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The role of fine sediment in managing catchment scale flood risk.

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Increases in sediment delivery to river channels from changes in land use and climate must be accounted for by catchment managers. Recent flooding of the Somerset Levels, UK highlighted the impacts of reduced channel capacity as a result of sedimentation. Sediment entering river systems needs to be carefully managed in order to sustainably mitigate flood risk.

Geomorphological drivers have previously been neglected when proposing methods to reduce flood risk. Understanding the connections between hydrology, geomorphology and engineering is fundamental to predicating sediment transfer within river catchments and thus successfully implementing sustainable flood management.

This study focuses on catchment scale fine sediment delivery, changes to channel capacity and its implications for existing flood defence infrastructure. Furthermore, fine sediment accumulations in river channels have been found to reduce water quality due to the presence of nutrients and heavy metals and degrade spawning and invertebrate habitats. Locating the sources of fine sediment within a catchment will enable catchment managers to target resources effectively at reducing sedimentation in rivers and appraise natural flood alleviation measures.

This study investigates whether changes in channel capacity due to sedimentation influence flood risk of the River Eye catchment, Leicestershire. Using a combination of field, laboratory and modelling methods this study 1) identifies the sources of fine sediment within the catchment, using sediment fingerprinting techniques; 2) quantifies the spatial and temporal changes in channel capacity at a reach scale with a history of flooding in Melton Mowbray, and 3) monitors existing flood defences designed to prevent downstream sedimentation to determine the longevity and success of the sustainable flood defence scheme. These results will be used to predict the long term flood risk to the catchment, using a series of hydraulic inundation scenarios.