



Advisory Visit to the River Coln,
Ernest Cooke Trust, Glos.
Undertaken on behalf of the Wild
Trout Trust, by Vaughan Lewis,
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1.0 Introduction

This report forms the output of a site visit undertaken to the River Coln, Fairford Glos, on 17 September 2004 on behalf of the Ernest Cook Trust .

Information for the report was gathered during the site visit. Additional information was provided by the agent, Jonathan Stebbing and fishery survey reports carried out by the National Rivers Authority/Environment Agency (EA). Throughout the report, normal convention is followed, with banks identified as RB (right bank) and LB (left bank) when facing downstream.

2.0 Description of fishery

The source of the River Coln is located at a spring line to the north of Brockhampton near Cheltenham (SP 035234). The river flows in a south-easterly direction to join the River Thames upstream of Lechlade, a distance of some 52 km. The river has a mean gradient of 1:430.

The geology of the catchment is dominated by oolitic limestone and clay, with the river encountering the following strata in a sequence from source downstream: Upper Lias clay, inferior Oolite limestone, Great Oolite limestone, and alluvium on Oxford clay.

The mean daily flow as measured at Bibury is approximately $1.5 \text{ m}^3\text{sec}^{-1}$, with a typical dry weather flow in the order of $0.5 \text{ m}^3\text{sec}^{-1}$ and flood discharges in excess of $4.5 \text{ m}^3\text{sec}^{-1}$. WS Atkins assessed the impacts of groundwater abstraction on the flows of the River Coln in a report prepared for Thames Region of the NRA. The Atkins report assessed groundwater abstraction for public water supply as having reduced natural mean flow in the River Coln by between 2 and 7 % (Period 1964-90) and Q_{95} flow by between 3 and 15% over the same period.

Water quality in the river is generally good, although there has been an increasing number of complaints regarding a milky grey turbidity present in the river. This mirrors complaints in other Cotswold rivers and is believed to be due to a diffraction effect caused by a combination of lias clay micelles and calcium carbonate precipitate.

The river downstream of Withington is an EU designated salmonid fishery, imposing imperative water quality criteria. Failure to meet these standards must be reported to the EU by the Environment Agency.

3.0 Habitat Assessment

Downstream of Netherton Bridge, the river was some 4m- 5m in width, with a gently meandering planform and a relatively diverse cross section. There was an abundance of shallow, gravel dominated sections suitable for spawning and juvenile brown trout *Salmo trutta*. Gravel quality on these shallows was moderate with the gravel poorly sorted, with significant entrained fine sediment present. In addition, here and throughout the fishery, significant amounts of 'Tufa' gravel were present. Tufa gravel is formed by the precipitation of calcium carbonate on a nucleus (often a very small piece of gravel). Continued precipitation over time causes the Tufa gravel to increase

in size. Tufa is of limited value for spawning fish due to its tendency to concrete into larger lumps, thus reducing through-flow of oxygenated water to trout eggs within redds.

There were adequate lengths of deeper water suitable for adult trout. The river was fenced on its LB, effectively protecting it from grazing cattle.

This section of the river had an extensive and dense growth of water crowfoot *Ranunculus spp.* during the early part of the 2004 fishing season. This was lightly cut in July by the river keeper in order to create a 'checkerboard' pattern. Subsequent to this, the crowfoot failed to re-grow with virtually no weed present on the day of the site visit. This had resulted in lower than usual water levels in the river.



River Coln downstream of Netherton Bridge. Note LB fencing and associated well developed marginal growth

Water vole *Arvicola terrestris* signs (burrows and feeding stations) were present at the site, with the bank profile and well developed marginal fringe suiting this species. However, the present Estate policy of hard cutting of the margins during the winter will not be so favourable to protection of water vole colonies. It will also tends to reduce the abundance of a range of macroinvertebrate species that over- winter in this vegetation.

Sections of the RB were not owned by the Estate and formed the gardens of individual residential properties. These banks were heavily cut to the detriment of the fishery, reducing fringing cover valuable to a range of fish species. Sections the bank had also been reveted in places



Heavily cut and reveted RB outside Estate control

The river then split into two channels around an old mill, with a large percentage of flow passing along the high level (mill) channel. The low level channel along this reach of the river was over-wide and over-deep with respect to the water flow along it. Bed profile was very uniform with poorly sorted gravel. Numbers of stocked adult fish were visible in this reach.

At the downstream limit of this reach, a small impoundment had been built up from stone adjacent to Quenington Bridge. This was retaining a head of water in the low level channel, increasing its width and encouraging the deposition of fine sediment.



Impoundment upstream of Quenington Bridge

Downstream of Quenington Mill, there was an abundance of flow dependent spawning habitat, dominated by moderately well-sorted gravel substrate. There were some small stands of water crowfoot present in this reach. Despite this, overall coverage of submerged weed was poor, with the result that there was an almost total lack of instream cover in the over-wide and shallow channel.

Good numbers of small, wild spawned brown trout were visible amongst the larger stocked fish.



Reach downstream of Quenington Mill. Water level very low due to lack of submerged weed

A relic water meadow carrier diverged from the LB of the main river, providing a potentially excellent nursery area for juvenile brown trout.



Water meadow carrier with potential as juvenile trout nursery stream

The main river below this point had been heavily dredged in the past, over-widening the channel. Emergent vegetation had responded by growing into the channel, creating wide, semi-consolidated margins. Access across these had proved difficult for rods fishing the water.

A number of small stone weirs have been introduced by the Estate in order to create diversity in bed profile and flow pattern. They have scoured significant holes downstream, providing cover for adult fish.

Below Moss Bridge, the channel was very uniform, dominated by shallow glides with poorly sorted substrate and little cover. Significant numbers of brown trout were present in shoals in the pools. This un-natural behaviour reinforced graphically the need to increase cover in this river reach.

Further downstream, where gravel had previously been introduced by the Estate, stands of fennel leaved pond weed *Potamogeton pectinatus* were present, providing some in-channel cover.

The New Cut was constructed in the early-1980's by Thames Water as mitigation for increased borehole abstraction in the Cotswolds. It was fed via a cut from the main river and a spring fed stream on the RB of the Cut. The channel was narrow (2m – 4m), with a largely gravel dominated bed. A series of small groyne had been used to manipulate flow and increase diversity. Stands of starwort *Callitriche* spp. were

abundant. Marginal growth was extensive and lush. Good numbers of small wild spawned brown trout were evident in the channel.



Typical section of the New Cut

The pattern of water crowfoot growth here was similar to that observed at Netherton, with early growth rapidly dying back after cutting.

4.0 Fish Stocks

A total of approximately 2,800 takeable sized hatchery reared brown trout and rainbow trout are introduced each season by the Estate. The rainbow trout are only stocked into the Broadwater, an on-line impounded section of channel upstream of Fairford town.

In common with other fisheries on the River Coln, numbers of grayling have declined over time. This is of great concern, not just from a fishing respect, but also in a wider, ecological context.

5.0 Recommendations

In general, the fishery was in good condition, and well maintained to the benefit of wild brown trout. A number of recommendations are however made below with a view to improving the fishery.

- The low level channel alongside the private properties at the upper end of the fishery was deprived of water due to the prioritisation of flow along the high level channel. As a consequence, the low level channel was overwide and overdeep for the flow along it. If possible, the flow allocation should be altered in favour of the flow dependent habitat of the low level channel. If this proves impossible, then consideration should be given to localised narrowing using faggot bundles or similar. Details are provided in the attached WTT Guide to improving trout streams. Narrowing could be undertaken either from the sides of the stream or by the creation of small, mid-channel faggot islands.
- The impoundment above Quenington Bridge could usefully be removed, reducing the retained head of water and the cross sectional area of the low level channel upstream. This would both reduce silt deposition and allow marginal growth to flourish, further narrowing the stream's width.
- The reaches below Quenington Mill and Moss Bridge both suffer from being over-wide, with uniform bed profile and a lack of submerged vegetation cover. As a result, it is recommended that more Large Woody Debris is introduced to the channel, either in the form of constructed wooden deflectors or felled, stabilised and secured trees trunks. Fallen branches and tree trunks are important components of river systems, helping to provide cover and trap fine sediments. Of particular importance to the Ernest Cook fishery is their part in shaping and forming bed profile. Fallen timber act as groynes, helping to scour out the bed, and sort substrate, removing fine sediment from spawning gravel.

In order to benefit from LWD, it is recommended that a policy of retaining and stabilising fallen trees and branches is adopted by the Estate, provided that this does not pose an increased risk of flooding of property. The EA should be contacted to agree a maintenance schedule within the estate's boundaries that reflects this change in policy.

- The marginal vegetation downstream of Moss Bridge should be allowed to grow laterally in order to encourage narrowing of the channel.
- The present policy of winter cutting of the marginal vegetation should be modified, in order to protect habitat for water voles and invertebrates. The presumption should be that no cutting should routinely take place.
- The poor growth of water crowfoot and other submerged weed is of concern. This pattern has been found elsewhere on the Coln and indeed other Cotswold rivers. There is little the estate can do on an individual basis other than to contact the EA, asking for assistance and offering support to the basic empirical research they are undertaking regarding this issue.
- The use of deep-substrate incubation boxes should be considered. Basically, these are gravel filled boxes, approximately 0.6m in each dimension, that are filled with suitably sized gravel and seeded with 10,000 - 20,000 trout eggs. A water feed at the bottom of the box allows the eggs to incubate and hatch. Once they reach the swim-up fry stage, they leave the box via the overspill pipes, stocking themselves into the river. In effect, they are naturally reared fish without the unhelpful behavioural

modifications associated with hatcheries. More details on incubation boxes can be found on the Wild Trout Trust web site www.wildtrout.org or in Volume 2 of the Trust's magazine, *Salmo trutta*.

These boxes have been used very successfully at Williamstrip Estate where they could be viewed in operation. The small water meadow carrier downstream of Quenington Bridge provides an absolutely ideal location for one of these boxes. If such an idea is adopted and shown to be successfully working, it should allow the Estate to significantly reduce its reliance on introduced hatchery reared fish, with an associated cost saving. Note that a consent in writing is required from the Environment Agency prior to the introduction of any fish or fish eggs.

- In order to reduce the need to cut bankside vegetation for angler access, the use of careful wading should be encouraged. The impact of thoughtful wading during the fishing season is minimal compared to the very significant impact of regular and heavy bankside cutting
- The encroaching marginal growth below Quenington Mill should be encouraged. This growth is a direct response by vegetation to the previous heavy dredging of this reach. Faggot bundles can be staked into the soft marginal fringe to speed up the rate of colonisation. Alternatively, simple walkways to the water from the path can be constructed using willow stakes and willow bundles. Above all, the temptation to dredge the river should be resisted. This would be a short term palliative with serious long term consequences for the recovery of the Coln.
- The decline in numbers of grayling is of great concern. It is important that the EA should be contacted regarding this issue, that may have a catchment wide origin.
- The quality and availability of suitable spawning gravel within the fishery is likely to be limiting the abundance of trout. The quality of the gravel can be improved by establishing a regime of cleaning spawning gravels each September. This can be achieved by either manual raking, or by the use of high-pressure water jets. Care must be taken to clean riffles rotationally, with only short sections being treated annually. It is important that the EA are contacted prior to any cleaning of gravel, due to the possible discoloration of water in the river resulting from the operation. The same concerns dictate that downstream neighbours should also be forewarned of the operation.
- It should be noted that no work should be undertaken to the bed of the channel or its banks within 8m of the channel without the consent of the Environment Agency under the Land Drainage legislation.