



## River Coln – The Trout House Fishery



An advisory visit carried out by the Wild Trout Trust – April 2009

## 1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on the River Coln on the Trout House Fishery in Gloucestershire. The water is owned by Mr Bill Cotton and is managed as syndicated trout fishery.

The comments and recommendations made in this report are based on the observations of the Trust's Conservation Officer, Andy Thomas and discussions with Mr Cotton and Mr Peter Boyle from the fishing syndicate, Mr Jonathan Stebbing from the EC Trust and Chris Bell and Lizzie Rhymes from the Environment Agency. 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.

A key element of the site meeting was not only to look at habitat management and enhancement opportunities but also to discuss brown trout (*Salmon trutta*) stocking options and in particular the possibility of using an old adjacent pool as a facility to hold wild bloodstock prior to stripping eggs and placing them into stream-side incubator boxes.

## 2. Catchment overview

The River Coln rises at an altitude of about 200m Above Ordnance Datum near Sevenhampton in Gloucestershire and flows from the limestone Cotswold Hills in a south-easterly direction to Lechlade where it joins the River Thames. The source of the river is in the Inferior Oolite aquifer in which it flows for the first few kilometres, but most of the river runs on the Great Oolite aquifer. Both of the limestone aquifers are sources for water abstraction.

Near the bottom of the catchment the river crosses Oxford Clay as it drops into the upper Thames flood plain. The catchment is mostly rural, with farming the main industry. The upper catchment is mainly grazing land, and there are large areas of deciduous woodland in the south-west. The upper two-thirds of the catchment are within the Cotswold Area of Outstanding Natural Beauty (AONB), and around Fairford the river has been designated as a Nitrate-sensitive area. There are no large conurbations on the upper catchment, although Cheltenham, from where surface water drains into the limestone above the river's source, has a population of over 100,000. The Coln catchment supports a population of around 9,000. The main sewage inputs to the river are from works at Andoversford, Bibury and Fairford. Bibury Tout farm is the largest discharge into the river, although most of this is 'on-line' through fish-ponds. The river has been subject to various enhancement schemes to improve ecology and fisheries. Water quality was recorded as 'good to fair' in the 1995 General Quality Assessment survey; the classification varies throughout the river, due to the effects of both discharges and low flows.

The biological quality of the river is very good. As well as a brown trout fishery, the river also supports natural populations of grayling (*Thymallus thymallus*) and coarse fish populations. Native crayfish (*Austropotamobius pallipes*) have been recorded but not since 1991; populations of the introduced American signal crayfish (*Pacifastacus leniusculus*) are also present. This, and further information

about the River Coln catchment is available from the Environmental Challenge Network. : (<http://www.ecn.ac.uk/aboutecn.htm>).

In the last few seasons the Coln, like other Cotswold limestone rivers, has been suffering from elevated levels of turbidity. Numerous theories have been put forward to explain the green opaque hue which currently exists, with the consensus view being that the issue is a chemical condition, possibly exacerbated during periods of elevated base flow.

### **3. Fishery overview**

The Trout House syndicate control approximately 2km of double and single bank fishing rights. The fishery is comparatively lightly fished by the 20 rods that share the water.

The fishery supports modest numbers of wild trout stocks and decent numbers of grayling. The fishery is also currently stocked with a mixture of hatchery derived adult diploid trout and last year was also stocked with approximately 10,000 fry produced via hatchery derived diploid eyed eggs being placed into a stream-side incubator box.

The syndicate has a desire to improve the wild component of the trout stock but recognises that some stocking is required to augment anglers' catch.

### **4. Habitat assessment**

The fishery can be broadly split into two discreet beats. The upper beat is heavily impacted by a large milling impoundment. This section was not closely inspected on the day but it was apparent that the beat is comparatively deep and slow flowing. In-channel habitats consisted of mainly deep glide habitat over a silt covered bed. This probably provides some holding potential for stocked trout but is considered to be a poor environment for wild fish.

It was apparent that this section of channel was also perched above the flood plain on the RB with evidence of previous dredging operations in the shape of a parallel spoil bund on the LB. This section was lightly shaded with the very occasional tree, with margins dominated by a narrow fringe of reed sweet grass (*Glyceria maxima*).

The milling impoundment appears to be a barrier to upstream fish migration. Works to the adjacent mill house are currently in progress but appear to have stalled. It is unclear if any opportunities have been explored to link the redevelopment with any opportunities for enhanced fish migration and enhanced up stream habitats.



Section of impounded channel looking upstream from the milling weir



Looking downstream towards the mill where the river passes through some undershot hatches

Downstream of the hatches the river takes on very different characteristics. Here the channel is comparatively shallow with increased water velocities flowing over a mainly gravel substrate. Trout have apparently been observed spawning on this section in the past and there was evidence of spawning activity with the remains of several winter redds still visible. This shallow streamy habitat persisted for approximately 150 metres before giving way to a mixed habitat of pool and glide. Where flows were vigorous and the substrate firm, large beds of water crowfoot (*Ranunculus spp*) were observed.

A short distance down from the Mill a spring water supply emerges from the ground and flows a short distance into the RB of the river. The colour and nature of the water emanating from the ground suggests that this supply is rich in dissolved iron. It is understood that a trout egg incubator box was run on this source but results were very poor due to low concentrations of dissolved oxygen.

A short distance further downstream there is an old outdoor bathing pool which is fed by another spring source before discharging into the river via a short section of channel. The possible use of this pool to hold wild broodstock as part of a local supportive trout rearing facility is discussed in more detail later in the report.



Outlet channel from one of the spring sources – This could be improved by importing gravel to provide a useful spawning site

The outlet channel from both spring sources could potentially provide some decent spawning habitat. Spring water is often very low in dissolved oxygen when it first bubbles from the ground but will rapidly absorb oxygen, especially when encouraged to tumble over shallow riffle habitat. Small side streams are often utilised by spawning trout over main river locations and are comparatively easy to get into good shape for spawning. Options for enhancement are discussed in the recommendations section.

Throughout the reach there were good examples of fallen tree trunks and submerged large woody debris (LWD). Many of these were acting as useful flow deflectors and enhancing spawning potential as well as providing cover for adult fish. Much of the river bed substrate on the Coln is comparatively poor for trout spawning, either being large chips of limestone or gravels which have naturally concreted together. The river did, however, have reasonable variety in depth and flow patterns, probably induced by the presence of large woody debris (LWD) at certain times which has sculpted habitats for all life stages of brown trout. The presence of LWD has been shown to be extremely important in several respects:

- An increase in the variety of flow patterns, depths and localised velocities.
- Development of high in-channel physical habitat diversity
- Significant benefits to the control of run-off at the catchment scale. Woody Debris helps regulate the energy of running water by decreasing the velocity. Thus the 'travel time' of water across the catchment is increased.

LWD is a general term referring to all wood naturally occurring in streams including branches, stumps and logs. Rivers and streams with adequate LWD tend to have greater habitat diversity, a natural meandering shape and greater resistance to high water events. Therefore LWD is an essential component of a healthy stream's ecology and is beneficial by maintaining the diversity of biological communities and physical habitat.

Traditionally, many land managers and riparian owners have treated LWD in streams as a nuisance and have removed it; often with uncertain consequences. This is frequently unnecessary and harmful: stream clearance can reduce the amount of organic material necessary to support the aquatic food web, remove vital in-stream habitats that fish will utilise for shelter and spawning and reduce the level of erosion resistance provided against high flows. In addition, LWD improves the stream structure by enhancing the substrate and diverting the stream current in such a way that pools and spawning riffles are likely to develop. A stream with a heterogeneous substrate and pools and riffles is ideal for benthic (bottom dwelling) organisms as well as for fish species like wild trout

On one or two sections the fishing syndicate have installed several flow deflectors to encourage local scour and promote better holding habitats for adult trout. Several types of deflector have been tried, including single (LWD) deflectors and paired "V" type deflectors. Some of the structures examined were providing enhanced habitats, however, several were configured with a slight

downstream facing angle, which in places is encouraging the channel to erode laterally towards the bank, rather than promoting the formation of mid channel pools.



Two LWD current deflectors installed to promote river bed scour. These would be much more effective if they were square to the current or facing slightly upstream



One half of a downstream "V" deflector. Increased water velocities are being directed towards the bank, gradually making the channel wider rather than scouring a central run.



A good example of making the most from an old fallen tree by supporting the trunk with a driven post



Live willow spiling will protect the bank but will require additional maintenance works once established.



Throughout the whole beat the margins have been managed sympathetically to promote valuable habitat but also to facilitate angling. Fencing has been undertaken on the RB to avoid over grazing and trampling by live stock and some thick fringes of marginal emergent vegetation have been promoted by revetting the banks and allowing a low boggy fringe to develop. This is important habitat for many specialized plants and invertebrate communities and can only enhance the quality of the fishery as a whole.



A valuable low soft margin. The thick fringe of vegetation will protect the bank from erosion

## 5. Trout stocking

To supplement the modest numbers of wild trout present the fishing syndicate annually introduce a number of adult hatchery derived diploid trout. The syndicate have also used a bank-side incubator box to hatch diploid eyed eggs and stock trout out as un-fed fry.

The Environment Agency's National Trout and Grayling Fisheries Strategy has set out a timetable for phasing out the stocking of fertile hatchery derived trout and by 2015 all options for stocking trout will have to be with either sterile (triploid) stocks or fish produced from locally derived broodstock. The Wild Trout Trust supports the concept of protecting wild stocks from the adverse effects of stocking with domesticated strains but also recognises that on fisheries with very limited habitat for wild fish that some stocking may be necessary to sustain a viable fishery.

One option discussed was to use an adjacent spring fed swimming pool as a holding stew to retain wild broodstock prior to stripping as part of a supportive breeding programme. The WTT believes that this option is not viable due to the following likely problems:

- The guidelines for supportive breeding programmes require at least 25 pairs to be used as broodstock to avoid inbreeding and to maintain genetic diversity.
- It is highly unlikely that this section of river supports enough wild broodstock to satisfy the guidelines, even if they were available for capture.
- Keeping wild broodstock alive long enough to mature in the spring fed pool will be very challenging.
- It is highly unlikely that any fish held in the spring source will naturally mature to the stripping phase without the use of hormone injection or implant.
- Water temperatures in spring fed sources are often very stable and often do not cool down sufficiently to give trout a cue for sexual maturation.
- Any calculations of overall benefit must take into account the loss of wild production from removing wild broodstock from the river system.

With only limited spawning and nursery habitat available for wild stocks, it is unlikely that any of the trout currently stocked, either via the incubator box, or as mature adults, are making any significant contribution to the wild component of the stock. The offspring of wild fish crossed with stocked parents are less fit (less likely to survive to maturity), so improvement of spawning areas combined with a move to stocking with triploid fish should increase the numbers of wild fish present within the fishery. This is more likely to be successful and carries less risk than artificially stripping wild broodstock each year.

## **6. Conclusions**

The River Coln on the Trout House Syndicate has considerable scope for enhancement to further build the wild component of the trout stock. Although not fully explored in this report, the upper half of the fishery above the milling impoundment is ripe for improvement. Any enhancement here is inextricably linked to the milling structure. The opportunity is there to lower the impoundment and pull water through at a greater velocity, which in turn would carve out new and better quality trout habitats on the upstream reach.

The syndicate have sensitively maintained the bottom section of the fishery. Work to protect the bank from overgrazing and trampling as well the use of woody flow deflectors to promote in-channel scour has undoubtedly improved habitat for trout. One or two of the deflectors would be more effective if repositioned to promote central channel scour. This could easily be achieved

through the use of a winch and re-staking the deflectors to a position where they would be more effective.

On the shallow glide sections below the mill further improvements in spawning success can be achieved by ensuring that the gravels are clean and loose prior to spawning time in the winter. Braking up the gravels with a spike and blasting the sediments out using a high pressure pump or back pack leaf blower will ensure a much better conversion rate of egg to fry survival.



Gravel cleaning using a leaf blower.

A guidance note on gravel cleaning techniques is attached to this report.

The local spring sources that discharge into the river offer an opportunity for improved spawning habitat. Improving the spawning substrate by introducing mixed angular gravels ranging from 15 to 50mm would provide enhanced opportunities for spawning and would be comparatively cheap and easy to achieve.

An additional opportunity for creating 200m of new spawning and juvenile habitat was looked at on the section immediately downstream of the bottom

boundary. Currently a side ditch runs parallel with the LB of the main river and this could be developed and reconnected the river downstream of an impoundment. This possible enhancement would not only provide some excellent spawning and juvenile habitat but would also provide a natural fish pass to fish wishing to migrate upstream into the Trout House reach.



Old overgrown ditch on the LB could be improved and connected to the main river to provide a superb spawning and nursery habitat as well as a natural bye-pass for fish to be able to negotiate the impoundment

The supportive breeding programme discussed will not provide the numbers of fish required to replace the current level of supplementary stocking. Removing local wild fish from the river could result in a net loss of local wild production. An early move to stocking with adult sterile fish will provide trout for sport but not adversely impact on the development of the wild stock, particularly if the stocked fish are caught and removed as the season unfolds. Catching and releasing stocked fish is perfectly acceptable in spring and high summer but consideration should be given to running the density down during the last month or two of the season.

Some concerns were expressed about water quality standards and its potential impact on fish and fly life. One excellent method of self monitoring water quality is to link up with the River fly Partnership. The Partnership provides simple training and a robust method of assessing fly life through periodic sampling of macro invertebrates. This is a simple and effective way of keeping a close eye on water quality performance. More information can be found at [www.riverflies.org](http://www.riverflies.org)

**It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking any 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 Development Control Officer.**

## **7. Recommendations**

- Explore options for reducing the height of the milling impoundment with the mill owners and the Environment Agency.
- Instigate an autumn programme of spawning enhancements. Identify the main areas of spawning activity and during October, prior to spawning, give those areas a thorough clean using high pressure pumps or a leaf blower.
- Consider the possibility of enhancing the productivity of the fishery by creating new spawning habitat with imported gravels, particularly in the small side streams that join the fishery.
- Reconfigure some of the current flow deflectors to limit marginal bank erosion and to encourage central channel bed scour.
- Keep a watching brief on water quality through joining the Riverfly Partnership and undertaking some monitoring of key areas.
- Consider an early move to stocking with modest numbers of adult sterile stock rather than fertile adults or incubator derived fry.
- Explore the possibility of supporting your neighbours in creating a new bye-pass channel on the section of river just below Netherton Bridge.

## **5. Making it happen**

There is the possibility that the WTT could help to start an enhancement programme. Physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). PVs typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams to obtain "on the ground" training regarding the appropriate use of conservation techniques and materials, including Health & Safety equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

The WTT can fund the cost of labour (two/ three man team) and materials (max £1800). Recipients will be expected to cover travel and accommodation expenses of the contractor.

Alternatively the Trust may be able to help in the development of possible project plans for the creation of new spawning and nursery habitats.

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 clubs, syndicates and landowners through guidance and linking them up with others that have had experience in improving trout fisheries.

### **Acknowledgement**

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

### **Disclaimer**

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