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Flood Impact Modelling to support decision making

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Much of what is known about the impacts of landuse change and Natural Flood Management (NFM) is at the local/plot scale. Evidence of the downstream impacts at the larger catchment scale is limited. However, the strategic and financial decisions of land managers, stakeholders and policy makers are made at the larger scale. There are a number of techniques that have the potential to scale local impacts to the catchment scale.

This poster will show findings for the 30km2 Leven catchment, North Yorkshire, England. A NFM approach has been adopted by the Environment Agency to reduce flood risk within the catchment. A dense network of stream level gauges were installed in the catchment at the commencement of this project to gain a detailed understanding of the catchment behaviour during storm events. A novel Flood Impact Modelling (FIM) approach has been adopted which uses the network of gauges to disaggregate the outlet hydrograph in terms of source locations. Using a combination of expert opinion and local evidence, the model can be used to assess the impacts of distributed changes in land use management and NFM on flood events.

A number of potential future landuse and NFM scenarios have been modelled to investigate their impact on flood peaks. These modelled outcomes are mapped to a simple Decision Support Matrix (DSM). The DSM encourages end users (e.g. land managers and policy makers) to develop an NFM scheme by studying the degree to which local runoff can be attenuated and how that flow will propagate through the network to the point of impact. The DSM relates the impact on flood peaks in terms of alterations to soil management practices and landscape flow connectivity (e.g. soil underdrainage), which can be easily understood by farmers and land managers. The DSM and the FIM together provide a simple to use and transparent modelling tool, making best use of expert knowledge, to support decision making.