

# The Demonstration Test Catchments Project

## Newsletter: February 2013

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### Demonstration Test Catchments

#### What's happening across the Demonstration Catchments?

Welcome to the fourth edition of the DTC Newsletter. It's designed to update you on developments across the Eden, Hampshire Avon and Wensum catchments. You may also visit the [Demonstrating Catchment Management website](#) where you can exchange knowledge with the scientists, farmers, water managers and policy makers involved in the sustainable use and management of river catchment areas.



#### Stakeholders hear the latest findings

A two day conference and seminar on 21 and 22 January provided policymakers, delivery agencies and land and water and catchment managers with an opportunity to learn about the latest research from the three Demonstration Test Catchments and to discuss the findings. Presentations from the two day event may be [found on line](#) on the Demonstrating Catchment Management website.



#### Weather problems for farmers and watercourses

The exceptionally heavy rainfall during 2012 made conditions very challenging for farmers and demonstrated the importance of rainfall in exacerbating diffuse water pollution. The high resolution monitoring equipment in the DTC catchments showed that the amount of nitrate and phosphorus entering water courses was around 2-6 times higher in the wet autumn of 2012 than in the same period in 2011. The continually saturated soil has been prone to compaction from farming operations, increasing the risk of particle mobilisation, erosion and flooding. The wet soil has made it difficult to harvest crops like potatoes and sugar beet. It has also hampered the drilling and establishment of autumn-sown crops. The poor weather conditions meant that wheat yields on heavier soils were 15-20% down from average, and grass 13% down. Livestock farmers have also been affected, needing to keep animals housed for longer. As slurry stores have filled up, there have been few opportunities to spread slurry onto the land because of the wet conditions.



## Chasing the storm

Members of three DTC consortia have been comparing evidence on a storm that moved across the country on 25-27 April 2012 to provide a case study example of the great research potential of the DTC platform. They are using well-established metrics to quantify the effects of this rainfall on discharge and water chemistry in all three catchments over the days following the storm. The researchers are now working on a paper that will outline the methodological approach of the platform in order to illustrate the advantages of the DTC setup and the way in which it can provide high-resolution datasets from three areas of the UK that vary in geology and land-use, and which experience different kinds of pressures.



## Direct drilling is underrated say Wensum researchers

Around 45% of arable land in the UK is under minimum till but only a tiny percentage of farmers use the no-till approach. Yet these kinds of direct-drill techniques are widely used in other countries and, say the Wensum research team, they could have a lot of benefits for some UK farmers. The project has been examining very detailed data kept by farmers they are working with, using “Gatekeeper” software and comparing these with an analysis of nitrogen leaching. From this they argue that reduced cultivation and more use of cover crops could improve nitrogen efficiency and save on set-up costs, fuel and fertiliser, while also benefiting the soil and reducing erosion. For more information contact Kevin Hiscock [k.hiscock@uea.ac.uk](mailto:k.hiscock@uea.ac.uk).



## Spreading the word on DTC research

A new policy and practice note from the Demonstration Test Catchment project uses a format developed by the Rural Economy and Land Use programme to explain the important role that the DTCs are playing in addressing water pollution. Copies available from [anne.liddon@ncl.ac.uk](mailto:anne.liddon@ncl.ac.uk) or [on line](#).



## Are wetlands and ponds the answer?

Wetlands can be useful for reducing the polluting impact of livestock but they need careful implementation. Avon DTC researchers sampled upstream and downstream

from riparian wetlands, examining the effects on nutrient and sediment delivery. One of the challenges of wetlands is that they produce a lot of vegetation that needs to be managed. Using livestock to graze it off is one approach, but this may defeat the purpose if the animals increase the organic pollutants in the waterway. Polluted water may also bypass the wetland, or travel through so quickly that the pollutants fail to drop out. So, although these features may be effective as one element in managing pollution, they don't provide all the answers. Wetlands can only work, the researchers say, if poor farming practice is eliminated first and these features must be properly maintained. (For more information contact Penny Johnes [p.j.johnes@reading.ac.uk](mailto:p.j.johnes@reading.ac.uk)). The Eden team has looked at 10 wetlands of different designs on varying soil types. They found that shallow ponds can help to accumulate sediment and encourage phosphorus and nitrogen to drop out of the water and be taken up by the vegetation. Dredging every two or three years is required for maximum efficiency where sediment loads are high, but they agree that with proper planning and maintenance wetlands and ponds can be an effective element in the toolkit. (More information at <http://mops2.diffusepollution.info/> or from John Quinton [j.quinton@lancaster.ac.uk](mailto:j.quinton@lancaster.ac.uk)). See also the [Game and Wildlife Conservation Trust website](#) for information about a parallel project on this topic.



### Do data tell the whole story?

Results from water sampling can vary greatly, according to how frequently samples are taken. High-resolution, 30-minute sampling at Kiosk E on the [Blackwater sub-catchment](#) of the Wensum DTC reveals that total phosphorus concentrations exceeded the environmental water quality standard for 22% of the time during 2011 and 2012. In comparison, weekly water sampling at the same location fails to capture the high concentration values seen during storm events. According to these weekly readings, the standard seems only to have been exceeded for 12% of the time. Would it be more meaningful to have a target for the frequency of exposure to concentration of nitrogen, phosphorus and sediment, rather than looking at average concentrations or loads? Given that the frequency of exposure measures the length of time that aquatic organisms are exposed to nitrogen, phosphorus and sediment for longer, then the answer may well be yes. More information available on the [Wensum DTC website](#) or contact Kevin Hiscock [k.hiscock@uea.ac.uk](mailto:k.hiscock@uea.ac.uk)



### Old buffers need looking after

Buffer strips are a familiar means of reducing diffuse pollution but how can they be used to maximum efficiency? The Avon team, working with Rothamsted Research North Wyke, has looked at how the current agri environment specifications meet our needs for mitigating pollution. Some findings from a recent workshop are that:

- A targeted approach to their implementation should be adopted rather than a blanket approach.
- Buffer strips must be considered as part of a suite of measures, both in field and edge of field, and not as a last resort.

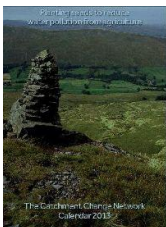
- Uncertainty and variability in buffer performance means they should be considered in terms of the wide range of benefits they can deliver, not just individual services.
- Simple measures such as establishment of plough furrows at the upslope edge of buffer strips can be effective for sediment trapping.
- Buffers require management and this must be varied depending on their primary function and environmental characteristics.
- Despite a wide range of reported efficiencies, overall they have a positive impact and so should be implemented more widely; we shouldn't dwell on variability of efficiency.
- Careful management and implementation as part of a suite of measures seems to work most effectively.

Contact Martin Blackwell [martin.blackwell@rothamsted.ac.uk](mailto:martin.blackwell@rothamsted.ac.uk) for further information and the workshop report is available at: <http://www.rothamsted.ac.uk/Content.php?Section=dpmm#>



### Data archive aims for easy access

A Demonstration Test Catchment Data Archive is under development by the Freshwater Biological Association, to store and make available a range of different types of data, both qualitative and quantitative. The data have to be fully searchable in the long term, with consistent vocabulary to facilitate searches, so it's not a straightforward process. But the work on the archive is going well and it should be available next year.



### Catchment change calendar targets farmers

The Catchment Change Network has developed a calendar for farmers and land managers that aims to help reduce diffuse pollution from agriculture by spreading the word about agricultural best practice. The messages highlight 12 key mitigation messages, one for each month of the year. The calendar is [available on line](#) or hard copies may be obtained from Marion Walker, email [marion.walker@lancaster.ac.uk](mailto:marion.walker@lancaster.ac.uk).



### Overseas researchers welcomed in the Eden

The Eden team welcomed French colleagues, Philippe Merot and Anne Monchy, from the French National Institute for Agricultural Research in November. Philippe, a senior scientist at INRA, is researching the impact of agriculture on soil and water resources and is also involved in the environmental assessment of farming activities. Anne manages a project looking at the use of research observatories in farming areas. They were prompted to visit because they are interested in how the demonstration test catchments might improve the relationship between agriculture

and the environment. When they visited some of the monitoring sites, thanks to the heavy rain and high river levels, they were able to observe first-hand the overland flow of water and the problems in the catchment. They were also able to spend time with members of the Wensum and Avon teams and to learn about work being done across all three DTCs.



### Avon investigates data analysis methods

The Bristol-based Data Analysis and statistical uncertainty team are currently compiling a review paper based on methods of change detection. They aim to evaluate the methods currently being used for assessing natural variability in systems and for detecting change. They will be doing this in the context of analysing high-resolution data collected via the DTC programme. The paper they are putting together discusses methods for detecting abrupt and gradual changes in water quality signals and considers the validity of their use for hydro-chemical investigations, as these types of datasets notoriously do not conform to the underlying statistical assumptions. Future work planned for the New Year includes an analysis of current nutrient load models. This should help to inform future DTC data analysis and nutrient load assessment within sub-catchments. For further information contact Charlotte Lloyd [charlotte.lloyd@bristol.ac.uk](mailto:charlotte.lloyd@bristol.ac.uk)



### American Geophysical Union welcomes Avon research

Charlotte Lloyd from the Avon DTC consortium [presented aims of the Demonstration Test Catchments and data](#) from the Avon research at the American Geophysical Union Fall Meeting held in San Francisco in December 2012. Her poster showcased both annual daily resolution datasets collected as part of the baseline monitoring and high-resolution data for analysing specific storm events. The work was enthusiastically received by scientists from both sides of the Atlantic and the poster will be available on the [Avon DTC website](#).



### Lessons emerging from Catchment Based Approach

CIWEM and Defra will be holding a conference “The Catchment Based Approach - from pilot to wider adoption” at SOAS, University of London, on 14 February, to report on progress and emerging lesson. The conference is open to all stakeholders, delegate fee is £35. For more details and to register visit the [conference webpage](#) or telephone 01531 890415.



## Catchment Sensitive Farming case studies on line

Natural England has put a [library of real life video case studies](#) on line, showing how Catchment Sensitive Farming advice can help food produces across a wide range of farming sectors to improve their local environment and cut costs.



## Central hub developed for resources and information

The Catchment Change Management Hub is being developed by Lancaster University and Cascade Consulting who are working with the Environment Agency, Defra, Sciencewise, Rivers Trust and the Freshwater Biological Association to develop a central place for sharing and commenting on all the information, tools and resources available. The Catchment Hub may be accessed at [ccmhub.net](http://ccmhub.net) and your feedback is welcome.