



## **Bulbourne - Berkhamsted**



**An advisory visit carried out by the Wild Trout Trust – April 2013**

## 1. Introduction

This report is the output of a Wild Trout Trust Advisory Visit (AV) undertaken on two sections of the upper Bulbourne, near Berkhamsted. The first section inspected was only few hundred metres downstream of the perennial source of the Bulbourne at Dudswell (SP 967096 to SP 971092). A second section was also inspected downstream of Berkhamsted, on land adjacent to Broadway Farm.

The request for the visit was made by Mr. Tim Wise, who is locally connected to the landowners of both sites. Mr. Wise is motivated to help manage the two sections of the Bulbourne to maximise nature conservation benefit. Comments in this report are based on observations on the day of the site visit and discussions with Mr. Wise and Nancy Young (Environment Agency Technical Officer) who is actively seeking opportunities to enhance the river.

The Bulbourne (Water body ID no GB 106039029890) is classified as a Heavily Modified Waterbody, with only Moderate Potential under the Water Framework Directive classification.

Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

<b>Bulbourne</b>	
<b>Waterbody ID</b>	GB106039029890
<b>Waterbody Name</b>	Bulbourne
<b>Management Catchment</b>	Colne
<b>River Basin District</b>	Thames
<b>Typology Description</b>	Low, Small, Calcareous
<b>Hydromorphological Status</b>	Heavily Modified
<b>Current Ecological Quality</b>	Moderate Potential
<b>Current Chemical Quality</b>	Good
<b>2015 Predicted Ecological Quality</b>	Moderate Potential

<b>2015 Predicted Chemical Quality</b>	Good
<b>Overall Risk</b>	At Risk
<b>Protected Area</b>	Yes
<b>Number of Measures Listed (waterbody level only)</b>	3

[WFD Waterbody summary sheet taken from the EA website](#)

## 2. Catchment overview

The following information is taken from an Environment Agency Biological Survey Report, which is available as an appendix to this report:

'The River Bulbourne is a chalk stream arising from near Dudswell, Northchurch at SP9590010100 and flowing through Berkhamsted and Bourne End to where it meets with the River Gade near Hemel Hempstead at TL0544005846.

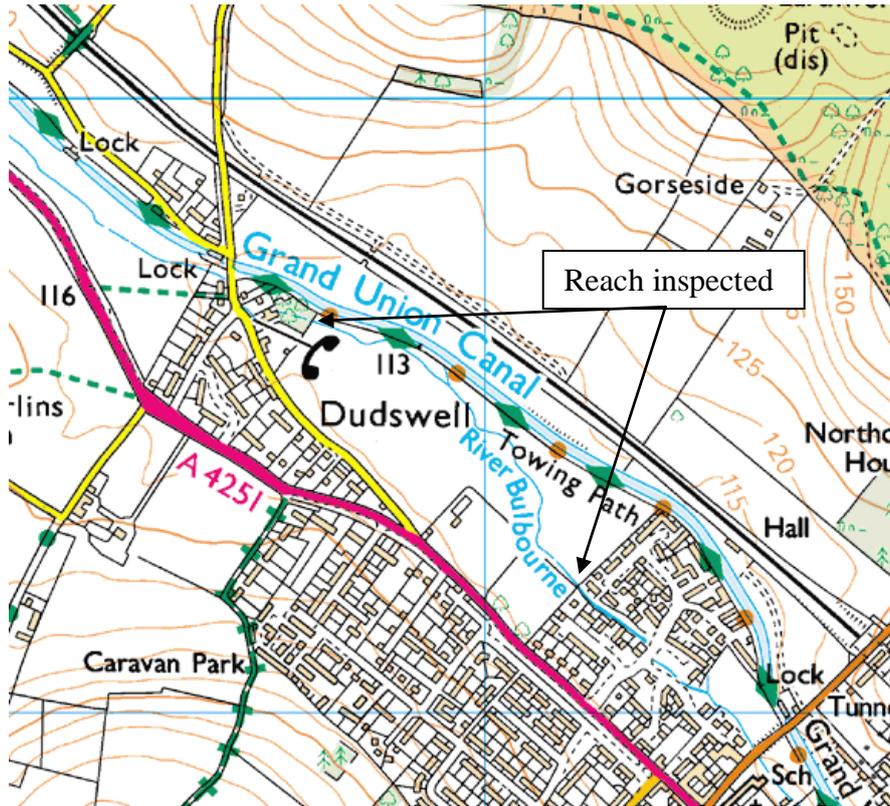
The upper section of the River Bulbourne runs alongside the Grand Union Canal until it is diverted into the Grand Union Canal (GUC) at Northchurch. This top section of the watercourse is groundwater fed and suffers from a history of over-abstraction. Although reduced groundwater levels are typical of chalk streams in the upper reaches during the late summer months, this section of the watercourse has a history of low flows and drying out all year round.

Further down the watercourse is interconnected with the GUC and differs in water quality to the upper sections as a result. These lower sections have also been impacted by industry and urbanisation.

In 2000 a scheme to alleviate the low flow problems in the upper section of the River Bulbourne was implemented. Thames Water agreed to close the borehole, which abstracted groundwater for public water supply at New Ground by March 2005. Now it is only used for emergencies where its use is infrequent and limited to short periods.'

## 3. Habitat assessment

### 3.1 Dudswell reach.



River Bulbourne Dudswell reach.

The section of Bulbourne inspected at Dudswell is a short distance downstream of the 'official' source of the river. This reach is ephemeral and was dry following the prolonged autumn/early winter drought in 2011. Recent measures agreed between the EA and the local water company to reduce abstraction pressures should help to ensure that these "drying up" events are less frequent. The section will, however, always be vulnerable to periodic drying, when the source of the wetted channel will migrate downstream.

A key habitat feature of the river corridor is the riparian zone between the Bulbourne and the Grand Union Canal. At the time of the visit the ground was very wet and the mosaic of riparian habitat supported by the stream and local groundwater is extremely valuable. In many places the stream channel is poorly defined, with the surface flow percolating through a comparatively wide wetland corridor. This may not be an ideal scenario for fish; however, there is no doubt that this area will support a wide variety of wetland plants as well as a diverse invertebrate, bird and amphibian community. It is valuable habitat.

It was noted that invertebrate surveys carried out between 2007 and 2010, at Dudswell, indicated an impoverished but recovering invertebrate community. A rudimentary look at the river on the day of the visit did not identify any significant invertebrate community and it is possible that they have suffered as a result of the 2011 drought. Although it is tempting to imagine a fish residing in those parts of the channel where the flow was strong, it must be remembered that the inspection took place in April following a very wet autumn/winter and water levels are likely to be exceptionally high.

Wild fish can repopulate sections of river, either through upstream migration or downstream drift. However, the Bulbourne has significant obstacles to upstream migration, including two lengths of culvert in Berkhamsted, and there are no refuge areas for fish upstream of the Dudswell reach, so any natural re-colonisation is highly unlikely.



Photo 1. One of the few sections of defined channel at the head of the reach



Photo 2 . A typical section of the Bulbourne at Dudswell. where the stream percolates through a dense fringe of emergent wetland plants, mainly reed sweet grass *Glyceria maxima*



Photo 3. Heavy filamentous algal growth is indicative of high nutrient loads.



Photo 4. At the bottom end of the Dudswell reach the river runs into a housing development where the treatment of the banks and bed is less than ideal.

In conclusion, the Dudswell reach of the Bulbourne would appear to have very little potential for supporting viable wild fish populations. Formally defining a narrow channel may have adverse consequences for the riparian zone, which is a rare and valuable habitat.

### 3.2 Broadway Farm reach.

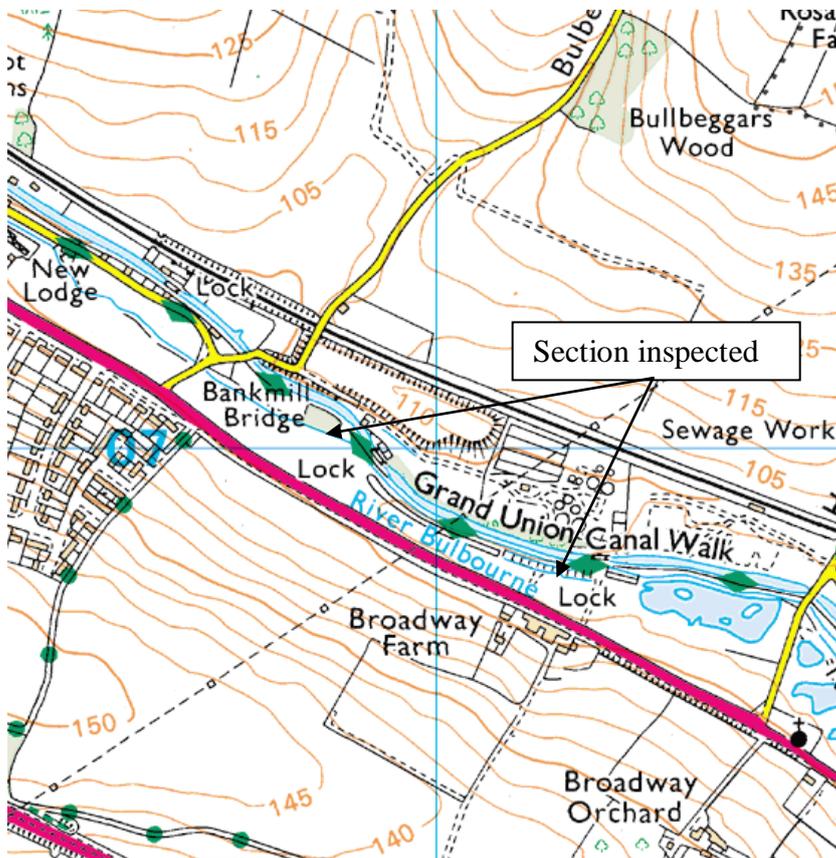


Photo 4. River Bulbourne. Broadway Farm

In stark contrast to the Dudswell reach, the section of channel adjacent to Broadway Farm offers considerable scope for supporting healthy and diverse fish communities. First impressions suggest that this 1km section of channel has the necessary habitat diversity to support a number of fish species, potentially including wild brown trout *Salmo trutta*.

Information on the current fish population is somewhat sketchy and it is recommended that an electric fishing survey is undertaken to obtain some baseline data prior to the implementation of any plans to enhance habitat quality.

Unlike the section upstream at Dudswell, this lower section of the Bulbourne is thought to have perennial flows, even during drought conditions. Habitat quality within the channel is reasonably good. Examples of riffle and glide flowing over a predominantly clean gravel bed were evident, with the occasional deeper pool. Habitat quality is compromised, however, by extensive channel modification as a

result of the adjacent navigation canal and old water cress beds, through which the river was once diverted.



Photo 5. Shallow riffle habitat over a clean gravel bed at Broadway Farm



Photo 6. Impounding structure. Fragmenting habitat and restricting access for fish migration.



Photo 7. Weir crest could be removed, modified or bypassed.



Photo 8. Manhole cover on the canal tow path above a hydraulic connection between the canal and river. The impounding structure in the river may be linked with water supply to the canal, or this may simply be a drain for excess water in the canal pound.

Of particular significance is the water level control structure shown in photos 6 and 7. It is not clear exactly why this structure was constructed, but it might have been used to manage water levels and therefore flow into the adjacent canal; however, it may be more likely that it was used to raise a head of water to divert flow through the old water cross beds.

Weirs like this, on such a low gradient stream, have a big impact on stream ecology over considerable distances. As well as fragmenting fish populations that might wish to migrate upstream, the weir is 'drowning out' the natural habitat features that would normally be supported by unimpeded flow velocity. The vibrant gravel bottomed riffles and pool habitat evident downstream give way to laminar flow over a heavily silted river bed above the structure.

Perching the stream above the valley floor has promoted a bank breach (Photo 9) upstream of the weir and has resulted in the channel braiding. There is sufficient flow here to support a high quality stream habitat but there is not enough water to support more than one formal channel. Constructing a new low level channel to take all of the flow and bypass the weir structure could provide an opportunity to create a high quality stream habitat and potentially move the stream away from the foot of the canal embankment. Encouraging this flow into a sustainable channel width below will bring the most ecological benefit.

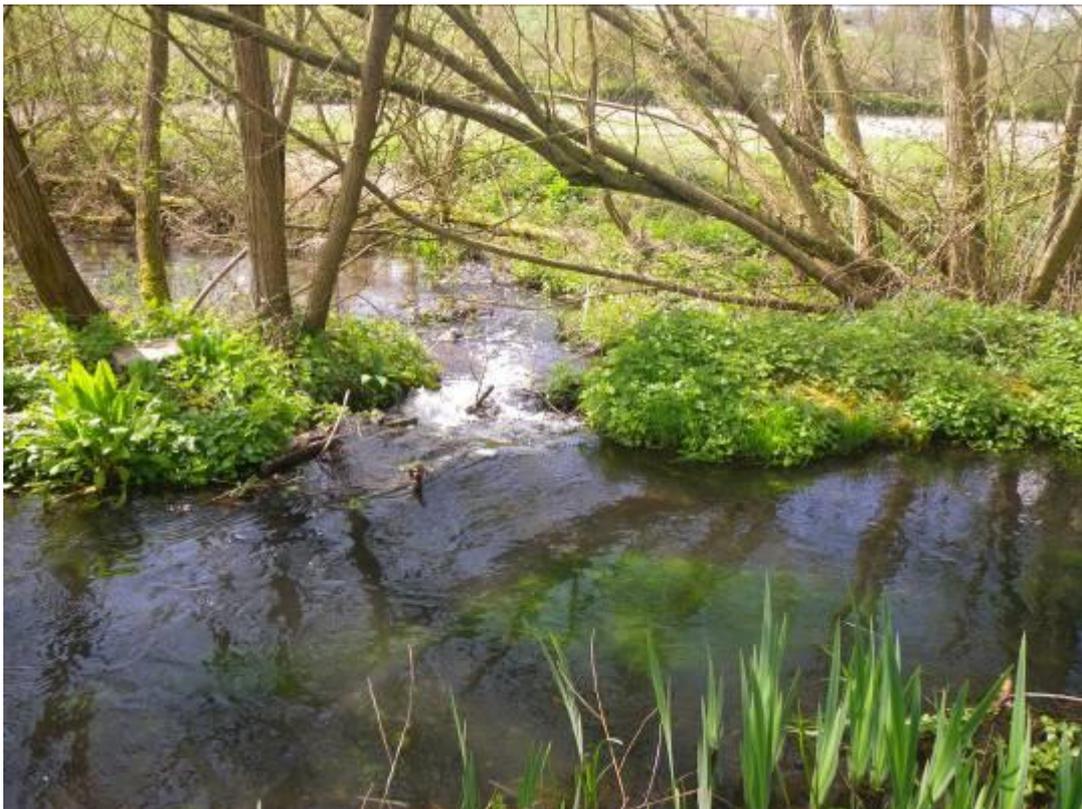


Photo 9. Bank breach above the weir. There is no "do-nothing" option here.

In some sections the channel is quite heavily shaded, which is restricting the growth of submerged and emergent aquatic plants. Creating gaps in the tree canopy on the RB by coppicing some of the riverside trees will create more habitat diversity. Shading on the LB is probably quite important, as this provides some important cover between the raised canal tow path and the stream. A 50:50 dappled light and shade regime would be a good ratio to aim for.

A habitat bottleneck for fish is likely to be the comparative lack of adult pool habitat. This could be resolved on the existing channel below the weir through the installation of some large woody debris (LWD) flow deflectors. If the bed is armoured due to calcium carbonate deposit, then it is recommended to loosen the bed material around the end of any flow deflector to allow the increased water velocity to scour and sort the bed materials. This will create sustainable holding lies for adult fish, including species such as trout or chub.

If the possibility of restoring a new channel to bypass the weir structure is considered then there is an opportunity to create a meandering channel, with the potential for lots of habitat features, including pool habitat. As a rule of thumb, naturally functioning streams usually support a habitat feature such as a pool, riffle or a bend, every 5 to 7 channel widths in a linear direction. Any new channel should not be "over-designed", but constructed to an approximate form and shape and then allowed to be developed by the stream itself.

#### **4. Conclusions**

The section of Bulbourne at Dudswell supports some high quality riparian habitats but has very little scope for developing sustainable fish populations. The stream should therefore be managed with the riparian zone as the main driver for any work that is contemplated within the wetted channel.

The lower section at Broadwater Farm does have significant potential to be enhanced as a section of perennial chalk stream. Several logical steps are required prior to any formal action on the ground. The first is to try and establish the current status of any local fish community. Hopefully the EA will be prepared and able to help with this exercise. A minimum estimate of typical fish populations above and below the weir structure will be useful in forming a plan for how the reach could be enhanced.

The weir structures are having a big impact on the habitat quality of the river. Removing, modifying or bypassing the weir will all bring ecological benefit. The construction of a new channel is a particularly exciting proposition and would bring significant ecological benefit over and above simple weir modification. A project of this size and scope will require support from the EA and the local landowners.

It is important to establish why the weirs were originally constructed, and whether or not the structures perform any function today. This will require liaison with the landowners likely to be impacted by any changes to the structure.

If full channel restoration is not an option, some improvements to habitat on the reach downstream of the weirs can be achieved through sensitive tree work to allow more light to reach the river bed and margins. As a rule of thumb, allow more light to reach the shallow riffle habitat and promote low, scrubby shade/cover over potential adult fish holding lies.

Creating increased diversity in the shape of the channel could be achieved by using material won from tree works to pin onto the river bed and margins. Locally pinching the channel width to promote higher flow velocity will help to sweep fine sediments away from the river bed. This in turn may help to provide improved habitat for flow loving and gravel spawning fish species.

## **6. Recommendations**

- Manage the Dudswell reach as a high quality wetland habitat rather than a formal river channel. Look for help and advice from the EA and the local Wildlife Trust.
- Request some help from the EA to determine the current status of the fish population on the Bulbourne at Broadwater Farm.
- Hold discussions with the landowners over the possibility of creating a more ambitious project to restore a functioning river channel at Broadwater Farm. A way forward is the production of a project proposal that could form the basis of a partnership project, possibly attracting external funding. The EA might view this as an opportunity under their Water Framework Directive objectives. A consensus view from the local landowners that could be potentially impacted by any enhancement scheme is essential. This should include the Canals and Rivers Trust.
- Investigate why the weir was constructed and if it serves any useful purpose.
- Consider the creation of some improved adult holding habitat through the installation of LWD flow deflectors and brushwood shelves on the shallow reach downstream from the weir.
- Undertake low-key tree works to the RB to create some gaps in the canopy, preferably adjacent to shallow water habitat.

**It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking those works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require a land drainage consent on any river**

**designated as "main river". Advice can be obtained from the EA's Development Control Officer.**

## **7. Making it happen**

There is the possibility that the WTT could help to start a project via a Project Proposal (PP) or a Practical Visit (PV). PV's typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration on the site to be restored. This will enable fishery managers to obtain on the ground training regarding the appropriate techniques and materials required to enhance trout habitat. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

Recipients will be expected to cover travel and accommodation expenses (if required) of the PV leader.

There is currently a big demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources. The Trust is always available to provide free advice and help to organisations and landowners through guidance and linking them up with others that have had experience in improving river habitat.

## **Acknowledgement**

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programmes.

## **Disclaimer**

This report is produced for guidance and not for specific advice; no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon guidance made in this report.