. The flood damage model was developed within the model builder in ArcGIS so that it can be easily replicated with many scenarios. Four measures were selected for the analyses, namely; reforestation, retention ponds, riparian buffer stripes, and bridge removal. This methodology has been applied to the case study of the Tamnava River Basin in Serbia within the EU-funded RECONNECT project.