



## River Avon – Yeo Farm, Loddiswell



An advisory visit carried out by the Wild Trout Trust – April 2009

## 1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on the River Avon at Loddiswell, South Devon. The advisory visit was undertaken at the request of Mr. Charles Smith who owns the fishery. Comments in this report are based on observations on the day of the site visit and discussions with Mr Smith.

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. Close to where the river leaves Dartmoor a dam was built in 1957 to form the Avon reservoir. After leaving the moor the river passes through South Brent and then Avonwick and Aveton Gifford and flows into the sea at Bigbury on Sea.

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

## 3. Fishery overview

The section of the River Avon at Yeo Farm extends from Topsham Bridge near Loddiswell upstream for approximately 1.5 miles. The top boundary is marked by an old Victorian boat house on the RB. This section of river lies approximately 4 miles from the estuary, making this section of river very important for migratory salmonids.

Yeo Farm has been in the ownership of the Smith family for a considerable time but it is only in the last few years that Mr. Charles Smith has taken full control and responsibility for managing the fishery. Prior to Mr. Smith's full ownership the riparian maintenance had been virtually nonexistent and in the last two years Mr. Smith has made considerable efforts to try and bring the river back into a fishable condition. Before embarking on further riparian tree management Mr. Smith is keen to ensure that any further works planned are in the best interest of the fishery and wider ecology of the river corridor as a whole.

Near the bottom boundary of the fishery a small side stream enters the main river from the LB. This stream looks to have considerable potential as a small spawning and nursery stream and may well be locally important for sea trout stocks that often prefer to spawn in side streams rather than the main channel.

#### 4. Habitat assessment.

Most of the in-channel habitats observed on the Yeo Farm beat were considered to be very good for salmonid fish species. The section as a whole is not blessed with lots of holding pools for larger migratory trout or salmon, although there were several superb pools which obviously will hold good numbers of fish during the summer months. In between the pools there were long sections of shallow glide and riffle habitat which provide superb habitat for juvenile salmon and sea trout, and all life stages of brown trout.

A key component of habitat throughout the reach is the comparatively heavy canopy of marginal trees. A considerable amount of thinning and coppicing has already been carried out adjacent to the LB on the bottom half of the fishery. The top half however still retains fairly dense tree cover. Part of the LB is bordered by an old redundant railway line which is thought to have been closed during the 1960s. It is highly likely that marginal trees running alongside the railway line would have been routinely managed by British Rail. Since the railway closure the marginal embankments leading down to the river have been heavily colonised by dense stands of trees, in particular sycamore (*Acer pseudoplatanus*).

The tree work already undertaken seems to have been carried out quite sensitively and appears to have been mainly targeted at the invasive sycamores. It is imperative to retain as many of the mature trees as possible, particularly any oak, ash, beech or thorn. It should be remembered that trees play a vital role in protecting the bank with their root systems by tying in marginal soils and giving the bank added protection against erosion. They are also vital in keeping the channel cool through the summer months. It is imperative to retain large areas of shading on a salmonid river and even more so on a spate river where flows can rapidly drop off during dry weather in the summer months. About 60% channel shading should provide ideal conditions in a river like the Avon.

As well as providing shade and bank protection, trees are very important in shaping in-channel habitats. Fallen trees, trunks and branches are usually referred to as large woody debris (LWD). The presence of LWD has been shown to be extremely important in several respects:

- An increase in the variety of flow patterns, depths and localised velocities.
- Development of high in-channel physical habitat diversity
- Significant benefits to the control of run-off at the catchment scale. Woody Debris helps regulate the energy of running water by decreasing the velocity. Thus the 'travel time' of water across the catchment is increased.

LWD is a general term referring to all wood naturally occurring in streams and rivers. 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 more likely to develop. A stream with a heterogeneous substrate and pools and riffles is ideal for benthic (bottom dwelling) organisms as well as for fish species like trout.



[A good example of some LWD providing excellent marginal cover](#)

Before discussing options for creating better quality habitats using LWD it will be important to ensure that existing pieces that are currently in the channel are not removed. Keeping LWD secure in a spate river can be a challenge. It is however surprising how some pieces that are attached to the bank by old root systems can remain quite stable for many years. The wood often acts as a flow deflector and has the ability to scour pools and develop runs (for fish improved holding), and also blow out fresh gravels into bars (ideal for spawning). Fallen trees and wood are therefore a vital component of in-channel habitat as well as for the riparian zones.

The West Country Rivers Trust have developed a decision matrix to help riparian owners and fishing clubs with issues surrounding naturally fallen trees.

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. **Re-position or extract the debris.**

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.



An area near the bottom of the beat where some coppicing has been carried out. It may be possible to "hinge" some trees into the channel to create secure flow deflectors on the heavily shaded upstream beat

It was noted that some large stones have been imported and used to protect the toe of the RB in places. Some individual large stones were also observed dotted around the channel. These may well be naturally present and they do provide some excellent micro habitat where they have scoured a slightly deeper pot on the downstream face. In another location it was noted that some stones had been configured in a line to try and impound the water depth, presumably in an attempt to promote some deeper water for fish holding.



Large stones used to protect the RB from excessive erosion. Some low scrubby cover provided by a small goat willow would soften its appearance and enhance its fish holding capability



Large stones on a shallow riffle can provide a good holding spot for adults.



Large stones configured to create a weir and impound water. Not a barrier to fish migration but no great benefit in habitat quality

Better quality pool habitats are usually created by promoting downward river bed scour rather than holding the water back with any form of impoundment. Pools that form naturally are often kick started by a fallen tree where the flow hits the underside of the trunk and is forced downwards. Even after the tree has disappeared pools can remain very stable for many years. Raising the water level through impoundments can often result in sterile laminar flows upstream of the impoundment: much poorer habitat for adult salmonid fish than a naturally scoured pool. Promoting improved holding water with large fallen trees may well help to promote better quality pool habitats, particularly on the upper reaches of the beat. Where more than one tree has fallen into the channel it should be remembered that pool habitats rarely form too close to one another. As a general guiding principle, a decent pool will only form at a distance of approximately 5 to 7 multiplied by the average channel width. So if your average channel width is say 10m, then you would not generally expect a pool to develop within approximately 60m..

Pools and glides that are most effective at holding fish usually also have some low overhanging shade.



The tail of a superb naturally formed pool. A great lying up spot for sea trout and salmon. Some overhanging shade is an essential component of good quality pool habitat.



A good example of a small West country river where an old fallen tree has created a great pool.

Near to the bottom boundary a small stream joins the main river on the LB. These small side streams are usually critically important spawning and nursery habitats on spate river systems and care should be taken to ensure that water and habitat quality is protected. These streams require good amounts of both LWD to help sort spawning gravels and CWD (Coarse Woody Debris) to provide overhead protection from predators. If debris dams build up they should not be removed unless they are considered to be a blockage to upstream migration. This is unusual as there are normally small undercuts and gaps where fish can find a way through.



Small stream entering the river just above Topsham bridge. Potentially a critically important habitat for spawning and juvenile trout.

## 5. Conclusions

The River Avon at Yeo Farm is a great example of a small spate river. The fishery would benefit from an extra pool or two and these could be promoted by some imaginative use of the large marginal trees through hinging into the channel or by using fallen trunks that could be imported and secured to other existing rooted trees. This type of work will require a consultation with the local Environment Agency. Any material used should be able to pass under downstream bridges in the event that they are ripped out in a large spate.

Care must be taken when contemplating any further tree work to ensure that there is still sufficient shading to keep the channel cool and to provide low cover

for fish. Coppicing some of the leggy sycamore near the top of the reach and replanting with some low bushy thorns or goat willow will help to promote low marginal shade but still allow access for angling.

Care must be taken when carrying out any maintenance on the small side stream. LWD should be left within the channel and if necessary woody brushings placed over the shallow riffle areas to protect fry from predation. If debris dams form they should be regularly checked, particularly from October through to January to ensure that migrating adult fish can still make progress upstream. The banks and marginal zones should be left scruffy and do not tempted to tidy up the channel or trim the margins.



A large ivy clad tree where the ivy stems has been cut to protect the tree. Ivy clad trees are very important for summer roosting bats so some of this habitat should be retained throughout the reach

**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 Development Control Officer.**

## 6. Recommendations

- Improve the trout habitat quality of the whole reach by retaining as much fallen LWD as possible.
- On one or two locations discuss the options of promoting some pool habitat with the Environment Agency. The simplest option is hinge an existing marginal tree into the channel. Another option is to import some sections of large tree trunk and secure to the river bed using steel reinforcing bar. Flood risk constraints can be minimised if the flow deflectors are made up of individual sections of trunk of a sufficiently short length to pass through the downstream bridge apertures. Large pieces of imported stone could be an alternative option.
- Continue your programme of selective thinning of marginal sycamores but retain mature hardwoods whenever possible. On sections where pool habitat is promoted plant up with marginal thorns or willows to promote low scrubby cover.
- Keep a close eye on the side stream in the autumn to ensure that fish can gain access to spawning areas. Do not maintain the stream as an open drainage channel but allow woody debris to form and a scrubby margin to develop.

## 6. 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 an 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.

Alternatively the Trust may be able to help in the development of possible project plans as a worked up application for Land Drainage consent from the Environment Agency.

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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