The Grayling Society

Habitat Advisory visit to the River Avon at Stratford sub Castle undertaken on behalf of Guy Hockley, by Vaughan Lewis, Windrush AEC Ltd May 2006

1.0 Introduction

This report forms the output of a joint Wild Trout Trust (WTT) and Grayling Society sponsored advisory site visit to the River Avon at Stratford sub Castle, near Amesbury, Wilts, on 30th May 2006. Stratford sub Castle fishery has a syndicate of 10 members.

Information in the report is based on observations on the day of the visit and additional comments provided by the landowner, Guy Hockley. Throughout the report, normal convention is followed, with right bank (RB) and left bank (LB) of the river identified when looking downstream.

2.0 Fishery Description

The fishery covered a total of approximately 1.5km of the upper River Avon, and is shown on this map http://www.streetmap.co.uk/newmap.srf?x=412870&y=132255&z=3&sv=412870,132255&st=4&ar=Y&mapp=newmap.srf&searchp=newsearch.srf .

Half of the fishery comprised a length of high-level mill channel, with a similar length of low level channel. A cross channel links the upper channel with the lower channel at the lower end of the fishery.

At the upstream limit of the fishery, a set of large undershot iron sluices controlled the flow split between the high and low level channels, with priority normally given to the former. Immediately downstream of the sluices, a short section of shallow, gravel dominated riffle, suitable for spawning of brown trout *Salmo trutta*, grayling *Thymallus thymallus* and Atlantic salmon *Salmo salar* was present. The profile of the riffle was uniform, with the gravel poorly sorted, relatively imbedded, with a moderate/high level of entrained sand and fine sediment. All of these factors are likely to adversely impact on the successful survival and hatching of salmonid eggs.

Further downstream, the channel was dominated by deep glide habitat, suitable for adult salmonids, but providing no habitat for spawning or early stages of juvenile fish.

High-level channel showing uniform deep glide habitat

The retained head of water within the channel was largely the result of the presence of a submerged culvert, through which a small LB stream was siphoned under the bed of the channel. Below this point, the gradient of the river increased, with substantial lengths of gravel dominated riffle present, with associated strongly growing stands of water crowfoot *Ranunculus* spp visible. Habitat availability for both trout and grayling in this reach was generally excellent.

The banks of this and all other reaches of the fishery were well fenced against agricultural stock with broad margins of densely growing marginal vegetation present throughout. As a consequence, diffuse source input of fine sediment from local sources is not considered a problem on the fishery.

The LB of the high-level channel was dominated by mature deciduous trees including pedunculate oak *Quercus robur,* crack willow *Salix fragilis* and ash *Fraxinus excelsior.* These were casting shade over the LB margins and central channel.

Shaded section of the high-level channel

There was little Large Woody Debris (LWD) present here or elsewhere within the fishery. The small pieces that remained provided excellent cover for fish and helped to encourage scouring of the bed immediately downstream. Where recent coppicing of a large willow had taken place, the regrowth also provided a high degree of cover.

Regrowth from recently coppiced willow

A large weir was present at the downstream limit of the high-level channel. This was understood to have been constructed during the 1960's as part of a scheme to replace and rationalise the old mill control structures. The weir divided flow between the mill leat and the cross channel linking the high and low level channels. There was a head loss in excess of 0.8m across the weir, providing an ideal location for the installation of a deep-substrate incubation box, but also creating a barrier to the upstream migration of grayling under virtually all water levels and to salmonids under low water conditions.

Retaining weir at the downstream limit of the high-level channel

The cross channel had previously been very shaded and heavily overgrown. Recent work by the owner to open it up had been very successful, with well-vegetated banks and developing stands of in-channel weed. Instream habitat quality was generally excellent, with abundant juvenile habitat for trout emerging from any incubation box

installed. There was evidence of some historic realignment of the cross channel at its confluence with the low level channel, with an old meander still visible on the RB.

A significant salmon spawning riffle was present near to the downstream limit of the low level channel, with large redds observed during recent winters. The very straight planform of this section of the channel appeared to have been the consequence of past physical alteration, with the more upstream length having a more meandering course. Physical habitat within the channel was again generally excellent, with a relatively steep gradient, and adequate amounts of shallow spawning/juvenile gravel.

The upper end of the low level channel was slightly wider. It had been subject to a major enhancement scheme during the last 10 years. The work was undertaken by a fishery contractor, in conjunction with local fishery interests. It entailed significant narrowing of the channel using faggot bundles and chalk infill to create a variety of features, including a walkway for anglers. The wetted channel behind the walkway provided habitat for a range of wetland species and a valuable low velocity refuge area for fish during high flows.

Whilst much of the work had established successfully, high flows following construction resulted in the partial failure of the structures. As a consequence, only the vertically driven wooden stakes remained in some sections of the river, with the faggot infill having been washed out. Opportunities exist to repair the damage to this pioneering work.

3.0 Fish stocks

Moderate stocks of wild brown trout and grayling were present in the fishery. Additional stocking with between 100-150 12”-13” hatchery reared brown trout was undertaken annually. The syndicate generally practised catch and release in order to preserve stocks of trout and grayling. The removal of grayling, undertaken as part of the management of the fishery before the syndicate took over, has now ceased and this species forms an important part of the sporting and ecological enjoyment of the fishery for the syndicate.

Atlantic salmon regularly spawn in the fishery, while numbers of mixed coarse fish including dace *Leuciscus leuciscus*, chub *Leuciscus cephalus* and roach *Rutilus rutilus* were present. Some pike *Esox lucius* removal has been undertaken by electrofishing.

4.0 Recommendations for enhancement

- The installation of faggot bundles along selected sections of the channel, particularly on the inside of bends, would both encourage the rapid development of a vegetated margin and the narrowing of the channel. It is recommended that faggot revetment should only be installed where the bed profile adjacent to the bank is shallow. In some sections, the vertical driven poles remain from the original enhancements. It would be a simple and desirable process to reweave a mix of deadwood faggots and live willow wands (from on-site coppicing) between the stakes, reforming the previous line of the revetment. Where no pole line is present, the interface between clean bed gravels and deposited silt provides a good indication of where the faggots should be installed.

Subject to ensuring that nesting birds are not disturbed, it is recommended that the installation of faggot/willow revetment and construction of islands is undertaken during the early summer period, in order to allow adequate time for vegetative growth to stabilise these structures before they are subject to high winter flows. The area between the newly established bankline and the old bankline should be infilled with brushwood bundles, tied or wired in place to prevent wash out. 'Turves' of sedge *Carex* spp., reed canary grass *Phalaris arundinacea* or reed sweet grass *Glyceria maxima* could be introduced over the faggot bundles in order to increase the stability of the structures, and enhance their ecological value.

Localised narrowing of another stream using faggots

- An alternative to narrowing from the banks is the construction of small, mid-stream islands. These would be particularly appropriate in the wider sections of the low-level channel. Benefits of island construction include the creation of refuge areas for animals and plants. Remote from human disturbance and grazing, they may support different plant communities compared to more accessible banks. Some criticism of the construction of islands in small chalk streams has been received from geomorphologists, who note that the natural occurrence of such features naturally is unusual in these low energy environments.

Islands can be created from a range of materials, including faggot bundles, and coir fibre rolls retained by wooden stakes and infilled with either locally derived granular soil or brushwood bundles. It may be necessary to protect the upstream toe of the island from erosion using loose stone ('rip-rap'). Size of the islands can be varied, but should generally be in the range 2m-4m width, with length between 4m-8m.

- Whilst there was some LWD present within the channel, there were opportunities to encourage a controlled increase in the amount of this valuable material. Measures to increase LWD should focus on the provision of cover logs in marginal areas by the simple expedient of trimming small to medium sized trees to an acceptable size and then felling them into the river channel. They can then be pinned into position using driven wooden stakes. Stable LWD of this sort is of particular long term value, allowing the build up of weed/debris rafts and associated beneficial

macroinvertebrates that are vital components of the energy cycle of river systems. Sediment accreting within and downstream of LWD will eventually be colonised by emergent vegetation, helping to narrow the river channel. Weed raft/ fallen tree complexes also provide excellent cover for adult fish. As with other habitat management techniques the objective is to provide a variety of robust and diverse habitat. Subject to any overriding water quality and quantity issues, given an appropriate variety of available habitat trout, grayling and all other associated species will thrive in a naturally base-rich river such as the Avon.

- It is also recommended that there should be a presumption against the removal of any naturally fallen timber. Such material can be pinned in place as described above with all the associated advantages stated. Advice relating to the management of LWD in the channel is predicated on the assumption that its retention does not cause any increased risk of damaging flooding. This risk should be assessed in conjunction with the EA's Development Control and Flood Risk Management departments.

- A potential source of semi-natural fish could 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. Alternatively, fry emerging from the box can be captured in a small box trap and distributed into suitable habitat throughout the fishery.

In effect, they are naturally reared fish without the unhelpful behavioural modifications associated with hatcheries. Such a system could be established using the weir at the downstream end of the fishery. Provided that the Environment Agency agree that its use accords with their policy for the river under their Trout and Grayling Fisheries Strategy, a box could be utilised to reduce the need for stocking with takeable hatchery reared fish. It would be useful to discuss the matter with Dr Allen Frake at the EA's Blandford Office. Details of the supply of suitable boxes can be obtained from Andy Thomas, Fisheries Technical Specialist, at the Coulden Common Office, Southern Region EA. (08708 506506). 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*.

Setting up a deep substrate incubation box

‘Colander’ incubators

Simpler incubators can be constructed using shop bought colanders attached to concrete slabs. These are filled with gravel and around 250 brown trout eyed ova and placed on the bed of the river in shallow water. The flow through the colander

incubates the eggs. Once hatched out, the swim up fry leave the colander via the holes. Deployment of these throughout the fishery offers another simple way to boost stocks of trout.

- The present policy of wading significantly reduces the amount of bank maintenance required for angling. This allows the development of densely vegetated banks, valuable for both trout and general habitat considerations. It is important that excessive wading does not take place in shallow areas between October and March, as trout and potentially salmon eggs will be present in the gravel. These can easily be damaged by mechanical shock. Similarly, excessive wading in April and May could potentially affect spawning grayling adversely.

- Finally accurate records of catches and fishing effort always enhance the management of fish stocks. Building up a consistently recorded measure of fishing pressure and the size and numbers of all fish taken and returned will provide not only a good means of determining the success of any future changes to the management regime as well as a useful source of information should factors elsewhere in the catchment ever impact on the fishery. All anglers should be asked to record their fishing with a simple measure of time spent on the river, catch by species and size and date.

- 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. It is possible that a single consent could be granted for a range of simple enhancements to the site. 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 recommended that advice should be obtained from Allen Frake, EA SW Region, Blandford Forum, prior to applying for Land Drainage consent or consent to install an incubation box.

5.0 Disclaimer

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