Effectiveness of online silt traps in reducing localised and catchment scale flood risk

Sarah Twohig, Ian Pattison, and Graham Sander
Loughborough University, Civil and Building Engineering, Loughborough, United Kingdom (s.twohig@lboro.ac.uk)

Geomorphological drivers are often 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.

Fine sediment erosion is a continuing concern in the River Eye, Leicestershire. The predominately rural catchment has a history of flooding within the town of Melton Mowbray. Fine sediment connectivity has been recognised by stakeholders as a contributing factor to flood risk and the degradation of the SSSI. In response, two online silt traps were installed to inhibit sediment connectivity within the channel and prevent loss of channel capacity. The artificially widened and deepened areas of the channel have been excavated once since there installation in 2002.

Time integrated mass suspended sediment samplers have been installed upstream and downstream of both silt traps to quantify the reduction in suspended sediment over a 12 month period. The sediment has been subjected to laboratory analysis to determine the size of suspended sediment particles and organic content, providing an estimate in distance travelled from the source.

Due to their rarity, the silt traps provide a unique opportunity to explore their impact on local hydrology. Four monitoring stations have been installed above the largest silt trap to record river stage and to ascertain whether flood risk is locally increased as a result of their placement. These results have been combined to determine the overall success of the natural flood management scheme.