Research Methods

- Field wetland monitoring allows sediment and nutrient load reductions and budgets to be calculated, and wetland effectiveness to be determined. Monitoring includes:
  - Continuous monitoring of water level (discharge) and turbidity (sediment)
  - Collection of water samples at pond inlets and outlets for laboratory analysis
  - Annual sediment surveys and sampling
  - Water and sediment tracing experiments.
- Economic analyses are being undertaken to establish farm-scale costs of building and maintaining features.
- Farmer questionnaires and focus groups are being used to assess likeliness of uptake by farmers.

Initial Results

- Samples collected fortnightly at the highly polluted sandy site show a reduction in the mean concentration of phosphorus of over 50% as runoff passes through a ditch and wetland system.
- Sediment trapping rates in 2009-2010 and 2010-2011 ranged from 0.01-0.07 t ha⁻¹ yr⁻¹ for field wetlands at the clay site, 0.02-0.4 t ha⁻¹ yr⁻¹ for the silty site, and 0.5-6 t ha⁻¹ yr⁻¹ for the sandy site.
- These early results suggest that these field wetland designs are effective and that field wetlands could be widely used to reduce diffuse pollution from agricultural land. The project will continue until 2013.

More About MOPS

MOPS1 and MOPS2 are two collaborative research projects, funded by Defra, involving four project partners, Lancaster University, ADAS, the University of Reading and The Allerton Project.

MOPS 1, which focused on in-field mitigation options for winter cereals, is now completed and a final report is available from our website. MOPS2 is currently underway (2008-2013) and focuses on two further areas of diffuse pollution mitigation:

- In-field losses from spring-sown crops (e.g. potatoes)
  ADAS: martyn.silgram@adas.co.uk
- Edge-of-field constructed wetlands
  Lancaster University: mops@lancaster.ac.uk
  The Allerton Project: cstoate@gwct.org.uk.

Economic aspects of the work will be carried out by the University of Reading: a.p.bailey@reading.ac.uk.

For further information on the MOPS projects, visit our website: mops2.diffusepollution.info.
**The Diffuse Pollution Problem**

- Control of end-of-pipe pollution sources has improved water quality, but many rivers and lakes are still poor quality and fail to provide clean water and good habitats for wildlife.
- Latest figures from the Environment Agency suggest that a third of our rivers fail to meet the levels of good ecological and chemical status required by the EU Water Framework Directive.
- The focus is now on diffuse pollution sources scattered across the landscape, such as eroded sediments, and nutrients and chemicals lost from agricultural land.

**Experimental Design**

- Ten experimental field wetlands have been built, located on four UK farms:
  1. Loddington, Leicestershire (clay soils)
  2. Crake Trees Manor, Crosby Ravensworth, Cumbria (silty soils)
  3. Whinton Hill, Plumpton, Cumbria (sandy soils)
  4. Newton Rigg, Cumbria (silty soils).
- Three field wetland types are being trialled:
  - Shallow (0.5 m) single pond (A)
  - Shallow paired ponds (B)
  - Deep (1.5 m) and shallow paired ponds (C).

**Aims of Constructed Wetland Research**

To establish the viability of using constructed wetlands as mitigation options for diffuse pollution, by providing data on their potential use and effectiveness to trap sediment and nutrients lost from agricultural land.

- Diffuse pollution can be transported to streams, rivers and lakes through a number of pathways such as surface runoff, field drains and ditches.
- Land management approaches can be used as mitigation options to trap pollution and prevent problems such as siltation and eutrophication.

**Field wetlands and their configurations**

- Field wetland consisting of a shallow single pond (length 25 m, width 5 m, depth 0.5 m) located in a stream, at Crake Trees Manor.
- Field wetland consisting of a shallow single pond (length 17 m, width 3 m, depth 0.5 m) located in a ditch at Whinton Hill.
- Digging a field wetland to be fed by a drain in a field corner, on clay soils at Loddington.

**Water source diverted into wetland**

- Field wetlands are fed by water from different sources, which may all carry pollution: surface runoff, drain outfalls, ditches and small streams.

- The focus is now on diffuse pollution sources scattered across the landscape, such as eroded sediments, and nutrients and chemicals lost from agricultural land.