

# MONITORING: WHAT IS INVOLVED?

FACT SHEET 5



## Background:

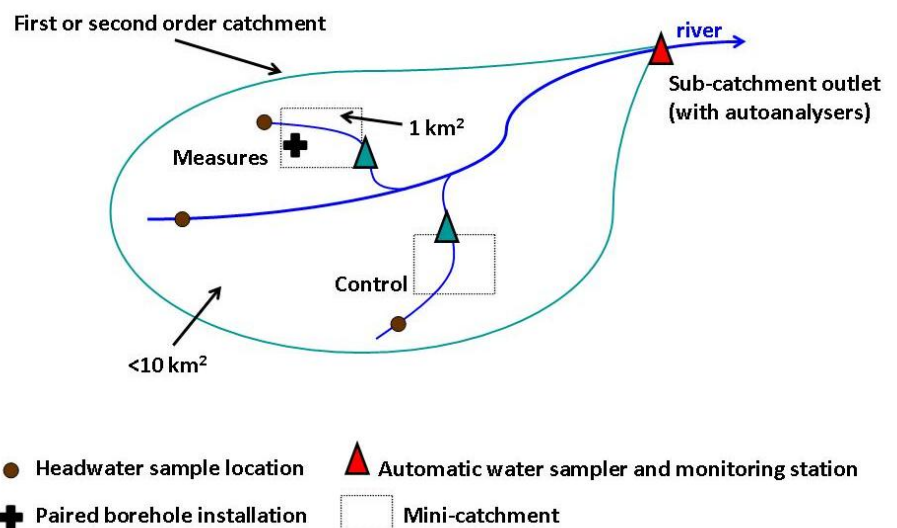
The overall objective of the Wensum Demonstration Test Catchment project is to assess the effectiveness of a variety of land management measures aimed at reducing diffuse pollution from agricultural activities across the whole river catchment.

Fundamental to that assessment is the collection of data to help understand the movement of pollutants within the water courses and groundwater at different times of year, in different weather / flow conditions and how this is influenced by geological and land use characteristics.

## Design of the Catchment Monitoring Network:

State-of-the-art measuring devices will be used for long-term monitoring to both identify and record pollutants and to evaluate the effectiveness of measures to reduce it. The study will consider the impacts and effects on ecosystems and sustainable production and aims to improve understanding of how to predict and control diffuse pollution from agriculture.

The basic design uses the “before-after, control-impact” (BACI) comparison approach. It features automatic water sampler and monitoring stations in both a ‘control’ mini-catchment and in a similar mini-catchment where measures to reduce diffuse pollution can be introduced. Impacts of the measures on groundwater are evaluated



A sub-catchment monitoring station records downstream changes at the wider catchment scale.

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## State-of-the-art monitoring

With the help of land owner / manager members of the **Wensum Alliance**, a number of high-spec monitoring installations are being put in place to collect data. The data will be reported back to the research team and participating land managers in near real time.

### Surface Water Monitoring:

Three spatial scales:

- Wider catchment (existing monitoring sites)
- Sub-catchment scale (<10 km<sup>2</sup>) (investigation of source-transport pathways)
- Mini-catchment scale (<1 km<sup>2</sup>) (investigation of mitigation measures)

Dual-instrumentation approach using:

- Sensor web-based monitoring technology
- Autoanalysers + conventional autosamplers

+ multi-parameter sonde + weather station + stream flow gauging

Key measurements:

- DO, temp, EC, pH, Cl, redox potential
- turbidity, suspended solids concentration
- chlorophyll
- total P, PO<sub>4</sub>
- total N, NO<sub>3</sub>, NO<sub>2</sub>, NH<sub>4</sub>
- Faecal Indicator Organisms, BOD, DOC

### Groundwater monitoring:

- Paired shallow (Quaternary deposits) and deep (Chalk) boreholes for groundwater level and quality monitoring in the manipulated mini-catchments to monitor catchment responses to recharge events.
- New borehole installations to core the unsaturated zone to provide solute profiles.

### Biological monitoring:

- Annual/seasonal monitoring using standardised equipment in accordance with monitoring protocols
- Expansion of current Catchment Sensitive Farming monitoring (invertebrates, fish, diatoms, macrophytes)
- Ecological status expressed using Biological Monitoring Working Party (BMWP) biotic scoring method for bottom-dwelling (benthic) invertebrates
- BOD data, biotic scores and abundance of aquatic insects to assess biological status and the impact of oxygen depletion caused by diffuse pollution inputs
- Replicate biotic scores from manipulated and control catchments with analysis by ANOVA or equivalent non-parametric tests for non-normally distributed data

## WENSUM ALLIANCE Research Team at UEA

The Wensum Alliance is being led by Dr Kevin Hiscock and Prof. Andrew Lovett from the School of Environmental Sciences at the University of East Anglia in Norwich. The first phase of the project runs until 31 March 2014. For further details please contact:

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If you would like to join the **Wensum Alliance** and be part of this project, please get in touch. Your local knowledge, experience, expertise and advice will be invaluable in helping to develop the right catchment and farm management solutions for reducing pollution in the Wensum catchment.

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