River Avon (Bristol) – Sommerfords Fishing Association

An advisory visit carried out by the Wild Trout Trust – March 2012

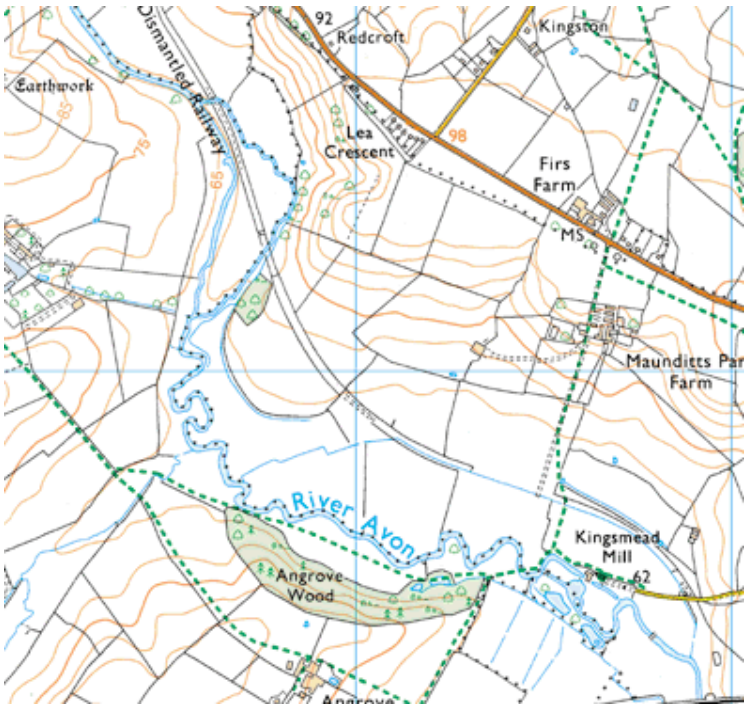
1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on a stretch of the River Avon on waters controlled by the Sommerfords Fishing Association. The club has approximately 11Km of fishing but the advisory visit was restricted to the top beat, above Kingsmead Mill NGR ST 956844.

The request for the visit was made by Mr. Ian Mock, who serves on the club committee and is the club's Treasurer. The Sommerfords FA manages the Avon as a mixed fishery, where the emphasis is mainly on coarse fishing. The club undertakes some trout stocking on the 1km reach downstream of Kingsmead Mill, with an annual introduction of approximately 300 triploid brown trout. The top beat is not stocked and the members target both wild trout and coarse fish from this section. There is concern that results from the top beat have been in decline in recent years and the club is keen to explore opportunities to improve habitat for flow-loving, gravel spawning fish species.

Comments in this report are based on observations on the day of the site visit and discussions with Mr. Mock.

Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.



Sommerfords FA beat above Kingsmead Mill

2. Catchment overview

The upper Bristol Avon rises east of the town of Chipping Sodbury in South Gloucestershire, just north of the village of Acton Turnville. Flowing in a somewhat circuitous path, the river drains east and then south through Wiltshire. At Malmesbury it joins with its first major tributary, the Tetbury Avon, which rises just north of Tetbury in Gloucestershire. Upstream of this confluence the river is sometimes referred to as the 'River Avon (Sherston Branch)' to distinguish it from the Tetbury Branch.

After the confluence, the Avon flows south east away from the Cotswolds and then quickly south into the clay Dauntsey Vale, where it flows on due south towards Chippenham and beyond.

The underlying geology varies considerably but is predominantly clays, with sand and gravel deposits in the Somerfords area. Base flows in the Tetbury Avon are derived from the Oolitic limestone aquifer located in the south west corner of the Cotswolds plateau. Water derived from this limestone source promotes generally productive river fisheries and is sometimes characterised by giving the water a distinctly turquoise hue under low flow conditions.

The Avon system is heavily abstracted for public water supply. The Avon Catchment Abstraction Management Plan (CAMS) indicates that there is “no water available” for further abstraction and it is understood that the river suffers from low flows in the Malmesbury area due to abstraction pressures.

The Water Framework Directive classifications for the Avon are set out in the table on page four. It is understood that the Avon is failing its targets for achieving Good Ecological Status (GES) due to high phosphate and diatom levels. It is planned that the river will meet 2015 targets for achieving Good Status.

R Avon (Brist) conf Tetbury Avon to conf R Marden			
		View data	
Waterbody ID	GB109053027650		
Waterbody Name	R Avon (Brist) conf Tetbury Avon to conf R Marden		
Management Catchment	Bristol Avon and North Somerset Streams		
River Basin District	Severn		
Typology Description	Low, Medium, Calcareous		
Hydromorphological Status	Not Designated A/HMWB		
Current Ecological Quality	Poor Status		
Current Chemical Quality	Good		
2015 Predicted Ecological Quality	Good Status		
2015 Predicted Chemical Quality	Good		
Overall Risk	At Risk		
Protected Area	Yes		
Number of Measures Listed (waterbody level only)	-		

Summary of WFD information for the reach at Great Sommerford

3. Fishery overview

The SFA has a stated aim of providing high quality coarse and trout fishing for their members in a peaceful and litter free environment. The club has a number of managed stillwater coarse and game fisheries. Management activities and angling pressure on the river beats are light, particularly on the top beat, which is the subject of this report.

4. Habitat assessment

The river upstream of the Kingsmead Mill is very heavily influenced by the large impounding weirs (photo1) located at this site. It was not possible to closely inspect the structures but it is assumed that there are no fish passes, or bypass channels. The lack of any usable access route for fish isolates the top beat from fish wishing to migrate upstream. Fish species such as trout, barbel and dace are known to migrate significant distances upstream to find high quality habitat for spawning and then drop back downstream after spawning. Juvenile fish will be washed downstream over the weir, particularly following summer spates with no hope of re-colonising sections upstream. The lack of connectivity is an issue for many rivers and is one that is usually flagged up in local River Basin District Management Plans.

Upstream of the weir, the river does have a gently meandering planform. However, any natural variations in river bed topography are completely drowned by the impounding effect of the weir, resulting in long, slow, deep glide habitat (photo 2) dominating the first kilometre of channel. It was not possible to see the river bed but it is highly likely to be predominantly soft deposited sediments. Opportunities for enhancing this lower section of the top beat are dependent upon modifications to the weir, either simply through management of hatches or gates, or via a capital project to modify or remove the structure altogether. This issue is discussed further in the conclusions section of this report.

Photo 1. Kingsmead Mill (main weir)

Photo 2. Hundreds of metres of deep glide upstream of the weir. A poor environment for flow-loving fish species such as barbel, trout and dace.

Further pressure is put on the river from arable land use (photo 3) adjacent to the LHB, also visible in photo 2 above. It appears that some of these meadows are now seeded for permanent pasture but they may well be part of a crop rotation scheme which extends in places to virtually the top of the bank. Some narrow uncultivated buffer strips between the top of the bank and the edge of the fields exist, however, they are far too small to be of any significant value. Wide buffer zones are critically important for filtering out nutrients, for preventing excessive sediments reaching the river and for bank protection during out-of -bank flood events.

The lower part of the reach is also characterised in some sections by the lack of valuable riverside trees. The poplar plantation in the background of photo 2 provides some shading but long sections of the channel were devoid of valuable low level cover and the associated areas of refuge afforded by submerged branches and root systems.

Native riverside trees such as goat willow (sallow), or thorns provide superb cover from predators when allowed to grow into the channel margins. The fibrous root systems of willow are often selected as a spawning medium by species such as roach and perch and trees such as alder and ash provide strong root systems that tie together soft banks and provide superb cover for fish.

Photo 3. A recent maize field reseeded for pasture. Note the vulnerable top soils within a couple of metres of the river

The characteristics of the river change dramatically a short distance upstream, where the influence of the weir is lost. In this section the physical form of the channel is much more natural with a meandering planform and distinct variations in channel shape with deeper pools, shallower glides and the occasional broken riffle evident.

Bankside cover throughout the middle and upper reaches is much more luxuriant and fish-friendly with good examples of valuable marginal trees (photo 4) and fallen large woody debris (LWD) having been left in the channel. Both large and coarse woody debris are critical components of good river habitat. Leaving as much material in the channel as possible helps to promote active river bed scour, sorting of spawning gravels, the provision of safe predator-proof lies and a primary source of food for many grazing invertebrates. The banks of the Avon are often soft and friable and leaving fallen trees without any intervention may cause some bank erosion (photo 5). In such cases, whole trees, trunks, or large branches can be moved, re-positioned and secured to promote bed scour rather than bank erosion. Indeed woody debris can be used to protect banks from erosion as well as provide habitats for fish. If woody debris is causing an issue the key message is ‘move it but don’t remove it!’ Photo 6 shows a good example of where fallen woody debris is likely to create some excellent habitat.

Photo 4 A great example of a sallow providing superb habitat and also acting as a flow deflector

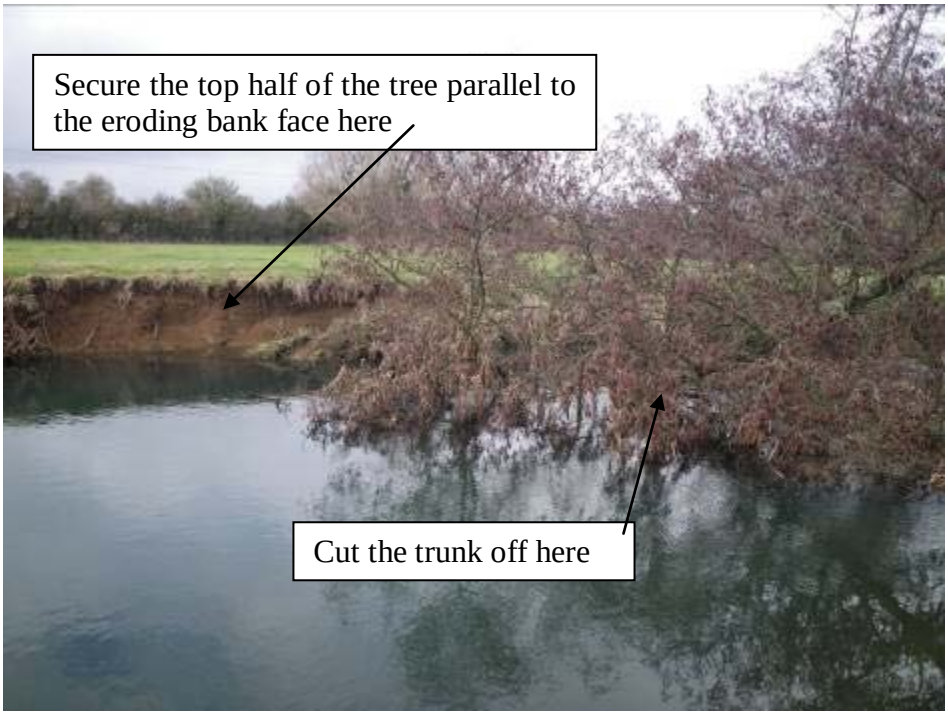


Photo 5. A fallen tree promoting a back eddy which is eroding the bank.

Photo 6 Valuable habitat

Emergent in-channel reed growth is obviously very luxuriant in many sections (photo 7). The common club rush *Schoenoplectus lacustris* (sometimes referred to as pipe reed) can be a bit of a thug on some systems. These plants are known to thrive in clay catchments on rivers with a firm gravel bed and can be rampant when conditions suit. Clumps of reed that act as cover and natural flow deflectors are of benefit but careful management is required to make sure that the channel is not completely clogged, causing the river to back up, potentially drowning valuable upstream habitat. Without wishing to state the obvious, excessive reed growth can make render fishing extremely challenging!

Long-term solutions for excessive reed growth include tree planting and reducing the river's nutrient input. The fishing club is obviously not able to tackle this issue alone but planting willows to provide additional shading is an easy and practical first step. Managing a self-cleansing channel through extensive beds of reed will require some measure of control. Club rush can be controlled with an approved contact herbicide but should only be applied by a licensed contractor with EA consent. Alternatively root systems can be grubbed out using a modified plough and winch. I should stress that the goal is to maintain a narrow self-cleansing channel, especially where the reed beds might be causing bank erosion issues and not to remove all of the plants, the majority of which promote good habitat.

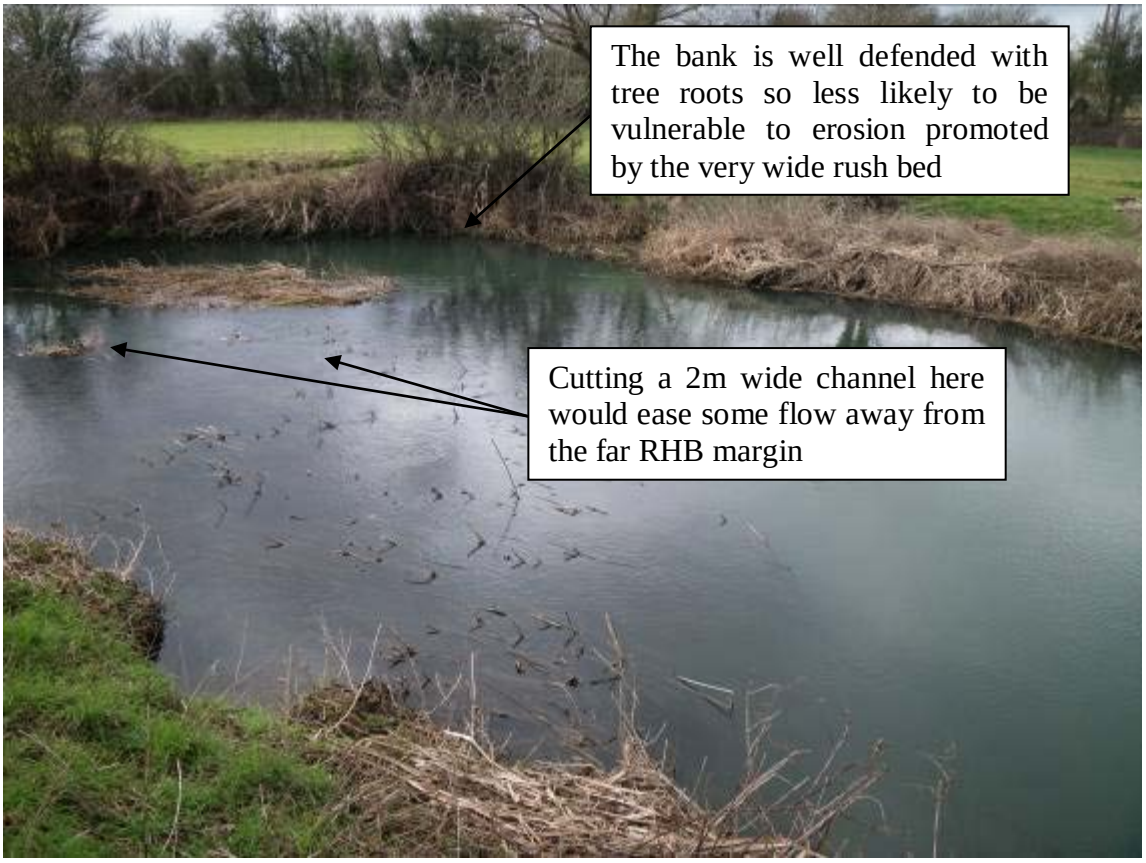


Photo 7 An extensive rush bed that may require some future management.

Shallow spawning glides and broken riffles were present but only represented a very small percentage of the total length of river. The reach as a whole is well provided with deep, well-covered pool and glide habitat, which is ideal for a wide range of adult coarse fish as well as adult trout. Gravel for spawning is limited and this may well be suppressing the production of barbel, dace, trout and even chub populations. Lowering, or removing the downstream impoundment could substantially increase the amount of available spawning and nursery habitat found in this top beat.

A few short sections of high quality spawning habitat do exist (photo 8) but may not be enough to sustain adequate recruitment for the reach as a whole. An additional problem is often gravel size and compaction. Rivers driven from limestone springs are often blighted by deposits of calcium carbonate (tufa) which act like cement (photo 9) and physically glue the surface crust of gravel together. When gravels become cemented and compacted it is extremely difficult for gravel-spawning fish such as trout to excavate redds and for coarse fish to utilise the natural gaps and crevices found in loose, well-aerated gravels beds. Over time shallow gravel glides can become very flat and hard and ultimately poor as a spawning habitat. Measures to address this problem can be easily taken and are described in the conclusions section of this report.

The real key to making habitat function for fish is also to create and link habitats together. Creating a suitable spot for trout, or barbel to spawn is only a small element of what is needed. Juvenile trout also need very shallow, well-covered margins and, as they grow, some shallow broken riffle habitat with plenty of larger stones, especially where weed growth is poor or non-existent. Beds of

submerged plants, such as water crowfoot *Ranunculus spp.*, can provide superb juvenile trout habitat in lieu of broken riffle over larger stones and cobbles. Coarse fish fry once hatched, on the other hand, will gravitate towards slack, shallow margins where flows are low or minimal. They rely on areas where shafts of light warm the shallow bed to promote production of their preferred food - initially a supply of planktonic organisms. Very shallow bays and back waters are therefore essential for coarse fish production. The closer these habitats are to the point of spawning then the lower the fry mortality will be, especially if these habitats are freely available and extensive in area. A lack of "joined up" habitat is often a key bottleneck on many river systems and the Avon would appear to be no exception.

Photo 8. A "fish factory" on the Sommerfords FA top beat

Shallow tapering margins on the inside of bends and old connected back waters are essential habitat in maintaining adequate holding areas for coarse fish fry. Without such habitat, any significant summer spate may well result in washing out a very high percentage of any single year of coarse fish production.

The club should be seeking to identify suitable areas to develop improved spawning and juvenile holding habitats. One such site that could be enhanced is the loop in the channel which leaves the main river near the top of the beat and rejoins further downstream. Currently, this back channel is heavily silted up and

has no significant flow and limited habitat suitable for augmenting stock for the main river.

There are several options worth exploring. The first is simply to desilt the back channel and try and encourage more flow via this route. There are a number of problems to consider, not least of which is that by sending more water via this route there will be a diminished flow in the section of adjacent main river. This is a problem because this top section of main channel supports some of the better quality spawning habitats and any reduction in flow will reduce productivity in the main channel.

The back channel consists of a significantly longer section of channel than the main river section that it bypasses and therefore it will have a reduced gradient and less capacity to form high quality spawning habitat for flow-loving fish species. If dredged and a sweetening flow maintained, it might function as a habitat for species such as roach, perch and pike but will not be particularly valuable for dace, chub, trout or barbel due to the lack of gradient. It should also be remembered that it has silted up and therefore will probably do so again unless the bed level is raised in the main channel to force more water via this route. Dredging the whole channel out would be unsustainable, ecologically damaging and very expensive.

There are options, however, for developing the back channel so that it does provide some habitat likely to benefit local fish communities by plugging the central section (photo 9) so that the channel becomes in effect two, connected oxbows. The top (photo 10) and bottom connections with the main river could be deepened and widened with a machine to create two significant backwater features. The banks could be battered back to create an ideal shallow shelving margin, perfect for summer fry and the backwaters would also make excellent winter refuge for many coarse fish during big winter flood events.

Photo 9. Central section of the backwater where the channel has virtually filled in already

Photo 10. The entrance and exit to the backwater could be substantially enlarged to create two large backwater habitats ideal for summer coarse fish fry and provide improved winter holding habitat.

Photo 11 Backwater confluence with the main channel.

Any connected backwater will be prone to settling sediments and will require periodic maintenance (every 3 to 5 years) to keep the habitat in optimum condition. Connected backwater habitats on many of our rivers are rare habitats and are often not recognised as being crucial for maintaining healthy populations of coarse fish.

5. Conclusions

The impact of the hatches at Sommerfords weir on upstream habitat quality and fish connectivety cannot be over stated. Options for reducing the impacts should be explored with the EA and Mill owner.

The top beat of the Sommerfords FA beat of the Bristol Avon supports a variety of high quality habitats suitable for both coarse and game fish species. The extent of spawning and nursery habitat for gravel-spawning fish is quite limited and it will be important to ensure that those shallow glides that do exist are managed to ensure that gravels are kept in good condition. Improved spawning success can be achieved by pegging in sections of LWD onto shallow glides (photo 12) to promote local bed scour and sorting of gravels. Another option is to physically break up the concreted crust of the gravels on each shallow glide with fencing spikes and vigorously raking 3 or 4 sections of 2-3m^2 in area. This will also help to provide good “silt free” areas perfect for spawning. This work should ideally be carried out in September or October when the gravels are not utilised for spawning.

Photo 12. A section of tree trunk pegged at right angles to the flow to promote score of bed gravels and improved spawning opportunities for spawning.

On one long section of potentially good trout juvenile habitat (photo 13) there is a chronic lack of marginal cover. This could easily be rectified by securing a line of whole felled thorn trees or large brash bundles layed into the margins and wired, or cabled to the odd driven post.

Photo 13. Habitat for fry could be provided by introducing brash cover into the RHB margin

In some sections there is plenty of high quality marginal tree cover. In one or two areas (photo 14), the odd tree could be hinged into the margins to create fantastic predator-proof cover and also provide a living flow deflector that will locally sweep sediments away from the central river bed locations.

In others areas tree cover is quite sparse and the river would benefit from planting the occasional sallow at water level to promote low scrubby cover. Willow species can be easily harvested by cutting stakes or whips from local live trees and simply pushing them into soft bankside areas, ideally cranked over at an angle to grow out and over the water, rather than up and away from the river.

Negotiate with the adjacent land owners for wider buffer zones between the top of the river banks and the edge of fields and meadows. Currently the river is failing WFD targets for phosphates and actions to improve diffuse pollution are a priority.

The provision of improved habitat for juvenile fish is a priority. The backwaters that join the main channel represent an opportunity to develop the entrances as significant sized habitat features, capable of sustaining large numbers of coarse fish at key times during early life stages and following spate conditions.

Photo 14. The left bank tree cover provides opportunities for folding in the odd hinged tree to create improved habitat within the channel.

Photo 15. Sensitive management of fallen trees is essential.

6. Recommendations

- Explore options with the EA and Mill owners for modifications to the operation and management of the weir structure a Kingmead Mill.

- Open up a dialogue with the local land owner to negotiate wider buffer zones between the banks and cultivated meadows.

- Look at options for the provision of shallow backwater habitat at the mouth of joining backwaters.

- Use hinged trees or tethered brash bundles installed in the margins, especially in the margins of shallow runs to provide enhance winter cover.

- Implement a programme of gravel enhancements by pegging in sections of LWD to promote local bed scour and breaking up of the gravel crust with fencing spikes or gravel cleaning pumps.

- Keep control of invasive in-channel emergent plants by cutting narrow channels to avoid any "back up" effects.

- Undertake sensitive management of fallen woody debris and use it to create enhanced in-channel habitats.

- Consider tree planting on the open impounded sections of the lower reach.

It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking those works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require a land drainage consent on any river designated as "main river". Advice can be obtained from the EA's Development Control Officer.

7. Making it happen

There is the possibility that the WTT could help to start an enhancement project. We could potentially help to draw up a project proposal (PP) which could be used to support any application for Land Drainage Consent. The PP might also be used as a document to be shared with potential partners as a vehicle for raising project funding.

Alternatively, physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). This approach is probably more

appropriate for works to the side carriers. PV's typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams to obtain on the ground training regarding the appropriate use of conservation techniques and materials, including Health & Safety, equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

Recipients will be expected to cover travel and accommodation expenses of the contractor.

There is currently a big demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources. The Trust is always available to provide free advice and help to clubs, syndicates and landowners through guidance and linking them up with others that have had experience in improving trout fisheries.

Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programmes.

Disclaimer