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The River EdenDTC Project: A National Demonstration Test Catchment

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Abstract

Our environment is a complex system of interactions between natural process and anthropogenic activities that disrupt them. It is crucial to manage the balance for continued food production whilst maintaining the quality of the environment. The challenges we face include managing the impact of agricultural land use on aquatic quality and biodiversity as an integral system, rather than as separate issues. In order to do this, it is critical to understand how the different components are linked – how does land use affect our water courses and ground water, and their associated ecosystems, and how can the impact of agricultural land use on these systems be minimised?

Regulating farm nutrient management through measures that minimise sources, their exposure to mobilisation, and reduce drainage pathways to water courses are all fundamental to the UK's approach to meeting the Water Framework Directive objective of achieving 'good ecological status' in all surface and groundwater bodies by 2015. The EdenDTC project is part of a 5-year national Demonstration Test Catchments (DTC) environmental scheme, aiming to understand the above issues through combining scientific research with local knowledge and experience from multiple stakeholders. The DTC project is a 5-year initiative by Defra, Welsh Assembly Government and the Environment Agency, which encompasses a research platform covering three distinct river catchments: the Eden in Cumbria; the Wensum in Norfolk; and the Avon in Hampshire.

Within the EdenDTC, the impact and effects of multiple diffuse pollutants on ecosystems and sustainable food production are being studied on a river catchment scale. Three 10 km2 focus catchments, selected to represent the different farming practices and geologies observed across the Eden, have been instrumented to record the dynamics of agricultural diffuse pollution at multiple scales. Within each focus catchment, two sub-catchments were selected: one control and one mitigation, in which a number of existing and novel mitigation measures will be tested. A number of on-farm measures, aimed at reducing agricultural diffuse pollution, will be evaluated by monitoring their effect on water quality and associated biodiversity.

In order to achieve this, state of the art hydro-meteorological logging systems have been installed. The outlets of the focus catchments each have a 'high-tech' multi-parameter station that will provide data for total P, soluble reactive P, nitrate, ammonium, temperature, conductivity, dissolved oxygen, turbidity, pH and flow. At the sub-catchment scale are 10 sub-stations, which provide a record of turbidity and water level. All are continuously sampling at 15 minute intervals and are telemetered. The goal is to give an abundance of high quality, multi-scale continuous data provided in real time. Additional storm sampling is being performed at all stations using automatic water samplers, and monthly spot samples are also analysed for each site.

The information gathered at these different scales is hoped to improve the effectiveness/efficiency of schemes such as the England Catchment Sensitive Farming Delivery Initiative (ECSFDI). It is also hoped that many of the mitigation features will be multipurpose, having positive effects on flooding, carbon sequestration, habitat creation and biodiversity.