Advisory Visit

Tapster Brook, Preston Bagot, Warwickshire

15th June, 2009

1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the Tapster Brook, Preston Bagot, Warwickshire on 15th June, 2009. Comments in this report are based on observations on the day of the site visit and discussions with Tony Eaves and the landowner, Commander Richard Onslow RN (retd.).

Normal convention is applied throughout the report with respect to bank identification, i.e. the banks are designated left hand bank (LHB) or right hand bank (RHB) whilst looking downstream.

2.0 Fishery Overview

The Tapster Brook is a tributary of the River Alne, which ultimately joins the Warwickshire Avon. The brook rises in the area around the intersection of the M42 and M40 motorways, and the upper reaches flow south east along the M40 corridor before turning south near Copt Green. From just north of Preston Bagot the brook follows a course alongside the Stratford-upon-Avon canal, joining the River Alne near Wootton Wawen. The brook was walked upstream and downstream of the A4189, a reach of approximately 2.3 km. References to areas of the brook in this report correspond with the maps kindly supplied by Richard Onlsow on the day.

Environment Agency (EA) electric fishing surveys have been carried out on the brook in the past, and data for surveys in 1991, 1995, 1997 and 1998 were provided (Appendix 1). Coarse fish removals were formerly undertaken by the EA (then National Rivers Authority) and fingerling trout stocked in their place. This has not occurred since 1998, and no trout stocking currently takes place. The survey data indicate that in addition to brown trout, dace, bullhead, stone loach and minnow are present, along with the occasional chub and roach (the latter probably originating from canal overflows).

The brook is very lightly fished with only Commander Onslow and Mr Eaves having access. Catch-and-release is the norm with most trout returned alive. Mr Eaves has an agreement with Commander Onslow to maintain the brook in return for fishing access, and this visit was requested to provide guidance on habitat management.

3.0 Habitat Assessment

Land use alongside the river is a mix of arable (wheat, barley) and livestock grazing. The farming practices appear to be very sympathetic to the river and there are wide grass buffer strips around field boundaries and uncultivated wetland areas alongside the river in places; this is very beneficial to the habitat and water quality within the brook. The majority of land adjacent to the brook is in Countryside Stewardship (final year of the agreement) and Entry Level Scheme. It is important that consideration is given to continuing the enlightened approach to land management once the Stewardship agreement reaches an end this year.

3.1 Downstream of main road

The brook is underlain with clay and there is abundant gravel present in most of the channel. Generally the habitat is very good, with a meandering planform, an excellent pool and riffle structure, good variation in depths, natural channel features such as gravel shoals and side bars, and good cover in the form of tree roots and low overhanging vegetation.

There are numerous shallow, faster, gravel-bottomed sections of water (riffles), which are where most river fish species choose to spawn, including trout. Loose, un-compacted gravel containing a low proportion of fine (<2 mm) sediments is very important for the survival of incubating trout eggs and alevins, which spend several weeks buried in gravel nests (redds) cut into the gravel by the adult female fish. The gravel present here is suitable for trout spawning: pea to golf-ball sized, reasonably well-sorted, loose and with moderate levels of fine sediment. Gravel cleaning in late September / early October prior to trout spawning would be beneficial on selected riffle areas to reduce the amount of fine sediment between gravel particles. Also the use of flow deflectors is recommended to create localised scour on some of the less well-sorted areas where higher amounts of fine sediment currently clog the gravels (see Recommendations).

Mr Eaves has worked on this section of the brook, carrying out coppicing work and clearance to make it more accessible for fishing and to allow more light to reach the river channel. This has been carried out in a sensitive manner and a good balance between light and shade has been achieved.

Photo 1 Sensitive land use alongside the brook via Countryside Stewardship – a wide, grassy margin between the field and brook.

Photo 2 Excellent natural instream features – pool, riffle and gravel side bar

Photo 3 A tangle of submerged tree roots provide vital cover for trout – excellent habitat

Photo 4 Good quality gravel suitable for trout spawning

It was surprising that there was no rooted weed present in the channel such as water crowfoot (*Ranunculus* sp.); this may be due to lack of light penetration before the recent coppicing. Water crowfoot could be introduced to riffle areas by transplanting from nearby watercourses (see Recommendations).

There was relatively little large woody debris (LWD) in this section of the brook. This is because an excavator was used in spring 2008 to remove it in order to speed up conveyance of flood water within the 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. Many land managers treat LWD as a nuisance and remove it from rivers and streams, and this appears to be the case here.

However, the retention of LWD in streams has numerous advantages:

- It creates greater habitat diversity as LWD influences the shape of the river channel by promoting localised scour, depth variation and a natural meandering shape (see section 3.2).
- LWD is an essential component of a healthy stream's ecology and is beneficial by maintaining the diversity of biological communities and physical habitat.
- Stream clearance reduces the amount of organic material which supports the aquatic food web, particularly invertebrate 'shredding' species which breakdown leaf litter and in turn provide food for trout.
- LWD provides vital in-stream habitats that fish will utilise for shelter and spawning
- Plentiful LWD has the cumulative effect of slowing the conveyance of water through a channel, promoting wetting of the floodplain and providing a buffer against high flood peaks downstream, and increasing the level of erosion resistance against high flow events.
- A relaxed approach to managing LWD is far easier and cheaper than installing flow deflectors and groynes, and usually achieves similar or better results.

The invasive plant, Himalayan balsam (*Impatiens glandulifera*) was noted on some sections of the river. The main issue with this species is its rapid rate of spread and the physical damage that it causes to river systems by blanketing river banks; being an annual it shades out other species during the growing season, but provides no soil retention over winter leading to erosion problems and sediment inputs. This plant should be controlled by pulling it up before it flowers in late June and July.

The reason why some pools hold trout whilst others don't was discussed and it seems that the key factor is the presence or absence of cover. Pools with submerged alder roots or undercut banks are favoured by adult trout, whereas areas of a similar depth but lacking in cover tend to be avoided. There are ample opportunities for improving this situation by 'hinging' tree trunks or branches into the water, or staking tree trunks in position alongside deeper water.

Photo 5 Willow hinged and staked alongside the bank (R. Wye, Derbyshire)

Photo 6 Good example of a willow still attached to its stump, but laid along the bank providing great cover for fish (R. Dane, Cheshire).

There were four weirs on this section, two of which were in disrepair; the others were low structures which could be easily by-passed by fish. Although fairly low in crest height, the weir below the road bridge (close to the field boundary between second and third Reeves Ground) was causing a backwater effect for about 40 metres upstream; along with the straightened nature of the channel here (second Reeves Ground / Coney Close) this was relatively poor habitat compared with that downstream. The brook here is overwide, slow-flowing, lacks diversity of depth and has poorly sorted bed substrate.

Commander Onslow has considered removal of this weir, and this would benefit the brook overall by re-energising the section upstream. In the short term (1-2 years) the river bed would regrade, and become narrower and deeper; over a longer period the channel may become more sinuous as meanders start to re-develop. This could be promoted by using flow deflectors to create scour of the river bed and/or banks (see Figure 1 for the effects created by differently positioned flow deflectors).

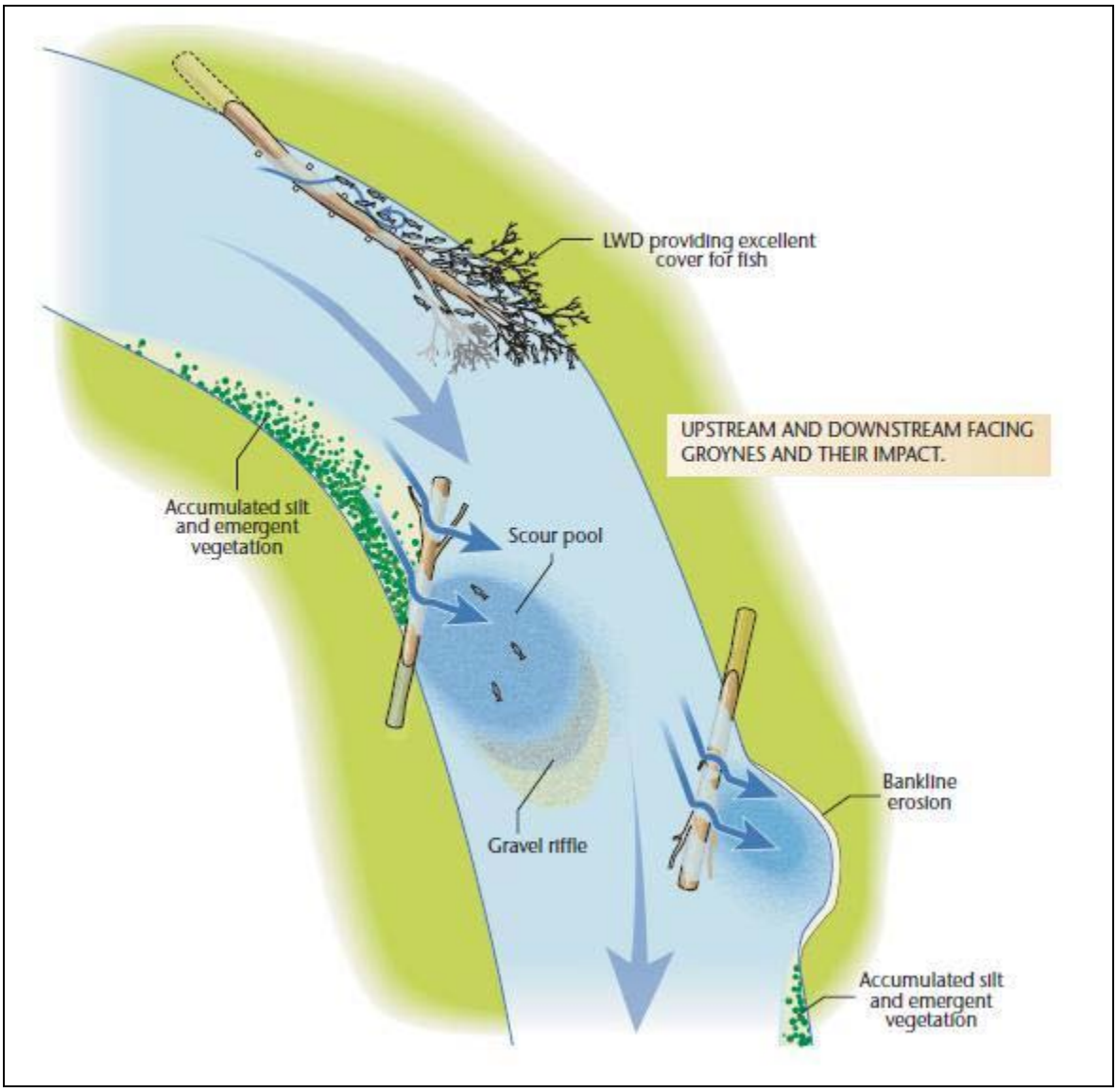

Figure 1

Although downstream pointing deflectors are generally not recommended because they promote bank erosion, they could be useful in this situation. The hard clay banks here seem quite resistant (see Photo 9 where a broken weir structure has obviously deflected flow against a bank for some time), so the use of downstream deflectors could help to recreate meanders on the straightened section, ultimately leading to lateral scour pools and riffles (similar good habitat to that present downstream).

Photo 7 Pool where installation of LWD and brushwood bundles on the outside of the bend would be beneficial, providing cover and erosion protection

Photo 8 Coppicing of trees alongside the deep pool. Installation of log cover along this bank will improve the holding capacity for trout.

Photo 9 Old weir structure deflecting water against the hard clay bank causing moderate erosion

Photo 10 Intact weir, downstream of A4189 road

Photo 11 Impounded section of brook upstream of the weir in Photo 10 – poor habitat

3.2 Upstream of main road

This section had some good habitat alongside the Mill Cottage (Home Close and Mill Ham), with some deep scours between alder tree roots, meanders, pools and riffles. There are a couple of weirs in this section, although both are low and have little or no impact on the river profile. There are some stable LWD structures in the river here, and it is recommended that these are retained for the reasons mentioned above.

Alongside Big Meadow the character of the brook changes markedly and it appears that historically its course has been changed. This section of river was probably diverted across higher ground than the original channel to provide a head of water at the mill. The straight course of the existing channel and a possible course of the original channel (at the southern edge of Big Meadow) are evident from the map.

In this straightened section the brook is bounded by steep banks, and the riverbed gradient is relatively gentle creating a slow flow. The channel is heavily shaded by the steep banks and mature trees. There is little gravel

through this section and the bed is largely clay, and there is relatively little depth variation compared with more natural sections of the river. The relatively poor habitat here improves with progress upstream, returning to a meandering planform in the vicinity of the old bridge abutments, then again returns to a relatively straight, shallow channel alongside Langford Meadow.

The upstream section of this reach (Dale Meadow) has much better habitat with meanders, pool and riffle structure, wide depth variation and a well-sorted substrate. There are some excellent examples of LWD and its effects on habitat structure (Photos 15 and 17), and these should be retained. Much of the channel here is overgrown and shaded, particularly by previously coppiced hazel trees; it is recommended that these are cut back to improve light penetration and access.

Photo 12 Some great habitat upstream of Mill Cottage – meanders, pools, riffles, gravel bars and tree roots

Photo 13 Some sections of the upper reach are straight with a relatively shallow uniform depth – not good trout habitat

Photo 14 Heavily shaded section of the channel where selective coppicing of overhanging trees would be beneficial

Photo 15 Woody debris dams are beneficial to the brook's ecology and should be retained

Photo 16 Excellent wet grassland areas are present alongside the upper section of the brook

Photo 17 A great example of the effects of retained woody debris on river form and processes.

4.0 Recommendations

- Large woody debris (LWD) within the river channel should be managed with a presumption to retaining it *in situ.* In addition to the ecological benefits, LWD promotes flood water storage in the floodplain during high water events, protecting downstream properties by reducing the height of the flood peak.

- Gravel cleaning should be carried out in late September / early October prior to trout spawning. This can be done with a water pump, hose and 'lance' (scaffold pipe), or with a leaf blower. Some points to note:

  1) Spawning gravels are also important habitat for invertebrates and plants too and you should avoid the temptation to clean 100% of the available spawning resource. Start a programme of rotational jetting doing no more than 25% in any one year (4 year rotation).

  2) Spend the winter preceding any jetting operations to identify areas were trout redds occur. This will enable you to target your time more efficiently.

  3) Undertake jetting in October prior to spawning season. On no account do it later than this or you may be causing more damage than you are trying to rectify.

  4) Evaluate your efforts - are there any redds in evidence in the winter after your efforts?

  5) Health & Safety - Work in pairs and use goggles/ safety glasses to protect your eyes. Undertake a risk assessment.

  6) Jetting does not solve the problems of excessive siltation. It merely mitigates against the effects. To tackle this issues effectively you must look at landuse and address problems at the catchment level.

Photo 18 Gravel washing with a leaf blower

Photo 19 Trout redd with excavated hollow at upstream end and finer, sorted gravel mound at downstream end.

- Pin some woody deflectors onto gravel areas to create local scour and promote the sorting of gravel. This will create areas of gravel with a low percentage of fine material, favouring increased incubation rates of trout eggs.

- Install cover logs alongside deeper water by hinging tree trunks and branches and pinning them to the bed and banks. Brushwood bundles (faggots) made from hazel coppicing could also be used to provide cover and protection of eroding banks (e.g area in Photo 7). Good examples of techniques and principles can be found in the Chalkstream Habitat Manual (*Use of Large Woody Debris* section) (http://www.wildtrout.org/index.php?option=com_content&task=view&id=324&Itemid=315).

- The more heavily shaded sections of the brook, particularly the reach above the road to the upstream boundary would benefit from a thinning of the tree canopy to allow in more light. The Wild Trout Survival Guide provided during the visit gives some guidance on rotational tree coppicing. The overall aim should be to achieve 'dappled shade' (about 60% shade / 40% light). It is important to remember that shading has a vital role in keeping a watercourse cool and that the upper lethal temperature for trout is in the low twenties Celsius. Careful tree management is therefore a vital tool in mitigating against the effects of climate change.

  The selection of trees for felling should be done in conjunction with plans for introducing LWD to the channel, for example to recreate the effects in Photo 17, or provide structures such as those in Figure 1.

- Water crowfoot (*Ranunculus* sp.) could be introduced. The simplest way of planting *Ranunculus* is to make a small hole (50-75mm diameter) in the riverbed using a metal stake. Take a sheaf of *Ranunculus*, fold the stems in half and push firmly into the hole. Close in the hole by 'heeling in' the surrounding bed material. Finally, place a series of stones over the newly planted root system to stop it pulling out of the bed. Planting can be carried out anytime from April-early June, ideally into a gravel/stone bed with a water depth of 150mm–450mm.

- Himalayan balsam should be controlled. This is best done by pulling the plants before they flower in June/July and leaving them off the ground to dry out. Herbicide (glyphosate) is also effective and this requires written consent from the Environment Agency for use alongside watercourses. Contact your local EA office for further advice.

- Continue to manage the land in a sympathetic manner. It is a pleasure to see how The Countryside Stewardship scheme has benefitted the brook and its surroundings and every effort should be made to continue this management. There was one minor issue to note that could affect the water quality of the brook – some horses are stabled on the left bank of the brook on the upstream section, and the manure from mucking out has been deposited at the top of the steep bank of the brook. This is likely to wash in during wet weather, and would be better stored well away from the watercourse.

Photo 20 Horse manure deposited too close to the brook – better off in someone's vegetable patch!

Please note: It is a legal requirement that all the works to the river require written Environment Agency (EA) consent prior to undertaking any works, either in-channel or within 8 metres of the bank.

5.0 Making it Happen

The WTT can provide further assistance to implement the recommendations, including:

- Assistance with preparing project proposals and Land Drainage consent applications
- Support at pre-application meetings with the relevant departments of the EA, if necessary.
- A WTT 'Practical Visit' (PV) to demonstrate the appropriate techniques such as gravel jetting and installation of flow deflectors. The WTT will fund the cost of labour (two-man team) and materials. Recipients will be expected to cover travel and accommodation expenses of the advisers. The use of specialist plant will be by separate negotiation if required.

Further funding could be sought from the Environment Agency Fisheries Project budget, emphasising the club's concurrence with the National Trout and Grayling Strategy's aims of habitat improvement and protection of wild brown trout stocks.

Note: Recipients of a PV must have received a WTT AV and have obtained the appropriate consents from the Environment Agency, Natural England,etc, prior to arrangements being made to undertake the PV.

Applications for all the above should be made via projects@wildtrout.org

6.0 Disclaimer

This report is produced for guidance only and should not be used as a substitute for full professional advice. Accordingly, no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon comments made in this report

7.0 Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency for the support which made this visit possible.

Appendix 1

Environment Agency Fisheries Data

	1991			1995			1997			1998		
	No.	Length Range (mm)	Biomass (g)	No.	Length Range (mm)	Biomass (g)	No.	Length Range (mm)	Biomass (g)	No.	Length Range (mm)	Biomass (g)
Brown trout	27	73-329	3448	29	77-301	3231	10	115-372	1549	16	92-323	1040
Chub				1	320	533				1	337	610
Dace	20	105-226	2120	27	81-262	2947	72	74-321	3173	16	98-208	1307
Roach							1	59	2			
Gudgeon	2	128-146	81									
Minnow	3	50-69		14	48-84		17	40-83		4	52-80	
Bullhead	18	36-87		27	35-75		55	44-85		15	40-75	
Stone loach	29	88-95					32	66-120		11	78-107	
Stickleback				2	30-42		3	36-46				

250 m^2 site (100m long by 2.5m average width). Two-run catch depletion electric fishing, pulsed direct current. Recorded numbers / biomass shown.