Project Title: **How Can Citizen Science and High Resolution Monitoring be Used to Characterize the Effectiveness of Natural Flood Management Solutions?**

Lead Institution/Department: University of Bristol, School of Geographical Sciences
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Summary

The effectiveness of natural flood management solutions (NFM) in small, complex catchments is challenging to evaluate without intensive assessment, which requires significant resources. This project will explore how citizen science methods (photographs, spot sampling) and in situ sensors can be most effectively applied to understand the impact of NFM in two catchments: the Ken Stream, Devon, and Watlington, South Oxfordshire.

Ken stream is a tributary of the River Culm, in the River Exe catchment. Following village surface flooding and sediment deposition in September 2023, a number of nature-based solutions have been implemented throughout the catchment. Chalgrove Brook is a chalk stream in the Thames catchment, where NFM solutions to protect the village of Watlington are undergoing design and implementation. A high-resolution sensor telemetered sensor network in the Ken and active citizen science networks across both catchments provides an unprecedented opportunity to understand how small catchments respond to environmental triggers, before and after the implementation of NFM. The project will co-develop a framework to determine how in situ sensors and citizen science reporting can be best used to evaluate NFM and provide data for model parameterization.

Methods

The student will liaise with citizen science groups in both catchments to co-develop monitoring protocols. They will work closely with local partners to understand how their data can be used to parameterize models of the impact of NFM, including a high resolution flow model already implemented in Watlington and a high resolution network of in situ sensors.The student will collect sediment samples for quantification within the laboratories at the University of Bristol quantify sediment transport, maintain the sensor network, analyse the data and also trial low cost water quality sensors and determine their efficacy against commercially available alternatives.

The student will explore how these data sources can be best combined and interrogated to evaluate the effects of NFM, and construct a framework for using citizen science, mapping and models to understand how interventions can be optimized to improve catchment flood risk.

Background reading and references

Ward, S. 2021 Connecting the Culm Environmental Evidence Review, Interreg 2 Seas, Available at: https://connectingtheculm.com/wp-content/uploads/2021/02/CtC-Evidence-Review-1stEdition-Feb2021_logos.pdf

How to Apply: The deadline for this position is 8th January 2025. The studentship will begin in September 2025. Please apply to the "Geography- PhD" at https://www.bristol.ac.uk/study/postgraduate/apply/