



River Glyme upstream of Woodford Bridge, Enstone.



Advisory Visit June 2016

Key Findings

- This section of the River Glyme has been extensively modified in the distant past but opportunities exist to create improved in-channel and riparian habitat.
- The channel is very uniform in depth and shape and would benefit from having a more diverse physical morphology to promote improved ecology.
- A lack of any tree management has resulted in long sections of the channel being in permanent heavy shade, restricting productivity.
- The large flood plain meadow adjacent to the left bank offers a chance to create connected wetland habitat.

1.0 Introduction

This report is the output of a site visit to a short reach (approximately 500m) of the River Glyme near Enstone in Oxfordshire. The request for the visit came from Trevor Cramphorn (Cotswold Rivers Trust CRT) on behalf of the landowner Kate Farquhar-Thompson.

Normal convention is applied with respect to bank identification, i.e. left bank (LB) or right bank (RB) whilst looking downstream. Upstream and downstream references are often abbreviated to u/s and d/s, respectively, for convenience. The Ordnance Survey National Grid Reference system is used for identifying locations.

Comments in this report are based on observations on the day of the site visit and discussions with Trevor and Kate.

	River Glyme near Enstone
Waterbody Name	River Glyme
Waterbody ID	GB106039030020
Management Catchment	Cotswolds
River Basin District	South East
Current Ecological Quality	Moderate status
U/S Grid Ref inspected	SP378245
D/S Grid Ref inspected	SP381243
Length of river inspected	0.5km

Table 1. Overview of the waterbody. Information sourced from <http://environment.data.gov.uk/catchment-planning/WaterBody/GB107042016640>



Map1. River Glyme Woodford Bridge © streetmap

2. Catchment Overview

The River Glyme rises to the south east of Chipping Norton and flows in a generally south easterly direction to join the River Evenlode at Bladon after passing through Blenheim Lake Site of Special Scientific Interest. Major tributaries include the Heythrop Stream and River Dorn. The catchment is predominantly limestone, with alluvium in the valley floor. The stream gradient is relatively steep for a lowland river, although there are long sections with a low gradient, particularly upstream of the many mills and on-line lakes within the catchment.

3. Habitat Assessment

This particular section of the Glyme is only a few kilometres downstream of the perennial source of the River. Flow is augmented right at the bottom boundary by the Heythrope Stream tributary, which joins the LB immediately upstream of Woodford Bridge. Both channels at this location have been significantly modified and it is very likely that both channels have been laterally relocated, either for agricultural irrigation, or in the case of the main Glyme, to increase the head of water for milling downstream.

There is a significant structure (waterfall) located approximately 1km downstream at Cleveley and it is possible that this was once used for generating power. The structure is also known to block free access for migrating fish and this might be one important factor in why the Glyme upstream of Woodbrige is currently failing to meet Water Framework Directive targets for "good ecological condition".

Habitat quality within the main Glyme is adversely impacted by the lack of bed gradient and the existing uniform channel shape. The lack of bed slope is also probably compounded by the invert of the Woodford Bridge (photo 1) on the downstream boundary.

Upstream of the bridge, the in-channel habitat comprises shallow, uniform "glide" habitat flowing over a mainly fine-sediment laden river bed. Poor habitat diversity is compounded by the extensive shading emanating mainly from the southern RB (photo 2) which severely restricts direct sun light hitting the river bed and as a result limits the success of in-channel aquatic plants.



Photo 1. The downstream side of Woodford Bridge. The limited capacity of the bridge and potentially bed armouring underneath may be responsible for sedimentation issues on the reach above.



Photo 2. Extensive tree shading from the RB.

Low level shading that brushes the water surface and provides cover for fish is valuable and should to be encouraged. Heavy shading of long reaches by blocks of tall trees should, if possible, be managed with occasional clumps subjected to rotational coppicing.

As a rule of thumb, low scrubby tree species such as willow, thorns and elder provide wonderful cover, without completely shading out long sections of channel. Identifying tall, leggy alders and crack willows for coppice, or low-level pollard, will benefit the river environment and encourage beneficial low re-growth. Care should be taken to avoid selecting trees that might support high quality bat habitat (cracks and holes in main trunks) and all tree work must be delivered outside of the bird nesting seasons. Creating a reach where there is 50:50 dappled light to shade regime is ideal but does require regular work to maintain the ideal balance.

The Heythrop Stream discharges into the Glyme immediately upstream of the Woodford Bridge. This section of channel is severely choked with emergent plants (photo 3) and may benefit from some intervention to maintain a narrow, open channel. Flow at the time of inspection was virtually static, giving the impression that the channel was more akin to a ditch than a flowing watercourse. It will be important to ensure that there is adequate flow conveyance for flood defence purposes in the section adjacent to, and immediately downstream of the houses pictured. Some low-level planting to create shade and restrict emergent reed growth in the section just upstream of the channel confluence, possible coupled with some sensitive mechanical removal of excessive mid-channel reed growth to create a narrow channel should be investigated.



Photo 3. A large plug of emergent vegetation is currently restricting flow conveyance in the bottom of the Heythrop stream. A combination of low-level shading and some thinning is recommended to create a narrow, self-cleansing channel in this sensitive location.

Occasional short sections of clean gravel (limestone chip) bed were seen in a few areas of the main Glyme located further upstream. Here the channel width is naturally squeezed (photo 4) promoting locally elevated flow velocities which have swept away some of the fine sediment, although a cleaner bed could be expected in a location like this. These sections are extremely valuable, potentially providing winter spawning opportunities for brown trout *Salmo trutta* and other gravel-spawning fish species such as dace *Leuciscus leuciscus*, minnow *Phoxinus phoxinus* and bullhead *Cottus gobio*. Protecting, or even creating areas of clean gravel bed can help to boost local fish populations



Photo 3. A pinched channel width, increased flow velocity and exposed gravel providing potential winter spawning opportunities.

4. Conclusions

It was apparent that large quantities of fine sediment is settling out on the bottom of this section of channel. Whilst all rivers carry sediment loads, the quantity seen here, even on some of the shallower, faster flowing sections, appears to be excessive. Whilst solving this issue is not within the gift of the landowner, a walk upstream following a heavy rainfall event may help to identify the source. Keeping nutrient rich sediment loads onto the land, rather than in watercourses is a major issue and is fundamental in helping rivers to meet ecological objectives.

A primary objective for the landowner on this site is to improve the whole site (river and adjacent wet meadow) for biodiversity. Introducing more physical diversity into the shape of the river channel and structure within it will provide improved opportunities for wildlife. Winning back any significant bed gradient due to past channel modifications is likely to be problematic and, although being the optimal solution, would be hugely expensive. However, creating a more diverse river environment by opening up some of the tree canopy and securely pegging the woody material won into the river bed will help to create a more diverse environment for plants, invertebrates and fish.

The WTT routinely recommends the use of both large (trunks and large branches) and coarse (small branches and brushwood) woody material to help scour and sort river bed sediments, as well as providing cover for fish and a primary food source for aquatic invertebrates. Woody material within the channel is therefore critically important in helping to maintain a diverse channel shape and a healthy river ecology.

There is a plethora of information about the benefits of woody material in river channels and how best to use it on the WTT website at www.wildtrout.org. The WTT can potentially demonstrate how to effectively manage woody material via a Practical Visit (PV) or WTT River Habitat Workshop.

Further opportunities to create a more diverse aquatic environment exist by potentially creating connected floodplain pool or pond habitat. Any wet scrape or pond in the floodplain is likely to be valuable to wildlife. However, when such a pond is connected to the river via a wide neck and/or deep ditch, it also creates opportunities for juvenile fish to develop away from strong flow conditions and larger predatory fish. These connected pools are known to be particularly valuable for both small (minnow) and juvenile cyprinid fish species. In creating a better environment for fish, not only will the fish populations be more resilient to adverse conditions of drought and flood, but will also help support populations of fish-eating birds and mammals.

It is recommended to keep the arches of the Woodford Bridge clear of woody material and to promote a more open channel on the bottom section of the Heythrop stream to reduce flood risk to neighbouring houses.

5. Recommendations

- Investigate the source of excessive sediment input upstream.
- Coppice occasional clumps of trees on the RB (south bank) to encourage improved light penetration and promote improved aquatic weed growth. This work will be of benefit to a variety of fish, invertebrate and mammal species.
- Introduce woody material to the channel to promote bed scour/sorting of sediments and to provide improved in-channel cover. Use large woody material to promote bed scour, parallel cover logs for fish cover, and brushwood to help stabilise vulnerable banks and support beds of

marginal aquatic plants. Guidance is available from Cotswold Rivers Trust and WTT.

- Consider a project to create a connected flood plain pond.
- If the watercourse here is classed as 'main river' by the Environment Agency, any work within 8m of the top of the river bank will require a consultation with the Environment Agency and quite possibly a permit for work.
- Control excessive spread of emergent plants on the bottom end of the Heythorp stream by some local shrub/tree planting to create shading and if necessary some mechanical cutting to create a narrow open channel for improved flow conveyance.

6. Making it Happen

The WTT can provide further assistance to help implement the above recommendations. This includes help in preparing a project proposal with more detailed information on design, costs and information required for obtaining consents to carry out the works. If required, a practical visit can be arranged to demonstrate habitat improvement techniques. Demand for these services is currently high but WTT is able to provide further advice and information as required. Further advice on fund-raising can be found at www.wildtrout.org/content/project-funding

We have produced a 70 minute DVD called 'Rivers: Working for Wild Trout' which graphically illustrates the challenges of managing river habitat for wild trout, with examples of good and poor habitat and practical demonstrations of habitat improvement. Additional sections of film cover key topics in greater depth, such as woody debris, enhancing fish stocks and managing invasive species.

The DVD is available to buy for £10.00 from our website shop www.wildtrout.org/product/rivers-working-wild-trout-dvd-0 or by calling the WTT office on 02392 570985.

The WTT website library has a wide range of materials in video and PDF format on habitat management and improvement: www.wildtrout.org/content/index

7. Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency for their continued support of the advisory visit service.

8. Disclaimer

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