



## River Avon (Devon) – Avon Fishing Association



An advisory visit carried out by the Wild Trout Trust – April 2011

## **1. Introduction**

This report is the output of a Wild Trout Trust advisory visit undertaken on waters controlled by the Avon Fishing Association on the River Avon in Devon. The advisory visit was undertaken at the request of Mr. John Roberts who is a serving committee member of the club.

The AFA manage approximately 6 miles of fishing on the Avon at various locations from South Brent to Knap Mill, which is a short distance above the tide near Aveton Gifford.

The fishing club is very much reliant on wild trout production and enjoys fishing for both resident and migratory trout (*Salmo trutta*) and they are keen to ensure that local trout habitat is maintained in optimum condition.

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

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.

## **2. Catchment overview**

The Avon rises in the southern half of the Dartmoor National Park in an area of bog lying to the west of Ryder's Hill. A dam was built in 1957 close to where the river leaves Dartmoor to form the Avon reservoir. After leaving the moor the river passes through South Brent, Avonwick and Aveton Gifford and then flows into the sea at Bigbury on Sea.

The Avon has a reputation of being an excellent brown trout fishery and also supports a substantial run of migratory trout as well as a significant salmon (*Salmo salar*) run.

## **3. Fishery overview**

The AFA membership comprises of 60 mainly local members who fish the river using fly only for trout, sea trout and salmon. Although spinning is permitted on the very bottom beat, the club is mainly orientated towards fly fishing tactics for wild fish.

Maintenance of the river is very low key and has been mainly focused on maintaining access for rods to ensure that the river is in fishable condition, rather than any specific habitat management aimed at supporting or improving the stock. Recently the Association has reviewed their maintenance works and

have undertaken some work using fallen woody material to protect vulnerable soft margins from excessive erosion and provide some additional habitat for fish.

#### **4. Habitat assessment.**

The most critical influence on any spate river is the nature and use of the valley through which the river runs. First impressions of the catchment suggest that the Avon is blessed a “fish\_friendly” catchment. Small, lightly grazed meadows interspersed with blocks of deciduous broad leafed trees provide an ideal buffer for the river against diffuse pollution pressures.

The upper reaches of the Avon above South Brent feed off the southern edge of Dartmoor and it is believed that there are no serious land care issues directly impacting the Avon from this area. The town of South Brent is a sizeable community and presumably the pressure on the local waste water treatment works grows during the busy summer period, when the population of the area swells. Some local monitoring of water quality below the town and possibly the A38 road bridge through a programme of simple aquatic invertebrate monitoring is recommended. This is explored in more depth in the Conclusions section of this report.



A typical Avon valley scene. Small, low density grazing meadows interspersed with blocks of deciduous woodland. A “river and fish friendly” valley

#### 4.1 Kerrydowns beat

The first section inspected was the Kerrydowns beat (cover photo) which starts a short distance below the A38 road bridge and flows south, picking up the Glaze Brook tributary.

The river here runs down a comparatively steep gradient over a substrate mainly composed of outcrops of hard Devonian sandstone and granite. Large boulders and cobbles are plentiful and provide excellent parr cover on the numerous shallow glides, while the "mini" gorge type pools create wonderful lies for adult salmonids. The whole reach affords a good balance of light and shade, with a range of mature broad leafed trees providing the shade regime which looks to be very near to ideal. Shading will be particularly important during comparatively dry years, when the flows will rapidly drop away. Keeping suitable holding pools cool will be of paramount importance for salmonids under such conditions.

Halfway down the beat the Glaze Brook joins the RB. This stream appears to be a very important spawning and nursery stream. Sea trout in particular are known to prefer small tributaries for spawning rather than main stem sites. The protection and welfare of tributaries such as the Glaze Brook are therefore of fundamental importance to the overall quality of the fishery. It is recommended that this stream, and other spawning tributaries, are walked every autumn to ensure that there is free access for migrating fish. It is rare for large debris dams to completely block upstream access for migrating salmonids but it is wise to periodically walk the tributaries just to make sure. Fallen trees and large woody debris are an essential component of trout habitat and therefore should not be removed unless absolutely necessary. If a debris dam has formed and the bed of the river upstream has re-graded so that there is a significant difference between the upstream and downstream bed levels (greater than 300mm) then easing the odd log out of the way to allow some undershot scour will provide free passage and gradually reduce the head difference.

Walking the tributaries in late November and December will also enable the AFA to become acquainted with spawning sites. Understanding where these sites are and checking to ensure that both gravel quality and cover is in optimum condition is well worth the effort. This will enable the Association to get a better feel for the relative importance of tributaries and provide an assessment of the overall habitat quality available for Avon fish stocks.

First impressions of the Glaze Brook suggests that it will be ideal as a spawning and nursery site with plenty of suitable gravels available for a range of differently sized brood fish to spawn. Suitably sorted and graded substrate ideal for spawning is often found on side streams and tributaries as opposed to main stem sites, where the erosive forces generated by the large water volumes and steep gradient can sometimes blow gravels away from glide habitat. This can be quite a common occurrence on rivers with a hard underlying rock bed, where the erosion of fresh gravels can be a limited resource. Suitably sized gravels for spawning were seen on the main stem but on this particular reach were not widespread.



"Mini" gorge providing great holding habitat for adult salmonids



The tail of a glide on the Glaze Brook – a good spawning site for trout.

There was some evidence of the presence of pockets of the non-native plants Himalayan balsam and Japanese knotweed. These plants are extremely undesirable and both have the capacity to spread throughout the catchment and cause significant damage to local ecosystems. Identifying the areas where these plants are established, and then instigating an eradication programme is strongly recommended. This issue is discussed further in the Conclusions section of this report.

#### **4.2 Avonwick Bridge to Avonwick Station.**

The section of river running downstream from Avonwick station is dominated by a dense growth of laurel trees on the RB. This section of river appears to have formed part of an old estate and the laurels, often planted by Victorian gardeners, have spread down a good proportion of the beat. The AFA have cut back sections in an attempt to control the plants and to promote more light penetration to the channel.

Laurel trees are not recommended as an ideal riverside plant. The leaves of laurel bushes are known to produce toxins, which although will not be having a measurable impact on river water quality, will be restricting the development of other marginal plants.



A laurel mat which has flopped into the RB margin

Although not ideal, the laurels have, in places, provided some much needed cover in shallow marginal areas. A tangled mass of brash like this often provides an important refuge area for small fish to escape from larger fish and avian predators.

One option is to gradually cut back the laurel and plant with native trees such as willow (*Salix caprea* and *S. cinerea*) or the odd thorn bush which can also provide a low tangled matrix of branches.

Where holes puncture the canopy and light reaches the river bed, small beds of water crowfoot (*Ranunculus spp*) have established. This is a very important plant for many rivers as it provides great cover for fish and is also an important habitat for numerous invertebrate species, many of which are valued by the fly fisher.



Below Avonwick bridge the gradient is slightly more gentle and where sufficient light penetrates the canopy beds of water crowfoot can be found. Good trout habitat.

The gradient throughout this section appears to be gentler than the top beat and it is likely that it supports good numbers of trout throughout the reach. Some excellent quality habitat has been formed by the river, which has in places been energised by fallen trees acting as flow deflectors. In sections where the river bed is comparatively flat, the presence of large woody debris can help to carve out superb holding habitat as well as throwing up ramps of loose, well sorted gravel, ideal for winter spawning.

If a fallen tree is in danger of causing a severe blockage and unacceptable flood risk, or if it is orientated in a way that puts severe erosive pressure on a vulnerable bank then the best course of action is to winch it into a position where it will enhance in-channel habitat. Move it – don't remove it.



A low willow providing a bankside refuge for juvenile fish. Replacing the laurel with goat willow or low thorns will improve habitat and allow more light to reach central channel locations.



A whole tree has come to rest in a central channel location. The orientation of the tree is unlikely to cause any serious bank erosion but it will help to dig a fantastic holding pool.



### 4.3 Gara Bridge

The section of river upstream of Gara bridge supports some interesting and varied habitat. The top of the beat runs through a fairly shaded, steep sided valley where the river displays classic pool/riffle/glide formation. Some concern was expressed regarding the growth of sycamore trees adjacent to a disused railway line. In bygone years, trees here would have been routinely managed by the railway company but all maintenance has now ceased and the section of river is now much more shaded. The balance of light to shade still looks to be very favourable for supporting good quality salmonid habitat. A ratio of 60% shade to 40% direct sunlight is always an ideal to aim for. When choosing trees to thin, coppice or pollard, make sure that random blocks are treated rather than one individual and choose less valuable riverside trees such as the sycamore over the ash or alder which often has well developed root systems that defend the bank and the soils in place.



Five "leggy" sycamores growing out of the old stone revetment. Coppice these to the ground to protect the integrity of the wall but lay in a whole tree on the river bed parallel to the margin to provide a shelf and cover for fish.

Long sections of the beat supported first class trout habitat. The combination of riffle habitat with lots of scattered boulders and cobbles provides pocket water for adult browns and plenty of micro holding lies for parr.



Good parr habitat with lots of cobbles and large stones scattered over riffle habitat.

Further downstream the canopy opens up and the river starts to meander through an open meadow. Some evidence of minor bankside erosion could be seen on this section but it is not a cause for major concern. When the outside of a bend erodes, often the face of the bank slumps into the margin to create new "toe" to the bank. If a toe is present then the best way to stabilise the bank is to plant up the toe with a series of willow whips, or willow branches laid flat and secured with live stakes.

If a toe does not form then it might be appropriate to take some action to slow the rate of erosion by using a tree sweeper or brush mattress, wired down to the face of the bank. An alternative method, where applicable, is to hinge whole live trees down parallel with the eroding bank. All of these techniques will slow down the erosive forces of the river by absorbing energy and by gathering sediments that slough off the bank face and also by collecting materials washed down with the flow. The whole face can also be planted up to tie in the soft vulnerable soils.



A section of live willow which can be pegged and wired down onto the wet toe of a slumped margin. The willow will set root and protect the face of the eroded bank.



Live hinged Alder used to protect an eroding bank on the River Monnow.

#### 4.4 Downstream of Gara Bridge

The beat below Gara Bridge was also inspected. Channel form was good, although holding pools were at a premium and the section is slightly over shaded, caused in part by the high bank on the RB rather than excessive tree growth. Some coppicing, however, would be beneficial and material won could usefully be used to enhance habitats within the channel.



The section of channel below Curtis Mill is quite shallow and shaded. Coppicing out blocks of sycamore in particular and pegging the material into the channel is recommended.

Coppicing out long tracks of bank-side trees should be avoided as this will result in a maintenance liability and unless regularly managed will result in an even greater level of channel shading. Small 10 to 30m blocks of coppicing is sufficient and any large landscape trees should be left to provide dappled light and shade, as well as a method of slowing down the re-growth of adjacent coppiced trees.

#### 4.5 Knap Mill

The final beat inspected was at Knap Mill, a short distance above a structure which marks the start of the tidal waters.

Here the river displays the typical morphological characteristics of a mature river, winding its way over the flat coastal meadows, before finally meeting the sea. Any student remembering their geography studies will have been introduced to this last mature phase of a typical lowland river. The hard stone outcrops have long gone and now the river carves its way gently through soft

alluvial deposits. As a consequence the river is “active” and with no hard banks, or steep gradient to force a straight channel, the river kinks and bends in response to any slight impediment to flow. The consequences are that it simply re-carves a line where it once deposited material many years before.

Although this process causes considerable anxiety, particularly when a loved sea trout pool is lost, or a section of river is given over to become a redundant oxbow, the process is entirely natural and one that is hugely expensive and difficult to fight. The secret is to be relaxed when one good holding pool is about to be lost, confident in the knowledge that a brand new one is in the process of being formed. They just need to be explored and will soon have the reputation as a new “hot spot”.

If bank side erosion is deemed unacceptable then it is possible to manipulate this wandering of the channel through the intelligent use of LWD flow deflectors. Pressure can be taken off of an eroding bank, just as easily as erosion can be encouraged to maintain a desired course. Our advice would be that if the landowners are relaxed about the way the river moves then the fishing club should be as well.



An eroding bank on the lower beat at Knap Mill. Some good holding pools will be lost but others will also be created.

## 5. Conclusions

The Avon Fishing Association's waters on the Devon Avon provide an excellent and diverse range of habitat suitable for supporting all life stages of trout, sea trout and salmon. From the sites which were inspected on the day, the catchment appears to be in really good shape, which for a spate river is so often the key to meeting the fisheries full potential.

Long tracts of the river just need a very light maintenance touch. Making sure that the network of small local tributaries are in good order is of paramount importance and the AFA should build good working relationships with land owners and acquaint itself with every yard of habitat, even though these may be outside of the Association's current management control. The same principles apply to the headwaters of the main stem. Find out exactly where your trout and salmon spawn and make sure that these sites are in optimum condition, with good quality, well sorted gravels and lots of brash cover over shallow margins. Building a working relationship with the owners of these sites and offering to assist with maintenance tasks might help to raise awareness and educate the land owners and provide additional protection for the fishery as a whole.

The village of South Brent and adjacent main A38 dual carriageway would appear to be a potential pollution threat to the fishery. Undertaking some monitoring of water quality through assessment of invertebrate communities would help to provide an early warning of any issues. Signing up for the Anglers' Monitoring Initiative is recommended and more details of how to obtain the training and get involved can be obtained from the Riverfly Partnership [www.riverflies.org](http://www.riverflies.org)

At several locations the presence of non native plants adjacent to river was noted. Japanese knotweed, Himalayan balsam, laurels and rhododendron will all restrict the development of local native riverside plants. The consequences for the overall stability of the banks, as well as the important contribution towards habitat quality are all good reasons for the Association to instigate an effective programme of monitoring and control. This can seem a daunting prospect but many small fishing clubs and river associations have made remarkable progress in tackling non native plant issues and there may well be support and funding available from other groups.

It was very encouraging to see so much large woody debris within the river channel. LWD is a general term referring to all wood naturally occurring in streams including branches, stumps and logs. Almost all LWD in streams is derived from trees located within the riparian corridor. Streams with adequate LWD tend to have greater habitat diversity, a natural meandering shape and greater resistance to high water events. Therefore LWD is an essential component of a healthy stream's ecology and is beneficial by maintaining the diversity of biological communities and physical habitat.

Traditionally many land managers and riparian owners have treated LWD in streams as a nuisance and have removed it, often with uncertain consequences. This is often unnecessary and harmful: stream clearance can reduce the amount of organic material necessary to support the aquatic food web, remove vital in-stream habitats that fish will utilise for shelter and spawning and reduce the

level of erosion resistance provided against high flows. In addition LWD improves the stream structure by enhancing the substrate and diverting the stream current in such a way that pools and spawning riffles are likely to develop. A stream with a varied substrate and pools and riffles is ideal for benthic (bottom dwelling) organisms as well as for fish species like wild trout.

Understanding the role of fallen timber in these streams is crucial. The Association should adopt a policy of retaining LWD in the river channel wherever possible. The West Country Rivers Trust provides a useful guide to the management of natural LWD:

1. Is the debris fixed, if yes then continue to 2, if not continue to 5.
2. Is the debris causing excess erosion by redirecting the current into a vulnerable bank? If yes then go to 5 if not then go to 3.
3. Would fish be able to migrate past it (take into account high river flows). If yes go to 4, if no go to 5.
4. **Retain the woody debris in the river.**
5. **Extract or fix the debris elsewhere.**

Note: If the debris dam needs to be removed but there is still a significant amount of the root system attached to the bank then it is recommended that the stump be retained for its wildlife habitat value and its stabilising effect on the bank.

The management committee of the AFA has some concerns over bank erosion. Losing sections of bank, as well as productive holding pools often causes anxiety, particularly to land owners. Excessive erosion can also be an issue for habitat quality, where large quantities of sediments are deposited onto potential spawning sites, clogging gravels and adversely impacting spawning success.

The section below Gara Bridge has some bank erosion but is not considered to be a major issue or cause for concern. In general the river banks are very stable, with the only exception being the very bottom beat at Knap Mill. As this section is so close to the tidal limit, spawning and nursery opportunities are very limited and again, not really an issue to worry about.

Maintaining the current course of the river and defending every eroding bend could swallow up considerable time, effort and money and will have no measurable benefit with regard to the number of fish the river produces and supports. If the erosion is deemed unacceptable due to the potential loss of valuable land holding then actions can be taken to slow down the rate of movement. Soft engineering techniques using LWD flow deflectors to kick the flows away from eroding faces and then defending the bare soils with a brush mattress and live willow planting is recommended. Design details are available in the WTT Upland Rivers Habitat Manual, available on-line ([www.wildtrout.org](http://www.wildtrout.org) – publications) or disk via the WTT Office.

## 7. Recommendations

- Leave as much fallen woody material in the channel as possible. If it falls in an undesirable location then move it and secure it.
- Undertake an autumn/winter walk over survey of all your tributaries and get a better feel for which sites your fish populations are using for spawning.
- Monitor natural debris dams but leave in situ unless severe blockages develop to the extent where the bed level differentials are greater than 300mm.
- Implement a programme for identifying the location of non native plants and working from the top of the catchment start an eradication project. Look for partners and funding and raise awareness with land owners and other local groups over your plans.
- If not total removal then at least punch some significant holes in the laurel/rhododendrons below Avonwick Bridge and replant with low goat willows to create low, brashy cover over shallow margins.
- If not already involved, consider signing up for some training in undertaking simple surveys as part of the Anglers' Monitoring Initiative with the Riverfly Partnership. This is an excellent initiative and will give a much better understanding about the productivity of your fishery and an indication of long term water quality performance, particularly at potential vulnerable sites
- Raise awareness amongst the membership over the importance of catch and release for wild salmonid conservation.
- Take a relaxed approach to natural river processes, particularly on the very bottom beat where the river has naturally meandered for thousands of years.

**It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking any 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 programme. Physical enhancement works could be kick-started with the



assistance of a WTT 'Practical Visit' (PV). 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.

The WTT can fund the cost of labour (two/ three man team) and materials (max £1800). 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**

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