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## A toolkit for modelling the geomorphic consequences of 'Working with Natural Processes' flood defence interventions

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Flood defence interventions deemed as 'Working with Natural Processes', or alternatively 'Natural Flood Management', seek to utilise the natural processes of river catchments to reduce flood risk. Such interventions include, but are not limited to, leaky dams, large wooded debris, and floodplain reconnection. They have proven popular recently in the UK due to the relatively low cost, perceived low risk, wider environmental benefits, and its ability to engage local communities with their own flood risk.

A major knowledge gap exists into the ongoing effectiveness of interventions such as leaky dams in the medium-term (10 to 50 years), especially when it comes to the feedbacks with geomorphic activity which might reduce an intervention's ability to 'slow the flow', or even remove it completely. Understanding this is important, as often the ongoing responsibility for maintenance and liability for the interventions is unclear. The impacts of future climate change are also poorly understood.

The CAESAR-Lisflood model has been used as the basis for a toolkit to simulate the effectiveness of flood interventions with work with natural processes at installation, and ongoing into the future considering the geomorphic response. By driving the model using rainfall simulator data the impacts of climate change can be assessed. Finally, different maintenance levels for assessing and repairing the interventions can be incorporated allowing for planning of intervention schemes which account for ongoing costs.