HABITAT ADVISORY VISIT, WINDRIDGE FARM, RIVER BEANE, HERTFORDSHIRE. UNDERTAKEN BY VAUGHAN LEWIS, WINDRUSH AEC LTD ON BEHALF OF OLIVER KAN

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1.0 Introduction

This report is the output of a site visit undertaken by Vaughan Lewis, Windrush AEC to the River Bean at Windridge Farm, Hertford The visit was sponsored by English Nature, as part of its commitment to support the biodiversity of chalk rivers through the offices of the Wild Trout Trust.

Comments in the report are based on observations on the day of the site visit. Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left hand Bank (LB) or Right Hand Bank (RB) whilst looking downstream.

2.0 Habitat assessment

The River Beane is a small chalkstream rising to the north east of Stevenage and flowing in a generally southern direction before joining the River Lea in Hertford. The Beane was a historically famous river, with large brown trout *Salmo trutta* and coarse fish regularly captured (see '*No need to Lie'* by Richard Walker). However, increased abstraction within the catchment has resulted in degradation of the river's instream habitat.

The fishery at Windridge Farm comprised of a long 'broadwater' type lake, known as 'The Canal', created by the impounding of the River Beane, a free-flowing reach of the original river, and a number of small carrier streams.

The Canal

The Canal had recently been restored, with a large volume of sediment and numerous fallen trees removed. The brick and flint dam at the downstream end of the Canal had also been reconstructed. However, a combination of a leak under the dam and the very low flows experienced in 2005 had resulted in very low retained water levels (<1m generally) in the 'Canal'.

In addition, cattle in the surrounding fields had exerted very heavy grazing pressure on the banks. Extensive growth of filamentous algae was present due to a combination of low flows, the shallow depth of the lake and high nutrient levels.

The Canal was fed at its upper end via a constructed weir.

Feed into the Canal via constructed weir

A length of the original River Beane flowed parallel to the Canal. This channel was between 2m – 4m wide, with a mixed sand and gravel bed, heavily overlain by fine sediment over much of its length. There were extensive stands of emergent vegetation including reed sweet grass *Glyceria maxima*, branched bur-reed *Sparganium erectum* and water forget me not *Myosotis scorpioides*, which totally occluded the channel for much of the reach length. Submerged vegetation was dominated by starwort *Callitriche* Spp, lesser water-parsnip *Berula erecta*, and some small stands of Water crowfoot *Ranunculus* spp.

Short sections of channel with a clean, gravel dominated substrate were present where the gradient was steeper and damaging dredging had not been undertaken historically.

Typical section of the original channel of the River Beane, showing its overgrown nature

A section of the channel with gravel dominated substrate, and a wide fringe of marginal vegetation

Flow in the reach of original River Beane channel was augmented by overspill water from the Canal passing along a small carrier, particularly during high flow periods. A second carrier further upstream fed water in the opposite direction, i.e. from the River Beane to the Canal. This stream was 1m- 2m wide, with a steep gradient, and sections of gravel-dominated substrate.

Small carrier feeding the Canal from the River Beane

The top of the fishery is delineated by a large weir, controlling the flow split between the Beane and a second, high-level canal stream on its LB. This is largely a coarse fishery, containing numbers of common carp *Cyprinus carpio* and other species.

Below the weir, there were short sections of flow dependent, gravel dominated channel flowing either side of an island. The low flows during 205 had allowed fine sediment to settle on sections of the bed, reducing its potential as trout spawning habitat.

Channel flowing around island downstream of the main control weir

3.0 Fish stocks

Small numbers of wild brown trout remained within the fishery. Supplementary stocking of the Canal had been undertaken with some 300 hatchery origin brown trout. 2,500 fingerling brown trout had also been introduced into the original River Beane. However, significant predation of the larger trout by cormorants *Phalocrocorax carbo* had occurred. At least 4 cormorants were seen fishing on the Canal on the day of the advisory visit.

4.0 Recommendations

- The key issue limiting the potential of the Windridge Farm fishery for wild trout was lack of flow. There is no doubt that this was particularly acute in 2005, but it will remain an issue in all years unless abstraction is reduced within the catchment.

- A consequence of the lack of flow is the need to decide on how flow is apportioned between the various channels. Ideally, if the weir at the lower end of the Canal can be sealed, the bulk of the flow would be directed along the original channel of the River Beane.

- It is vital that grazing cattle are prevented from damaging the banks of the various channels. Fencing, either permanent or temporary electric, should be erected to prevent access to the banks.

- The extensive growth of filamentous algae can be reduced by the application of barley straw to the fishery in March. The straw should be applied at the rate of approximately 2.4 small bales/ha, ideally contained within a 'sausage' constructed from the netting used to wrap Christmas trees. These 'sausages' need to be hung near to the water surface, as the barley straw only functions in the presence of sunlight and oxygen. The barley straw should be replaced in May/June as necessary. Further details are available for the Centre for Aquatic Plant Management website: capm.org.uk.

- Provision of submerged fish refuge sites (for instance log piles) within the Canal, may help to reduce predation of trout by cormorants.

- There are significant opportunities to improve opportunities for trout spawning and subsequent recruitment. These include:

- The quality of the existing 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 Environment Agency 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.

➢ In order to increase the availability of spawning gravel, riffles can be constructed from gravel. This is a very effective but potentially expensive operation. Typically, a 15m riffle would cost in the region of £1,500 to construct. However, the presence of existing gravel pits on the estate would significantly reduce the costs involved. Work of this nature requires significant planning and should not be entertained without further detailed advice

➢ The quality of the existing spawning gravel could be improved by selective narrowing of overwide riffles by the installation of faggot bundles. Narrowing of the channel can significantly increase water velocity, increasing scour and hence decreasing the amount of fine sediment deposited on the gravel, whilst increasing the abundance of valuable marginal cover for swim-up fry. Arisings from the coppicing or pollarding can be used to create faggots, roughly 2m long with a diameter of approximately 300mm. Once manufactured, the faggots can be used to locally narrow the channel, either from the margins or by the construction of small mid-channel islands. The faggot bundles should be pinned in place using wooden stakes and backfilled with secured brashings. The top of the faggots should be set at approximately 100-150mm above mean summer water level. Further details of faggoting techniques are provided in the Wild Trout Trust's "Guide to Improving Trout Streams".

➢ Another potential source of semi-natural fish would be 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 existing impoundment at the upper end of the Canal, with the resulting fish captured and distributed throughout the fishery onto suitable shallow gravel areas. Further details 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 growth of the emergent weed is very extensive during the summer months, largely as result of dredging undertaken historically, and the reduction in flow due to abstraction. This has resulted in an over-wide channel and an associated reduction in water velocity. Removal of all emergent weed is neither practical nor desirable. However, it is possible to manage the weed in order to maintain sections of open water. This can be achieved by either manual cutting (chain scythes), mechanical cutting (hydraulic powered cutter mounted on 360 excavator) or by the use of herbicide. Of these options, the best in terms of its cost, lack of environmental disturbance and practicality is probably the herbicide.

The only appropriate herbicide cleared for use near to and in water is glyphosate (sold as 'Roundup', Roundup Pro Biactiv etc). It is a selective, translocated herbicide that is used to treat the actively growing plant once its leaves have emerged from the water. Glyphosate offers a cheap and environmentally sensitive option (it is inactivated on contact with water and sediment) for the treatment of emergent vegetation.

Glyphosate can be used to selectively remove small stands of emergent vegetation, creating runs and sections of clear water where required. It can be also be used carefully in order to shift sediment from strategic locations by training the river's flow to scour these areas. Detailed advice on the use of herbicides can be obtained from the Centre for Aquatic Plant Management capm.org.uk. The written consent of the Environment Agency is required for the use of glyphosate.

- 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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