
Assessing the potential for using constructed wetlands as mitigation options for phosphorus and sediment within UK agriculture

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The Mitigation Options for Phosphorus and Sediment (MOPS) projects explore practical methods to reduce diffuse pollution from UK agriculture. Previous research undertaken within MOPS has demonstrated that the use of in-field mitigation options (e.g. reduced tillage) can be effective at reducing surface runoff, sediment and nutrient loss. However, pollutants can still be lost from hillslopes unchecked via subsurface flow pathways, which may transfer high nutrient loads downstream. Current research within MOPS is therefore investigating edge-of-field mitigation approaches, which can tackle both surface and subsurface pathways where they discharge into ditches and streams.

MOPS has created seven new constructed wetlands at the edge of agricultural fields, and is now assessing their functioning and effectiveness as diffuse pollution mitigation options. The constructed wetlands, located on different farm and soil types, have been built to three different designs and sizes suited to UK landscapes. Sediment and nutrient load reductions and wetland effectiveness are determined through continuous monitoring of discharge and turbidity and storm water sampling for sediment and nutrients at wetland inlets and outlets. Sediment and nutrient accumulation will also be assessed by annual topographic surveys and sediment sampling, and tracer experiments will be carried out in the course of the project in order to understand water and sediment residence times.

The use of constructed wetlands to trap sediment and nutrients is new to the UK, but is well established elsewhere, particularly in Scandinavia. The project builds on this research, and has a number of novel factors including assessment of multiple pollutants and pathways and pollution swapping, and the consideration of the economic and social aspects of these mitigation options. Here we present the initial results, including novel high-resolution data from the first monitored events.