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Habitat Advisory visit to the River Swift, Warwickshire, sponsored by Orvis and undertaken on behalf of Warwickshire Flyfishers by Vaughan Lewis, Windrush AEC Ltd
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1.0 Introduction

This report forms the output of a site visit to the River Swift, Warwickshire on 22nd March 2005 on behalf of Warwickshire Flyfishers (WFF). The visit was sponsored by Orvis as part of their continued support for the preservation and restoration of wild trout fisheries in the UK. Information in the report is based on observations on the day of the visit and additional comments provided by John Burton, secretary of the club. WFF has a membership of approximately 90 members, with a mix of Stillwater and river fisheries in the Midlands.

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 River Swift was a small, clay based tributary of the River Avon, flowing in a roughly southerly direction form near Gilmorton before joining the Avon at Rugby.

The downstream limit of the fishery was near to the village of Churchover, with the A5 at Bransford Bridge, the upper limit. A large automates sluice gate was present at the downstream end of the fishery. The gate's function was to divert and prioritise water along a LB channel that fed the Oxford Canal during times of lower flow, allowing the navigation to continue to operate.

Automated sluice at downstream fishery limit. Note canal feeder to the left of the picture

Immediately downstream of the sluice was an Environment Agency (EA) gauge weir that effectively prevented upstream migration of fish.
On the day of the site visit, the sluice was fully open. In combination with low winter rainfall, this had resulted in a drop in upstream water level of some 30cm.

River Swift upstream of sluice. Note the exposed margin of the river, as a result of draw-down from the raised sluice and lack of rainfall during winter 2004/05

Crayfish burrows were noted in the banks along the whole reach. These were likely to have been excavated by signal crayfish *Pacifasticus leniusculus.*

The river had a meandering planform, but was over-wide and deeply incised, with evidence of past dredging activity having taken place, in the form of banks of deposited spoil evident on the banks. The downstream section had a moderately uniform channel cross-section, with little gravel or stone substrate. The short riffle and shallow glide sections present had a clay dominated substrate. Flows in the river were low, as a result of very limited winter rainfall. However, significant rainfall events can lead to very large fluctuations in water level, with the clay catchment resulting in very 'flashy' flows.

The over-wide nature of the channel and it low summer flows had, in combination, resulted in heavy growth of emergent vegetation, including reed canary grass *Phalaris arundinacea*, sedge *Carex* spp. and common club-rush *Schoenoplectus lacustris*, and yellow lily *Nuphar lutea.* In many places, the channel becomes totally occluded during the summer, preventing access for angling. Water vole *Arvicola terrestris* were still present on the River Swift, although the presence of mink *Mustela vison*

may compromise the long-term viability of the population. There have also been sightings of Otter *Lutra lutra* in the river.

Both LB and RB were managed as improved pasture with short sections of local erosion of the bank apparent as a result of agricultural stock poaching.

There were few trees or shrubs on the banks, with the result that both channel shade and Large Woody Debris (LWD) were limited. Instream cover was mainly provided by the extensive beds of emergent vegetation and the presence of large numbers of deeper pools.

Typical section of lower reach of the fishery, showing emergent vegetation and LWD

There was an extensive field drainage network in place, exacerbating both the rapid run-off of surface water and the consequent low flows experienced during the summer.

Water quality in the river is believed to be good, with hatches of upwinged flies noted during the season.

In the middle reaches of the river, stands of Water crowfoot *Ranunculus* spp were present, despite the paucity of gravel substrate.

Stand of water crowfoot in the middle reach of the river

There was clear evidence of recent dredging of the river in the very recent past, with deposited spoil evident on the bank. A small copse had also been planted adjacent to the river in the middle reach, providing welcome cover and shade.

Mid-channel islands had formed as a consequence of past dredging, bank collapse and growth of emergent vegetation. Deep pools were present between the shallower, riffle and glide habitat.

Towards the upper end of the fishery, there were increasing amounts of fine gravel. RB land use changed to arable cropping, with the land having been ploughed to within 2m of the bank top. The upper fishery had even less tree growth, with a very open aspect. Well-consolidated marginal berms were present in places, helping to narrow the channel, producing well-defined riffle habitat.

3.0 Fish stocks

The river held stocks of mixed coarse fish, including chub *Leuciscus cephalus*, roach *Rutilus rutilus*, pike *Esox lucius* and perch *Perca fluviatilis*. In addition large numbers of stone loach *Barbatula Barbatulus* were also known to be present. An average of 20 adult pike are removed annually by rod and line fishing, with fish up to 4 kg having been caught. He club allows fishing in the winter for coarse fish, with members having caught roach in excess of 1 kg and perch in excess of 1.5kg.

There has been very little evidence of significant recruitment of wild spawned brown trout, with only a few redds observed towards the upstream end of the fishery.

Numbers of small fish caught on rod and line and during electrofishing surveys were apparently low.

The club stocks annually with 200 brown trout with an average weight of 250g. Fish were stocked during late February 2005.

4.0 Recommendations

- At present, British Waterways is allowed to abstract an unconstrained volume of water for navigation purposes. However, the provisions of the recently adopted Water Act, 2004, will ultimately place a volumetric limit on the abstraction. No action need be taken by the club, but the situation with respect to abstraction for the Oxford Canal should be restricted in the future.

- The EA gauge weir acted as a barrier to upstream migration of fish. It might be possible for the EA to retrospectively install a fish pass to the weir. However, this would be an expensive and relatively complex operation, and is likely to have a low priority with the EA.

- The growth of the emergent weed is very extensive during the summer months, largely as result of the previous heavy dredging undertaken, which has resulted in an over-deepened channel and an associated reduction in water velocity. Removal of all of the weed is not practical or 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 and all other approved herbicides approved for use in and adjacent to watercourses.

- Stock fencing should be installed at locations where local damage is apparent on both banks. This will both reduce the poaching of the banks and allow the development of a riparian tree fringe. However, it should be understood that the removal of grazing pressure would increase the maintenance liability of the club if adequate access is to be provided to the fishery for anglers.

- Targeted planting of riparian trees would be of great long term benefit, both to the general ecology of the river and more specifically, by providing increased shading of the channel which would help to restrict the growth of emergent vegetation. Long-term management of the trees would involve coppicing/pollarding to maintain dappled shade. Any trees planted would need to be protected from grazing stock as well as rabbits and hares

- 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.

The report also provides recommendations for the management of LWD, the most important of which is "although there are certain situations that may require wood removal to eliminate stream blockage, the wisest management is no management". Building on this simple truism, it is recommended that before any future work to remove LWD from river channels is undertaken, the wider implications of the proposal on the whole river system are considered, rather than just the potential (in many cases unproven) benefits to salmonid populations. In addition, the impact of planned riparian tree work on the supply of LWD to the river should be considered. In some circumstances, it may be beneficial to allow trees to fall into the channel, provided the risk of increased flooding is acceptable.

- If it has not already done so, the club should endeavour to obtain and archive data on its fishery. As a minimum, details of the following should be obtained from the EA:
  - Results of electrofishing surveys undertaken either by the EA.
  - Results of macroinvertebrate monitoring
  - Water quality data for the river
  - Details of abstraction, both surface water and groundwater, from the catchment

- The removal of pike with rod and line will be size selective, with larger fish more susceptible to capture than smaller individuals. As a consequence, there is a risk that numbers of small pike could increase in the absence of controlling cannibalism. This is not a significant issue if natural recruitment of brown trout is poor. However, if habitat enhancements are undertaken in order to improve brown trout recruitment, some research suggests that predation by elevated numbers of small pike may be a

significant issue. Consideration should thus be given to the cessation of the pike culling policy if steps are taken to improve numbers of wild spawned brown trout.

- Consideration should be given to a concerted and long-term programme of mink trapping. This would not only reduce predation on fish stocks in the river, but would also help to protect the vulnerable population of water voles in the river. Use should be made of the mink tracking rafts popularised by the Game Conservancy Trust. These rely on a mix of sand and clay to monitor movement of mink through floating rafts. Once the presence of mink is detected, a live trap is placed in the tunnel, the mink captured and shot. Details of the raft and trapping techniques are provided at http://www.gct.org.uk/

- The relative paucity of shallow, gravel dominated riffle habitat was probably limiting recruitment of brown trout to the fishery, with very restricted sections of habitat suitable for both spawning and juvenile lifestages. Addressing this deficit would be relatively expensive, requiring the introduction of imported gravel of a size suitable for spawning trout. One possibility would be to consolidate the small islands of emergent vegetation that were present throughout the fishery using faggot bundles, placing gravel in the faster flowing channels created on either side of the island. This would create short sections of flow dependent spawning habitat for trout and chub. The section of channel below the old mill would also be suitable for gravel enhancement, as it had an appropriately steep gradient.

- The over-wintering success of stocked fish is known to be poor. Given this fact, it makes sense to stock with larger (takeable) fish in order to optimise angling returns from stocked fish. In addition, it is recommended that stocking dos not take place before April, with fish trickle stocked throughout the fishery to prevent the 'shoaling up' that is a trait of hatchery reared fish that increases their vulnerability to poaching and predation.

- If adequate enhancement was undertaken to improve the abundance of gravel and hence spawning/parr habitat in the river, then it would be possible to make use of deep-substrate spawning boxes in order to boost stocks of trout fry. 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 or, probably more usefully, caught in a fine meshed box and distributed around the fishery. In effect, this system produces 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.* One or more could be sited in the fishery, perhaps at the mill near the fishery's upper reach using the head loss over the structure to drive the box.