

3 The character of chalk rivers



© Natural Image, Bob Gibbons

⤴ Chilbolton Common on the River Test



⌄ A winterbourne section – the River Till at Winterbourne Stoke



⌄ A perennial headwater section – the River Itchen above Cheriton



⌄ A classic chalkstream – the middle Itchen



⌄ A large chalk river – the River Avon, Ringwood

A typical chalk river is dominated by rain-fed groundwater percolating through chalk, but it may also be influenced by other rock types. This gives rise to a flow regime that is naturally less variable than in rivers fed mainly by surface water. Flows are maintained during dry periods and there are less intense high flows after heavy rain. River flows rise during the winter as the aquifer is replenished, and decline over the summer and autumn, when the water-table falls. The river water is very alkaline ('hard') and relatively constant in temperature as a result of the water's underground journey through the chalk. Within a chalk river system, the habitats provided for plants and animals vary, from headwater 'winterbournes' that are naturally dry for a few months in summer and autumn, through chalk streams, to large chalk rivers.

The characteristic plants and animals of chalk rivers reflect the flow pattern, water hardness and changes in physical habitat (Appendix 3). Winterbournes are dominated by plants and animals that can cope for periods without water, such as invertebrates that have dormant phases or seek refuge in damp riverbed sediments. Chalk streams with permanent flowing water support a wide range of submerged and waterside plants, along with a host of insects, snails and fish species that thrive in the cool, clear, often swift water and predominantly gravelly riverbed. In the most downstream sections, chalk rivers can become more sluggish, providing ideal habitat for a different variety of species.



⌄ Water meadows on the River Avon at Downton

The wetland habitats that characteristically occur along the length of chalk rivers depend on the supply of clean water from springs, upwellings and the river. These include wet woodlands ('carr'), flower-rich fens and wet grasslands.

A detailed account of the characteristic wildlife can be found in the '*Chalk River Handbook*' (English Nature and Environment Agency, 1999).

Historical change

Historically, chalk rivers unaltered by management would have been shaded by trees, including alder (*Alnus glutinosa*) and willow (*Salix* spp.), along most of their length. In the floodplain, the river formed a network of ever-changing main and minor channels. But very few chalk river reaches remain in this state today. Since at least Roman times, engineering has modified the watercourses for human purposes. After the prehistoric woodland clearances, two to three thousand years ago, most of the remnants of wet woodland were cleared and drained for agriculture. Between the 17th and 19th centuries, channels were modified to form 'carrier streams' that were used to create water meadows for sheep and cattle grazing. Sediment inputs to the stream were low, leaving extensive gravel beds in the channel. Weirs and water mills deepened some reaches, modifying the flow regime and helping to create the channels as we see them in their present form.



© Hampshire Wildlife Trust

⤴ A canalised section of chalk river



⤴ Bintry Mill on the River Wensum



© David Packham

⤴ Mill on the River Arle

Most water meadows were abandoned in the late 19th to mid-20th centuries. During and after the Second World War, drainage for agriculture and flood defence lowered water-tables and produced widened, straightened and deepened river channels. Urban and road development encroached on natural river habitats. Today's chalk rivers tend to be fairly uniform and few stretches are free of some form of artificial modification. The widespread removal of trees from the river corridor has also allowed luxuriant growth of water plants by reducing natural shading.

The pressures on chalk rivers – notably land drainage, agriculture, urban and infrastructure development, flood defences, water abstraction and effluent discharges, remain intense. Unless they are carefully managed, these activities threaten the chalk river resources upon which significant wildlife and many people depend.

Given the pressures of human population growth, the realistic aim is to achieve more sustainable rivers and floodplains, which are rich in species and continue to support human needs. Reversion to pristine habitats is simply not feasible in an intensively used modern landscape. From an ecological perspective, a high quality chalk river, from winterbourne to lower reaches, would have a high water-table in the floodplain with meadows, fen and occasional wet woodland, a winding series of channels, crystal clear water and predominantly clean gravel. Its mosaic of different habitats would support the diverse aquatic and wetland life for which these rivers are renowned.