

# CATSCI SOIL NERC TRAINING

## NERC Postgraduate and Professional Skills Development

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Picture: Phil Haygarth

On the 9<sup>th</sup> of March I attended a week long NERC-funded catchment sciences (CATSci) advanced training short course at the Eden Demonstration Test Catchment (DTC), hosted at Lancaster University by Ben SurrIDGE and Phil Haygarth.

The course focused on the source, mobilisation and delivery of diffuse pollutants from agricultural activities. On the first day the group travelled to three farms, the first being a visit to a mixed farming system on the Brackenburgh Estate in the River Eden catchment. The farm's outputs consisted of cereal, potatoes, and grass as fodder for dairy and sheep, representing a truly mixed agricultural scenario with potential for numerous diffuse sources of pollution. Discussion during this visit focused on the range of nutrients required to support such an endeavour, these include bagged fertilizer, lime, gypsum, dairy slurry, sewage cake, compost and farmyard manure. Mitigation approaches on this farm include precision farming, where the amount of fertiliser is distributed appropriately based on soil chemical analysis and GPS guidance.

The second visit of the day was to the Eden Rivers Trust (ERT) HQ at Newton Rigg where an overview presentation informed the group of the involvement of the ERT in terms of the agricultural activity within the Eden catchment, with particular emphasis on community engagement. During this visit, the group was introduced to a state-of-the-art dairy system at Sewborwens Farm, run by Askham Bryan College. This particular activity introduced nutrient sources in the context of intensive livestock production systems, as

the cattle were kept indoors year round. The idea of this was for better slurry management, a step towards more effective control of diffuse sources of pollution.

The final part of the day was a visit to an organic dairy farm. The farm had only been certified organic for eight years and so the restrictions and benefits were explained to the group, mainly that there are significant savings to be made through eliminating the use of fertilisers, but this has to have been ongoing for five years previous. The farm itself operates a slurry recycling system where the liquid and solid components in the manure produced are separated and spread back on to the fields that produce silage. Many thanks to Mrs Warburton for the delicious tea and cakes!

The second day of the course focused on the relationships between soil physical properties, land management and surface runoff. Specifics of the day included the discussion of the role of soil compaction and its causal effects on accelerated runoff, demonstrations of the ways of measuring soil compaction, ranging from very simple to hi-tech approaches. The afternoon session focused on obtaining high resolution surface topography data from digital photographs taken on the day.

The third day introduced the group to the concept of biomonitoring, focusing on the benthic diatom community. The task was situated on one of the Eden DTC's field monitoring sites, Newby Beck at Morland. The group examined the diatom community through use of *in situ* fluorometers. Samples were also collected and examined under microscopes at Lancaster University. The data collected on this day related to ongoing work at the Eden DTC, where changes in diatom community structure are examined with respect to key parameters such as stream flow and nutrient concentrations.

The week concluded on Friday morning with a presentation series from the group in a 'Dragon's Den' style research proposal pitch. The task was to design and cost a three-year research project, with a budget of £1m, focusing on tackling the pollution of ground and surface water bodies from diffuse agricultural sources. Group projects ranged from closing the nutrient cycling gap by reapplying excess nutrients from eutrophic waters to fields, to the production of a set of catchment 'top trumps' cards.

Many thanks to NERC for funding the short course, the farmers and ERT staff members for talking to the group, and of course Ben Surrige and Phil Haygarth for organising and delivering the course.

Pictures from the course: <https://www.flickr.com/photos/iwam/sets/72157648966549713/>

Video from the course: <https://www.youtube.com/watch?v=9JyNrm97D8M>