

Chalk rivers and the Living River project

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This talk by the Living Rivers officer for Hertfordshire & Middlesex Wildlife Trust described the Living Rivers project, which is focussed on chalk streams in Hertfordshire. Funded by the Environment Agency from April 2012 to March 2016, it aims to achieve landscape-scale nature conservation in Hertfordshire river valleys and recognises that rivers are intimately involved with the landscape and with nature conservation.

Chalk rivers

Clearly restricted to outcrops of chalk geology, chalk rivers occur from the Devon and Dorset coast, through Wiltshire and Hampshire into the North and South Downs and the Chilterns through to Norfolk as well as in the Lincolnshire and Yorkshire Wolds. In Hertfordshire and Middlesex, there are 2 main river catchments, the upper Lea, with its tributaries the Mimram, Beane, Rib, Quin, Ash and Stort and the Colne, with its tributaries, the Misbourne, Chess, Bulbourne, Gade and Ver. Most of the speaker's work has been focussed on the Lea catchment and especially the Mimram and Beane.

The characteristics of chalk rivers are exemplified by the River Mimram, which is one of the finest stretches of chalk river in Hertfordshire. It has chalk geology underlying it and is fed by groundwater (80% of flow), which has been filtered as it passed through the chalk. The water is thus very pure and slightly alkaline due to dissolved minerals and emerges from springs at a constant temperature of 10°C year-round. A healthy chalk river has a clean gravel bed, providing a spawning area for fish and a home for invertebrates, a low bank-profile and gentle meanders which are only gently incised. Riparian vegetation provides a habitat for water voles and other small mammals and invertebrates. In-channel vegetation, especially *Ranunculus* (Water crowfoot) provides shelter and is important in the annual cycle of water level and plant growth. As water level falls in the summer, full vegetation growth restricts the channel and maintains water depth. Winterbourne sections occur in the upper reaches due to seasonal variations in groundwater level.



The River Mimram at Tewinbury

Why are chalk rivers special?

Chalk rivers are globally rare with fewer than 200 in the world as a whole (they are thus rarer than Giant pandas). Southern England has 80-90% of the world's chalk rivers. They are a high priority in international conservation terms. They support great biodiversity, including water voles, brown

trout, kingfishers and water crowfoot and are the home of iconic species of British wildlife. They are very productive, with huge populations of invertebrates such as freshwater shrimps, caddis flies, mayflies etc. Birds include green sandpipers, snipe and other waders and great egrets are seen.

They also have a cultural importance, with John Constable's 1831 painting of *Salisbury Cathedral from the meadows* showing the River Avon in Wiltshire and John Millais' 1852 painting *Ophelia* showing the River Hogsmill in Surrey. One of the best descriptions of chalk rivers is that in *Wind in the willows*.

Threats to rivers

The biggest single threat, which is specific to chalk rivers, is that of drying up. The River Beane flows from east of Stevenage to Hertford and most of the time, the upper half of the river is dry, even in winter when groundwater levels would be expected to be higher. Similarly, the River Ver near Redbourne and the River Mimram are sometimes dry in parts due to over-abstraction of groundwater. This is a densely populated area and water companies exploit the large reserve of fresh water in the chalk. Eastern England is the UK's driest region and Hertfordshire is one of the driest counties with average rainfall being about $\frac{2}{3}$ of the national average. There is less rain per head of population than in Istanbul. Hertfordshire people also use more water than average for the UK (8% up), probably related to affluence, lifestyle and many old houses which are less water-efficient.



River Beane near Whitehall Pumping Station

Chalk rivers are also subject to threats which are common to all rivers. These include bank erosion, often caused by cattle coming down to drink, leading to pollution by sediment; pollution from urban and road sources (heavy metals, oil, petrol), from agricultural land (fertilisers, pesticides, herbicides) and over-shading by riparian trees. Weirs have been built for a variety of reasons over the years and they block fish passage and back up the river, slowing its flow and changing

conditions from those of a flowing river to a pond. Deepening and dredging of rivers disconnects the river from its flood plain and straightening removes the meanders which are very important for the variations in flow created and thus in microhabitats in the river channel. Extreme weather is also a problem that appears to be becoming more common.

Invasive species can cause particular problems. Himalayan balsam is a rampant invader that has become almost ubiquitous. It out-competes everything else and, being an annual, leaves the river vulnerable in winter to bank erosion. Giant hogweed is also rampant and has the added problem of its toxicity. The signal American crayfish is larger than the native crayfish and will eat anything, including the native species and young of its own species. It also carries a disease to which the native species has no immunity and burrows into the bank, causing erosion. American mink are responsible for the 90% decline in water voles that has been experienced.

What is the Living Rivers Project doing?

HMWT are Catchment hosts for all the rivers in the upper Lea catchment and catchment partnerships have been established including landowners, local groups, volunteers, statutory bodies and water companies. Catchment management plans are now in place.

Practical projects have included river restoration projects, often requiring simple things such as the installation of a deflector, eg a large log sticking out into the river, which forces the river to deflect around it, speeds up the flow, scours the bed, removing the silt on the gravel bed and traps silt behind it to eventually form part of the bank. An over-widened section has had wooden stakes driven into the river bed, with the area behind back-filled with brush, which, again, will form part of the bank with the silt trapped behind it. Over-shading has been treated by removing trees to allow light through. While the immediate result is a pretty bare river bank, there is a rapid response, with the bank greening-up within months.

Singlers Marsh on the River Mimram was very silty and shaded, generally a bit neglected and with no vegetation in the river. Scrub has been removed, and the bank has greened up over time, the flow has speeded up and the gravel bed is now showing. Where the river runs alongside a road, coir rolls have been placed to create an artificial river bank and some of the gravel removed by dredging has been put back in the river.



Replacing gravel n the River Mimram

Tackling invasive species has involved working parties in the summer months pulling up Himalayan balsam, which is very shallow-rooted. This process is more effective if started at the top of the catchment and then moves downstream.

River School has been developed as a parallel to the Forest schools. It was piloted in St Albans in 2014 and will involve primary schools in St Albans, Welwyn, Digswell and Hertingfordbury. It is directly linked to Year 5 of the Geography curriculum – “Rivers”, and also eco-schools, citizenship and sustainability.



Pupils at “River School”



Cased caddis fly larva

Campaigning and lobbying is very active, with events such as the “Walk the Beane event in October 2012, when as part of the WWF “Blue-mile” activity, people walked a dry mile on the River Beane.

Over-abstraction of groundwater and the drying of rivers is more of a problem. Water companies are legally obliged to supply water to new development, they are not statutory consultees in the planning system and their expenditure, or at least the costs charged to consumers, is governed by OFWAT. However, the situation in Hertfordshire is quite positive and Affinity Water appear to be much more aware of the environmental damage caused. They propose to reduce extraction from the Rivers Mimram and Beane catchment sources by 95% by 2018, replacing it by reducing leakage (currently up to 20% in some areas). They are also aiming to reduce demand with a big programme of metering, education and the provision of free water-saving gadgets, as well as bringing water from elsewhere, eg from Grafham Water in Cambridgeshire.

Two national initiatives have been launched in Hertfordshire. The Chalk Stream Charter, launched in May 2013 from the Rivers Beane and Mimram and the Catchment-Based Approach launched from the River Mimram in June 2013. The Wildlife Trust continues to support local river groups and is developing “Living landscape” champions on the upper Lea, the Ash and the Stort.

The Riverfly monitoring initiative is to train local volunteers to sample and identify 8 groups of invertebrates with the aim of being in place on all Hertfordshire rivers by 2016. A training hub has been established for the Chilterns, Hertfordshire and Middlesex. The Annual Forum will be on 7 February. To date, 5 people have been trained to become trainers and 50 people as monitors.



Examining the catch

A *Chalk Rivers ID Guide* covering 40 species has been published jointly with the Field Studies Council.

Future projects will include more practical restoration projects, the development of River School, establishment of a Chalk river discovery trail on the River Mimram, the launch of catchment management plan websites for each river in the Lea catchment and the appointment of a new “Living Rivers officer”, after the end of January.

Funding conservation in Hertfordshire involves the Trust having an income of £1,9M, with 35 members of staff. Income is largely from membership (46%) with grant at 44% and donations at 4%. The membership also provides an invaluable “eye on the ground”. Typical conservation costs include £25 for a bat roost, £10 to protect an area of river bed and £30 per sheep for conservation grazing.