Quantifying the effectiveness of natural flood management in lowland catchments

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Further calls for the inclusion of natural solutions in flood alleviation schemes were made following the severe floods in Cumbria, December 2015. Natural Flood Management (NFM) has emerged over the last decade as a very useful and sustainable approach. It involves the adoption of a multitude of measures that mitigate flooding by restoring or enhancing natural processes in upstream catchment areas. Evidence of the effectiveness of NFM in flood risk management is limited. Therefore, the overall aim of this project is to monitor a range of NFM interventions and evaluate their functioning in space and time. This will provide the information needed by numerical modellers to assess their effectiveness at a range of scales. More specifically the objectives of this project would be to: (1) monitor the functioning of NFM interventions both individually and in combination for a range of event magnitudes and antecedent conditions; (2) define flood hydrograph metrics and determine the potential of interventions to mitigate specific flood characteristics (e.g. peak flow, peak level, flood duration, rate of rise); (3) consult numerical modellers to translate measurements of hydraulic and hydrological intervention functioning into useable parameters (e.g. roughness and storage indices); (4) interpret and communicate measurements of intervention functioning to a wide range of stakeholders; and (5) consider the sustainability of interventions and their potential in mitigating future environmental change. This project benefits from the unique opportunity to monitor the effectiveness of interventions being implemented as part of the first Thames Basin NFM trial in the Evenlode catchment. This is a 5 year trial (2016 to 2021) being co-ordinated by the Evenlode Catchment Partnership. The potential of using citizen science to enhance the monitoring of interventions will be considered. This project will compliment previous NFM modelling studies and benefit from alignment with current initiatives. A range of novel monitoring techniques will be used to monitor intervention functioning (e.g. Unmanned Aerial Vehicle (UAV) photography and a remote controlled surveying boat).

Training opportunities: This project provides comprehensive personal and professional development training (e.g. catchment based partnership working through close links to the Evenlode NFM working group and local communities). Training will be given in research methods, state of the art field instrumentation and computing techniques.

Student profile: Candidates for this project should have a minimum of a 2nd Upper Hons degree or equivalent in engineering, environmental science, geography, or a similar discipline, and an interest in catchment hydrology. The candidate will be willing to undertake field work and have reasonable numerical and computing skills. Good communication skills will be essential to engage with stakeholders (including citizen scientists). The project will be based at CEH Wallingford with fieldwork located primarily in the Evenlode catchment.

Funding particulars:
This project has gained CASE support from the Evenlode Catchment Partnership (£1k p.a. for 3 years).
http://www.reading.ac.uk/nercdtp