Advisory Visit to the South Wey, near Bordon, Hants
Undertaken on behalf of Mr P.Whitfield by Vaughan Lewis, Windrush AEC Ltd

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1.0 Introduction

This report forms the output of a site visit undertaken to the South Wey, near Bordon Hants on 2 May 2006 on behalf of Mr P Whitfield.

Information for the report was gathered during the site visit. Additional information was provided by Mr Whitfield. 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 downstream reach of the fishery had generally good instream habitat, with a mix of deeper slow glide, interspersed with shorter sections of shallow glide and riffle habitat, potentially suitable for spawning and juvenile brown trout *Salmo trutta*. However, the high volume of fine sand and sediment present entrained within and on the gravel was likely to have significantly reduced the hatching success of any trout eggs deposited. Environment Agency (EA) fishery surveys undertaken in this reach generally failed to produce any trout less than one year old, reinforcing this hypothesis of poor spawning success.

The channel was lightly shaded by riparian trees particularly on the RB. Despite their presence, Large Woody Debris (LWD) was underrepresented within the channel, with only limited amounts of fallen timber present.

Typical section of the downstream reach

There were some strong stands of Water crowfoot *Ranunculus* spp present, along with starwort *Callitriche* Spp. and hemlock water dropwort *Oenanthe* Spp.

Habitat quality in the upper end of the reach was poorer, with deeper water and little spawning gravel present. The top of the reach was delineated by a weir with a head loss of perhaps 1m.

Weir marking upper limit of downstream reach

Upstream of the weir, habitat quality for spawning and juvenile fish appeared less good than in the downstream reach. Despite this, trout stocks within this reach were better.

There was abundant good habitat for adult fish, including undercut banks and tree root systems. There was a good mix of shaded and more open sections of channel, allowing good growth of instream and marginal weed. There was once again a dearth of LWD in the channel, with a consequent lack of substrate sorting and scouring. Lengths of unconsolidated sediment were present on the inside of some of the bends, with the channel often overwide for the river's flow at these locations. Attempts had been made to narrow some of these sections in the past, evidenced by a line of stakes remaining in the river.

Overwide section of river

Upstream of the main access bridge crossing, the river had a relatively steep gradient, with good instream habitat. Flyboards had been installed in the channel. These had become well colonised with a variety of macroinvertebrate larvae. An automatic Environment Agency water quality monitoring station was present in this reach as a result of a number of past pollution incidents. A short length of gravel riffle had been installed by the EA in the past.

Flyboard

Further upstream, the river channel was rather uniform with limited juvenile or spawning habitat. Despite the presence of large numbers of riparian trees that were overshading the channel, there was little LWD in the channel. The riverbed was uniform and dominated by very mobile sand. There was a strong growth of Himalayan Balsam *Impatiens glandulifera* on the banks.

Land use in the upstream reach of the fishery was dominated by improved pasture. The river was shallower, with a moderate gradient. There was some local overgrazing of the banks by agricultural stock that had led to erosion of the banks in places.

3.0 Fish Stocks

No trout had been introduced to this reach of the river for more than 20 years. Stocks of trout were generally good, although numbers recorded and captured by rod and line were lower in the downstream reach below the weir, with a recent EA electrofishing survey recording only 18 trout in a 100m section. Upstream of the weir, recorded densities were considerably greater.

Numbers of chub *Leuciscus cephalus*, dace *Leuciscus leuciscus*, roach *Rutilus rutilus* and pike *Esox lucius* were also present. Pike control was undertaken on a regular basis by electrofishing, and rod and line.

4.0 Recommendations

- Trout stocks in the downstream reach below the weir were generally low. It is possible that given the poor quality of spawning gravel within the whole fishery,

downstream drift of fry from upstream spawning sites is of significance. If this is the case, the presence of the weir may prevent upstream migration of adult fish and reduce downstream drift of fry, perhaps accounting for the poor fish stocks below the weir.

It may be possible to bypass this potential spawning bottleneck by the use of a deep substrate incubation box set up below the weir. Basically, these are gravel filled boxes, approximately 0.6m in each dimension, that are filled with suitably sized gravel and seeded with trout eggs obtained from native South Wey trout. 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 head of water retained by the weir. 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*.

If this proves successful in increasing numbers of trout downstream of the weir, it would be empirical evidence of the poor quality or availability of spawning gravel in this reach.

- Additional strategies to improve spawning success in the downstream reach include:

➢ Improving the quality of the existing gravel, by mechanical cleaning annually in September. This can be achieved 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.

➢ Increasing the availability of spawning gravel, by constructing riffles from imported gravel and stone. This is a very effective but relatively expensive operation. Typically, a 15m riffle would cost in the region of £2,000 to construct. Work of this nature requires significant planning and should not be entertained without further detailed advice from the EA. It would also be of benefit to construct one or more riffles in the top meadow of the fishery.

➢ Increasing sorting of the existing riffles by the careful placement of LWD in the form of large tree limbs or trunks. This can be used to constrict the flow locally, increasing water velocity and substrate scour.

- More generally, the lack of significant LWD throughout the fishery reduced the habitat quality significantly. In low energy lowland streams, the presence of LWD is one of the few habitat features that can increase local flow velocity enough to cause scouring and sorting of the bed. Without LWD in the channel, instream habitat will remain relatively homogeneous, with a uniform layer of fine sediment present over much of the bed.

Stabilised tree root system causing localised scour in a river

Practical management options to increase LWD include making use of fallen timber in order to create simple flow deflectors by wiring/staking these to the bank. These can be used to scour relatively homogeneous riffle areas in order to sort potential spawning gravel and create deeper pools used by adult fish. These small pools can provide shelter areas adjacent to riffles during spawning periods, increasing the numbers of spawning fish. Provided that the LWD is adequately secured in the channel, there is very little risk of it posing an unacceptable local flood risk.

It is important that the EA is made aware of any adopted policy to retain LWD in the channel, in order to prevent its removal during routine management operations undertaken by the Agency.

- It is recommended that faggot bundles are installed where the channel is overwide and where there are banks of unconsolidated fine sediment on the inside of bends. Interwoven with vertically driven untreated stakes, these can be used to form a new, soft river edge. The void space between the faggots and the existing bank can be backfilled using timber brashings (brushwood) securely fixed to prevent washout.

Installing faggot bundles

Soft edged bankline constructed from faggot bundles. Note partial backfill with emergent vegetation

- Localised areas of overshading were present, most notably where a larch plantation was present on the RB. These could usefully be thinned out, reducing shading and providing a valuable source of timber and brushwood for bank revetment.

- The presence of Himalayan Balsam is undesirable. It is classified as an alien invasive weed species. There is no policy for its control on a catchment basis, with no authority having a remit to undertake this work. Despite this, it may be possible to undertake limited control of the large stands of balsam present in some areas of the fishery. Chemical control with the herbicide glyphosate when the plant is actively growing in early spring should be effective. Alternatively, the plants can be cut at

ground level before the flowering stage (June) or they can be pulled up by the roots and disposed of by composting or burning unless seeds are present.

Note that the use of glyphosate or any other herbicide on or near water requires the consent in writing of the Environment Agency.

- Consideration should be given to fencing of the upper reach of the fishery in order to reduce overgrazing by agricultural stock and consequent erosion of the banks**.**

- The present policy of pike removal may be counterproductive, with the justification for removal of pike from a trout fishery tenuous. It has never been adequately proven to be beneficial, and may, in some cases, result in an explosion of small pike that prey selectively on juvenile fish including trout.

- 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.