

THE CEH RIVER LAMBOURN OBSERVATORY

WHY: MONITOR CHALK RIVER SYSTEMS?

This project is directed through the topic Variability and Change in Water Systems (Topic 1; Objective 1.1) within the CEH Water Programme

Silt accumulation below a *Ranunculus* stand
(Photo: Gareth Old, CEH)

BECAUSE:

Lowland permeable catchments provide vital sources of water supply from both groundwater and surface water and in addition they often host protected habitats and many support valuable fisheries. However such catchments are often subject to intense rural and urban management and population pressures. Understanding the functioning of lowland permeable catchments and identifying environmental change is therefore important, both in order to manage the resources of the catchments and to protect their ecological systems. Current research activities supported by our core monitoring include an assessment of the impacts of macrophytes and their management on river water quality and hydraulics, nutrient transport and transformations through groundwater-surface water interaction, nutrient limitations on algal growth and impacts of climate change on fish.



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Flowering *Ranunculus*
(Photo: Pam Naden, CEH)

Focus on the River Lambourn

The chemical and biological quality of the River Lambourn is exceptionally high providing an important reference against which more polluted chalk rivers can be assessed. The whole river is designated as a Site of Special Scientific Interest (SSSI) as it is a classic example of a lowland chalk river and a Special Area of Conservation (SAC) owing to its importance for the following species: water crowfoot, brook lamprey and bullheads. It is also noted for its good fishing with productive population of brown trout and grayling.

The CEH River Lambourn Observatory: In autumn 2007 CEH purchased 600m of river and 10 hectares of water meadows at Boxford, Berkshire, NGR SU429722 (see previous). Freehold ownership ensures unconstrained access to the site and the ability to control management practices. At Boxford the upstream catchment area is 162 km². The highly permeable chalk geology throughout the catchment results in the river having a very high (>95%) baseflow contribution.

The monitoring programme

Monitoring at Boxford provides a platform which brings together and consolidates unique cross-disciplinary expertise within CEH and its collaborators from the fields of hydrogeology, hydrology, hydrochemistry, sedimentology and ecology. Research at this site enables the relationship between geology, groundwater, surface water and river ecology to be studied in a truly integrated way. Our detailed knowledge of the site also makes it an ideal location to evaluate novel instrumentation and sampling methods.

The key elements of the long term monitoring programme include:

- An automatic telemetered river water quality monitoring station: established in March 2008 (see photograph below). The following variables are recorded at 15 minute time resolution: turbidity, water temperature, pH, electrical conductance, dissolved oxygen and water level. Suspended sediment concentration is determined on event triggered samples.
- A comprehensive weekly river water chemistry sampling campaign: since June 2008.
- Monthly river flow gaugings: since July 2008.
- Monthly macrophyte surveys: since February 2009.
- Three times yearly species level invertebrate sampling: since November 2009.



Water quality monitoring station
(Photo: Ned Hewitt, CEH)