River Bulbourne Investigation into impacts of Canal & River Trust's abstractions

February 2019

Background

The Environment Agency have been working alongside Affinity Water and Canal & River Trust to conduct two studies into the low flow issues in the River Bulbourne. Affinity Water's investigation was completed in Spring 2018, while the investigation into potential impacts of Canal & River Trust operations will be completed in Spring 2019.

Chalk Streams

The River Bulbourne is a chalk stream which has been modified for recreation and urbanisation purposes. Chalk streams are globally rare habitats; there are only around 200 worldwide and 85% are in the UK.

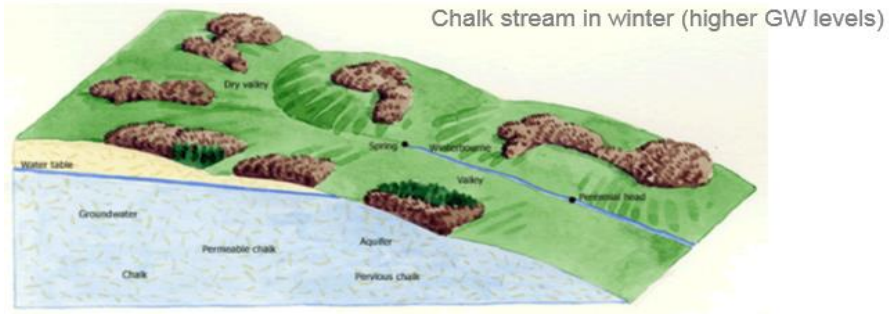

Figure 1 - *a chalk stream in higher and lower groundwater level conditions; Source: Affinity Water. Photos: River Bulbourne at Northchurch Playing Fields*

Chalk streams flow comes from chalk aquifers. Rain permeates into the ground, moistens soils and raises groundwater levels in the chalk aquifer. To replenish groundwater sufficiently, gentle, persistent rain over a long period of time is needed.

Heavy downpours in a short period of time will not give the ground enough time to absorb the water. This will flash through the drainage and river system quickly and will disappear downstream.

The water that emerges at the river sources is crystal clear, mineral rich and with stable temperature and pH.

These rare conditions create vital and unique habitats for wildlife and support a huge range of plants and animals. This includes some of our most precious wildlife like brown trout, water voles and kingfishers.

Seasonal Flows

River Bulbourne rises between Tring and Northchurch from where it flows to its confluence with the River Gade at Two Waters in Hemel Hempstead. Its source comes from natural springs which change seasonally following fluctuation in groundwater levels.

In the summer and autumn, groundwater levels usually recede. During this time the source moves down and the river naturally dries up. This section of the river is referred to as winterbourne. The point where a river is flowing all year round under average conditions is referred to as the perennial head of the river.

In the River Bulbourne, over the past twenty years, we observed head of the river migrating seasonally from top of the catchment to Bullbeggars Lane at Berkhamsted.

Previous Studies of Low Flows in the Bulbourne

Ecology of the River Bulbourne, both invertebrates and macrophytes are failing Water Framework Directive objectives of Good Ecological Potential. Among the probable reasons for the ecology not achieving Good are groundwater abstractions for water supply and navigation.

There were number of investigations looking into low flow pressures on the ecology of the River Bulbourne. Those are summarised below:

1. 1996 – Halcrow conducted investigation on behalf of the Environment Agency (EA). As the result, Thames Water Pumping Station was closed in phases between 2005 and 2012 (at present, it's used only in an emergency).

2. 2010 – EA carried out a study looking into effectiveness of the implemented scheme. Conclusion was that although the ecology started to become more resilient, realisation of expected benefits was compromised by increased groundwater abstraction from Canal & River Trust's (the Trust) sources.

3. 2018 – Affinity Water investigated impacts of their groundwater abstractions on flows and ecology of the River Bulbourne. They concluded that there are other overriding pressures on flows in the River Bulbourne. These are: influence of the canal, river modification and possibly upstream groundwater abstractions. Affinity Water will contribute towards river restoration works to alleviate some of the significant morphological pressures in the catchment (subject to funding being approved by Ofwat).

Current study

Study area was defined as the source of the River Bulbourne to Berkhamsted Sewage Treatment Works outflow at Little Heath Lane in Berkhamsted. The study concluded:

1. Review of the ecological data confirmed that low flows and/ or prolonged drying of the river channel is contributing towards ecological failure in the Upper Bulbourne.

2. Canal & River Trust arranged a number of signal tests, where they stopped abstraction from one or both of their pumping stations to enable Environment Agency to collate hydrological data. Analysis of hydrological data confirmed that the Trust's abstractions are reducing baseflow into the Upper River Bulbourne hence negatively affecting flows in the upper stretches of the river.

3. Key pressures on the ecology in the study area are: flow, morphology and sedimentation.

4. The investigation has progressed to options appraisal to develop feasible solutions to alleviate above pressures from within the study area. Results are expected in Spring 2019.

5. High level options being considered:
    a. Changing abstraction regime
    b. Augmentation
    c. Demand management
    d. River Restoration
    e. Invasive species control
    f. Increase access to the river

6. River Bulbourne and Grand Union Canal Activities Survey

The Agency and the Trust are looking to improve the River Bulbourne for people and wildlife. We therefore want to understand what local communities think about their water environment and how they use it. We will be grateful if you help us to promote this survey by completing it and sharing it with others, and where possible including a hyperlink on your website. The survey is closing on the 28th February 2019.

Link to the survey:
https://atkinsgeospatial.maps.arcgis.com/apps/GeoForm/index.html?appid=f211770f5c2c40178448b37f83335603

Current Water Situation

The current dry weather puts a lot of pressure on ecology of the rivers like the Bulbourne. Source of the River Bulbourne (as of the end of January 2019) was at Stag Lane, Berkhamsted. Rainfall for the last 12 months, and beyond, in the Colne area has been below the long term average. This has resulted in notably low groundwater levels being recorded in the Colne observation borehole at Ashley Green. The groundwater levels however have now stopped declining, soil has saturated in the Colne catchment hence the rainfall can now more effectively reach the aquifer helping towards its recovery. This in turn should mean improved flows into the river. This however will largely depend on quantity and quality of rainfall in coming months. We closely monitor this situation, and produce a monthly water situation report. This can be found at https://www.gov.uk/government/publications/water-situation-local-area-reports

More Information

There are number of river restoration projects planned across the Colne catchment, including River Bulbourne. More information about specific projects in the River Bulbourne can be found here: http://www.colnecan.org.uk/index.php/the-action-plans/rivers-gade-and-bulbourne/rivers-gade-and-bulbourne-projects. Additionally, general information about the River Colne Catchment Action Network (ColneCAN) which includes individuals and organisations working together to improve the chalk streams in the Colne is available here: http://www.colnecan.org.uk/.