



**ADVISORY VISIT TO THE RIVER LEE AT
WATERHALL FARM, BYFORD, HERTS.,
UNDERTAKEN BY VAUGHAN LEWIS,
WINDRUSH AEC LTD, ON BEHALF OF RED
SPINNER ANGLING SOCIETY
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Sponsored by:

**English Nature and the Environment
Agency, as part of the 'Cinderella
Chalkstreams' Project**

1.0 Introduction

This report forms the output of a site visit undertaken to the River Lee at Water Hall Farm, Bayford, Herts, on behalf of Red Spinner Angling Society. Information for the report was gathered during the site visit. Additional information was provided by club members. Throughout the report, normal convention is followed, with banks identified as RB (right bank) and LB (left bank) when facing downstream.

2.0 Habitat assessment

The river had a moderately sinusoidal planform, with some well developed meanders. The downstream section of the fishery was some 6-8m in width and relatively deep, with abundant habitat for adult brown trout *Salmo trutta*. Water velocity and level were generally low. The river was lightly coloured as a result of significant overnight rain. It is understood that the discharge from the adjacent mineral working can also colour the river, particularly in the afternoon. The bed was dominated by clay, overlaid in many places by a layer of silt. Instream cover was provided by submerged leaves of common club rush *Schoenoplectus lacustris*, overhanging vegetation and undercut banks/tree roots.

Land use on the LB was rough pasture, with a mix of rough pasture and arable fields on the RB. There was light/moderate shading of the channel by riparian trees, mainly alder *Alnus glutinosa*. Many of these were infected with *Phytophthora*, a fungal disease often lethal to alders.



Downstream reach of the fishery

There were a number of woody debris dams that provided significant cover for a range of fish.



Useful Large Woody Debris held up under hawthorn tree

Further upstream, the river's gradient increased with lengths of gravel dominated, flow dependent shallows. There were large stands of starwort *Callitriche* Spp., and some water crowfoot *Ranunculus* spp present. Habitat was ideal for spawning and juvenile brown trout, barbel *Barbus barbus*, dace *Leuciscus leuciscus* and chub *Leuciscus cephalus*. The quality of the gravel was very variable, with significant volumes of entrained sand in some of the riffles.



Shallow, gravel dominated riffle habitat, with starwort and water crowfoot

3.0 Fish stock management

The river held good stocks of coarse fish, in particular barbel, chub and dace. There were also numbers of common carp *Cyprinus carpio* present. These were less welcome, having escaped from flood plain stillwaters into the river during flood events.

Brown trout are known to exist in reaches upstream and downstream of Water Hall Farm. Their distribution may be affected by the presence of a gauging weir at the upstream end of the fishery, which acts as a significant barrier to migrating fish.

4.0 Management recommendations

- The key aspiration of the club is to attempt to establish a self-sustaining brown trout stock at the fishery. The club acknowledges that this will probably never support a significant rod and line trout fishery, but will provide both a limited recreational resource to a few keen members, as well as increasing the range of brown trout within the Lee catchment. Habitat quality in the fishery was generally good. A number of recommendations are made below that, if implemented should improve both the quality and abundance of instream habitat for brown trout. Water quality in the river is also believed to be moderate/good. Given this, and the fact that numbers of brown trout exist upstream and downstream on the site, there appears to be no reason why a population of brown trout should not be established at the fishery.
- Subject to Environment Agency's approval under the terms of the Trout and Grayling Strategy, probably the best way to introduce brown trout to the site is by the

use of a deep substrate incubation box. Basically, these are gravel filled boxes, approximately 0.6m in each dimension, which 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. Such a system could be established using the impoundment created by the gauge at the upper end of the fishery, provided that the co-operation of the Environment Agency could be gained. They may be concerned that a small volume of water will bypass the weir during the winter period, although Thames Region has previously allowed a similar arrangement to be established at a gauge weir on the River Glyme in Oxfordshire. Trout hatching out of the box could be caught in a small mesh catch box and transferred to suitable shallow fry sites elsewhere on the fishery. 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*.

- The quantity and quality of shallow gravel riffle areas could be increased. Riffles (minimum length 15m) could be constructed from introduced gravel in the middle lower reaches of the river. Given the close proximity of the mineral workings to the river, it is likely that suitable sized gravel could be sourced locally, reducing both the overall cost and the need for long distance transport by lorries.

The gravel quality of some of the existing riffles could be improved by the introduction of larger (25mm–40mm diameter) gravel, more suitable for spawning brown trout. The introduction of Large Woody Debris in the form of tree trunk groynes (see below) would also be of great benefit on existing riffles. The constriction of flow resulting from their introduction will help to sort gravel, forming deeper pool areas with a 'tail' of relatively silt free gravel suitable for spawning trout.

Both the creation of new riffles and improvement of the existing riffles will also favour spawning barbel, dace and chub.

This work should not be undertaken without the necessary consents from the EA (see below) or detailed advice from a competent fisheries specialist. As part of the Land Drainage consenting process, the EA may require a basic assessment of the likely impact of the works on the local flooding regime

- Many of the alder trees at the site will die as a result of *Phytophthora* infection. As a consequence, there will be a significant loss of bankside cover and shading. In order to plan for this likelihood, it is recommended that the club consider replanting with a mix of species, including ash *Fraxinus excelsior* and hawthorn *Crateagus monogyna*. These will require protection from grazing animals and should be weeded around for at least 2 growing seasons in order to optimise their successful establishment and subsequent growth
- Where possible Large Woody Debris (LWD) should be retained in the channel. Large woody debris (LWD) is an integral component of stream ecology. The benefits for retaining it are clearly laid out in the recent EA R&D document, "Large Woody Debris in British Headwater Rivers". Key conclusions of the report include:

- An increase in both mean flow depth and velocity and variability of both parameters.
- The development of high physical habitat diversity both in-channel and in the floodplain. Removal of LWD reduces both habitat quality and availability for juvenile and adult brown trout.
- Although active LWD dams may impair upstream migration of fish at low flows, they rarely do so at high flows.
- LWD have significant benefits to the control of run-off at the catchment scale.
- River and riparian management has important effects on the distribution and character of dead wood accumulation within the river system.

Woody debris could usefully be added to the fishery, particularly on the shallow riffle areas, in order to sort gravel and reduce the percentage of fine sediment present. Care should be taken to ensure that the addition of woody debris does not increase localised bank erosion. Angling of the introduced tree trunks in an upstream direction, and adequate keying in of the trunks to the bank will significantly reduce this risk. Upstream facing 'V' shaped groyne as described in the WTT Guide to Improving Trout Streams can also be useful in creating diversity in uniform shallow sections.

The construction of small faggot islands would also be helpful in improving both cover and the sorting of gravel riffles. The islands should be arranged in a staggered line down the channel, in order to create a mosaic of channels with increased velocity, and optimising conditions for the growth of *Ranunculus* spp. They should be constructed from faggot bundles, secured to cleft chestnut stakes, driven at 600mm centres.

The central core of the islands can be infilled with woody brushings, tied down in order to prevent washout by high discharge events. The upstream 'toe' of the islands can be protected by stone rip-rap to reduce the risk of erosion.

The top level of all islands should be set at approximately 100mm-150mm above mean summer water level. During high flow periods, the islands will become submerged, reducing the risk of accumulation of debris and minimising impact on flow conveyance.

- Funding of the works recommended in this report could come from a variety of sources:
 - The Wild Trout Trust has small scale funding available for 'Cinderella Chalk Rivers'. Contact Edward Twiddy for more details
 - The recently completed Lee Fisheries Action Plan (FAP) aims to promote the development of brown trout populations in the Lee catchment. It is possible that the EA may be able to contribute financial assistance to any works undertaken. Contact Phil Bellfield at the EA's Hatfield Office (08708 506506)
 - Finance may also be available via the Aggregates Levy or Landfill Tax contributions. The EA may be able to assist with obtaining such funding and with the establishment of a partnership project

- Note that all works to bed or banks of the river or within 8m of its banks require the written consent from the Environment Agency under the Land Drainage legislation. The introduction of any fish or eggs into any inland water requires the consent of the EA under the Salmon and Freshwater Fisheries Act, 1975. It is imperative that all relevant consents are obtained by the club.
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