Advisory Visit

Bradshaw Brook, Lancashire

August 2010

1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the Bradshaw Brook, Bolton, Lancashire on 19th August, 2010. Comments in this report are based on observations on the day of the site visit and discussions with David Worswick of Bradshaw Fly Fishers (BFF) and Kevin Nash and Darren Bedworth of the Environment Agency (EA).

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 Catchment / Fishery Overview

Bradshaw Brook is located in Bolton, Lancashire and rises on the West Pennine Moors before flowing into the River Croal and then the River Irwell. Jumbles Reservoir is located at the head of the catchment and the brook relies on compensation releases to maintain its flow. Overtopping of the reservoir, natural spates and valve flushing releases can lead to rises in river level of over 2 metres so it can be fairly described as a high energy system.

The Environment Agency have carried out regular electric fishing surveys of the brook, building up a set of data which can be used in the event of drought orders being applied for, to reduce compensation releases from the reservoir. The brook holds a self-sustaining population of brown trout, and good numbers of fish were observed during this visit.

BFF were formed in 1984 and currently have about 40 members. They carry out two invertebrate surveys each year which show there is a good diversity of invertebrate life. The brook was stocked with trout twice shortly after BFF's formation, but has relied on natural production of fish stocks since then. Catches of trout can be up to 40 or 50 fish per day on good days, with a good size range from young-of-the-year up to 12-14" fish being typical, plus the odd larger one.

This site was the subject of a Wild Trout Trust (WTT) Advisory Visit in 2002 carried out by Ron Holloway, the report from which is available at www.wildtrout.org. The main issues highlighted in the WTT report were heavy tree shading, bank erosion and resulting over-widening of the stream

channel. Recommendations put forward included opening up of the tree canopy, erosion control using both soft and hard bank revetment techniques and pool creation by installing channel constricting flow deflectors. Following the visit, BFF drew up a five-year plan to implement the recommendations which was reviewed by EA Fisheries and Biodiversity staff.

The tree canopy thinning has been carried out, but other recommendations have not been implemented because of concerns from EA staff over the whether they are appropriate or likely to be successful in this context. This report provides a review of the previous WTT recommendations, BFF's 5-year plan and the EA's comments upon it.

3.0 Habitat Assessment

The brook generally has good in-stream habitat as demonstrated by the prolific, self-sustaining population of brown trout. The abundance of smaller size classes of trout does reflect to some extent a lack of adult habitat in the form of deeper pool areas and low cover; however, this should be seen in the context of this section of brook being located in the upper part of the catchment, where smaller fish would be expected to predominate.

Some sections of the brook are wide and shallow. In some cases this is a result of natural variation in the shape and form of the channel; in other cases it is because of bank erosion (Photo 1). The naturally occurring shallow areas are desirable because of their contribution to the natural diversity of the channel, which could be enhanced further by the addition of some large woody debris (LWD – see later comments). The bank erosion evident in Photo 1 appears to be occurring largely through human activity (footfall), leading to loss of binding vegetation and hence soil erosion; a potential solution is to install brushwood groynes and live willow along the inside of the bend to encourage the deposition of sediment and narrowing of the channel. Figure 1 illustrates the principle of this and is taken from WTT Upland Rivers Habitat Manual (Section 5, page 22). More detail is available in the manual which can be found at www.wildtrout.org/index.php?option=com_content&task=view&id=384&Itemid=327).

Photo 1 Overwide channel because of bank erosion through human activity

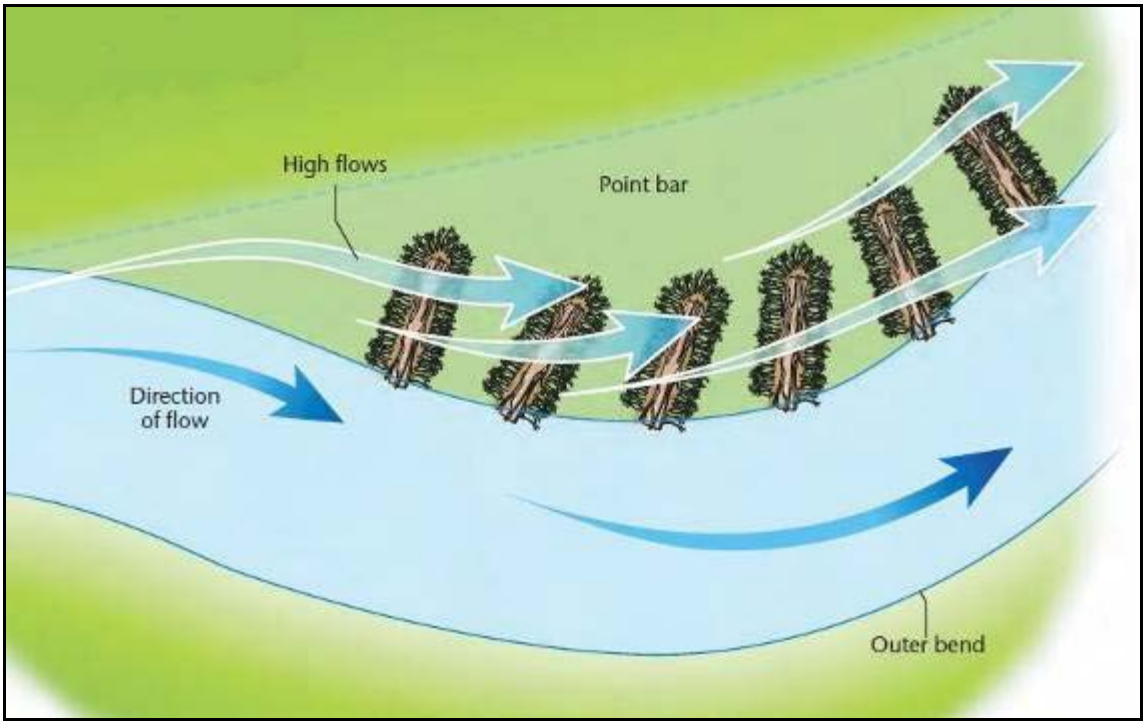

Figure 1 Groynes to trap sediment on the inside of a bend

The installation of the groynes could be combined with opening the canopy along the right bank to encourage growth of bankside vegetation and the installation of a visual barrier to encourage walkers to stick to the footpath alongside the river. This could be in the form of a low guide rail (e.g. www.snh.org.uk/publications/on-line/accessguide/downloads/5_11%20Single%20Barrier%20Fence.pdf). Once sediment starts to accumulate and consolidate along the right bank, the channel will narrow and deepen.

Other localised areas of accelerated bank erosion were observed, but generally it is not a severe problem on the brook. Erosion at a natural rate provides a source of sediment to the river which includes the gravel needed by trout for spawning; this can be particularly important on a system with an upstream impounding reservoir, which can severely limit sediment supply. The examples of erosion against steep banks identified in the 2002 WTT report (page 5) and the BFF 5-year plan (Year 3) are not regarded as problems by the current author. The previously proposed works (rock rip-rap) would involve a lot of effort and expense for little if any gain in terms of habitat improvement and the resources would be better targeted elsewhere.

There is an area of accelerated bank erosion occurring downstream of a low weir formed by a sewer pipe crossing the river (Photo 2). The reason for the erosion occurring here is the angle of the weir across the river which is directing high flows against the eroding bank. Ideally the weir should be modified to direct flows more towards the centre of the channel; however this may be an expensive and difficult exercise, complicated by the presence of a surface water outfall on the left bank immediately downstream of the weir. There may be scope to tackle this and improve fish passage over the structure (see later comments).

The effects of the bank erosion could be reduced here by reinforcing the toe of the eroding bank using a suitable method (e.g. log and Christmas tree revetment, or brush-packing – see Upland Rivers Habitat Manual). It may also be possible to use a “belt and braces” approach and install a tree kicker to sit in the gap left by the erosion, if a suitable anchor point can be found (Figure 2).

Photo 2 High flows are directed against the eroding bank by the pipe weir

Photo 3 Soft revetment techniques can successfully reduce erosion rates and consolidate banks (River Manifold, Staffordshire)

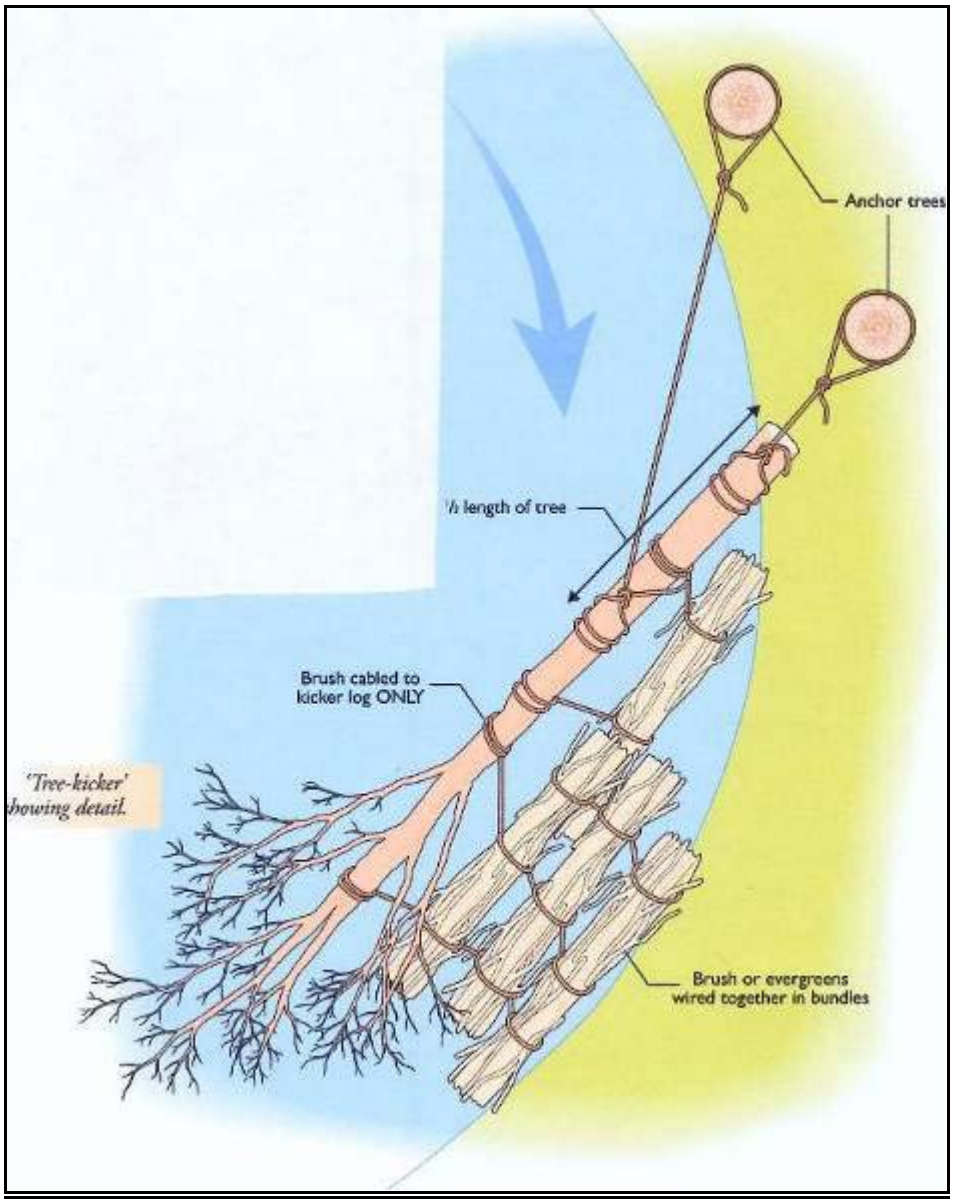

Figure 2 Tree kicker – these structures are anchored so they can float within the gap on an eroding bank, stilling the flow and providing erosion protection at all river levels.

There are a number of obstacles to free movement of fish within this section of brook, including the pipe-weir described above, a low weir installed by BFF at the confluence of a small tributary on the left bank (Photo 4) and the large weir under the access road to the cricket field (Photo 5). The obstruction in the tributary can and should be easily removed to restore access for trout to a potential spawning area.

Photo 4 This easily removed obstacle would open up a potential spawning tributary

Photo 5 The large weir near the cricket pitch. The simplest solution to improve fish passage and upstream river habitat would be to remove a central section (as indicated). Entire removal of the weir should be considered as well.

It was mentioned on the visit that BFF had plans for a fish pass at the cricket field weir. The EA are looking at the feasibility of reducing or removing obstacles on the River Croal (a target for achieving Good Ecological Status on this watercourse under the Water Framework Directive). The possibility of working collaboratively with the EA, and maybe the Irwell Rivers Trust, to achieve these common goals should be explored.

Fish passage could potentially be improved at the pipe-weir by the construction of a simple pre-barrage in the corner against the left bank (Photo 6, Figure 3). This would probably require the extension of the surface water outfall to prevent water backing up it. These works may also take some of the pressure off the eroding bank downstream by diverting flows more to the centre of the channel. Careful planning would be required when working so close to a sewer pipe.

The pre-barrage could be constructed from timber baulks (Photo 7 shows an example on the Sussex Ouse). The idea is to raise water levels immediately downstream of the existing barrier (the pipe weir) and provide a step up over the obstacle for migrating fish (Figure 5).

Photo 6 Pipe weir with potential location of pre-barrage

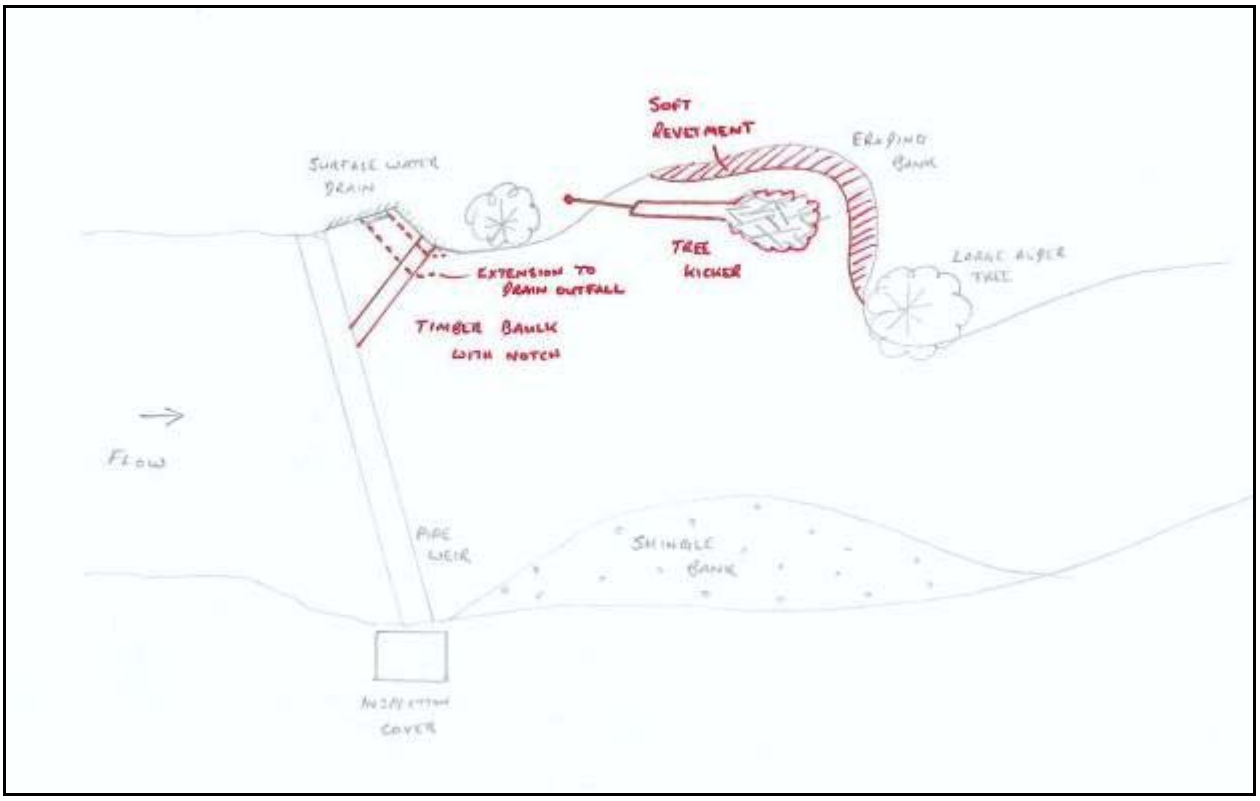

Figure 3 Potential works in the vicinity of the pipe weir. Additions to existing features shown in red.

Photo 7 Timber baulks with notches used to create an easement at a barrier to fish migration (Sussex Ouse).

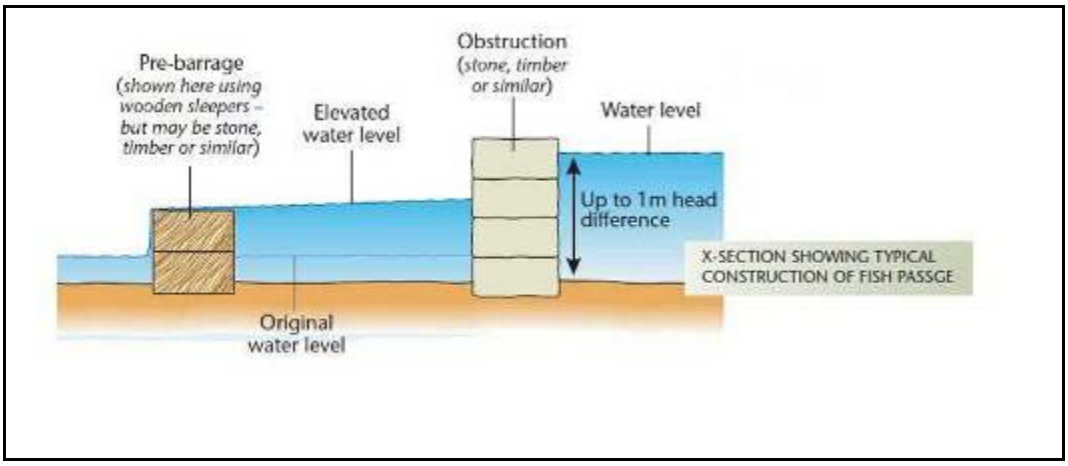

Figure 4 Principle of a pre-barrage

The 2002 WTT report recommended creating more pool habitat within the reach using channel constrictors or wing deflectors. This is a technique which is more suited to lower energy streams with higher base flows such as chalkstreams. The more constant steady flows in such watercourses produce a steady scour (usually of finer bed materials) which maintains pool depth. There are better techniques for improving the variety of depths on higher energy rivers like Bradshaw Brook; these are easier and quicker to implement, have multiple benefits for habitats and are more natural in appearance.

The introduction of large woody debris in the form of tree kickers (or tree sweepers) and submerged log flow deflectors has been carried out successfully on other high energy rivers in the North West (e.g. River Goyt, Disley and New Mills AC – see http://dnmacgoyt.blogspot.com). The River Goyt work was carried out as a partnership between WTT, EA and the angling club. These structures have a variety of effects (Figure 5) including:

- creating localised scour, increasing depths and holding water for adult fish
- trapping fine sediments and narrowing the river channel
- providing cover and refuge for fish
- trapping organic matter providing food for invertebrates (which provide food for fish)

It is recommended that BFF use LWD to introduce habitat diversity to reaches of the river where channel constrictors were previously intended. The comments from EA staff regarding the electric fishing site should be noted and this area should be avoided.

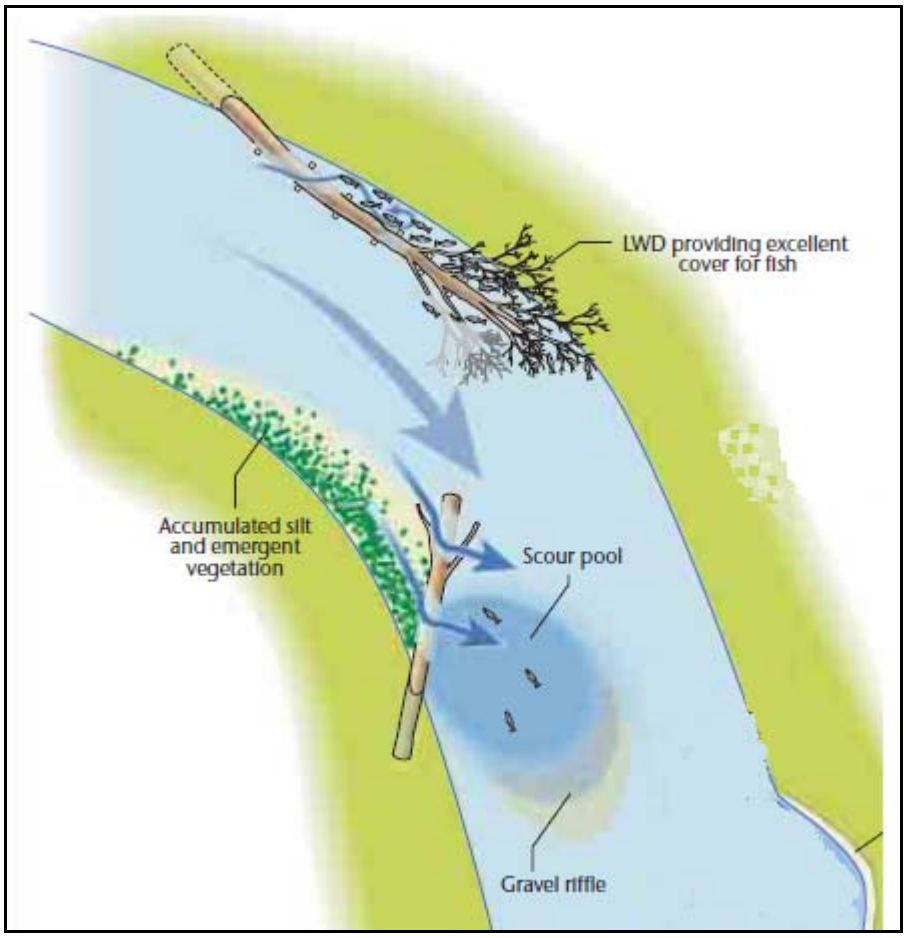

Figure 5 Effects of large woody debris

Other issues affecting the site included a sewer inspection cover which often blows off allowing untreated sewage to enter the watercourse. This normally happens at times of heavy rainfall when the river is high and the dilution prevents the pollution affecting fish life. It is however not an acceptable situation and BFF should keep raising the matter with United Utilities when problems occur.

Himalayan balsam (*Impatiens glandulifera*) is a non-native, invasive plant species which occurs alongside the Bradshaw Brook. It is undesirable because it forms monocultures in areas such as river banks, shading out other low-growing plants. Being an annual, it dies back in winter leaving river banks exposed and more vulnerable to erosion and hence channel widening. Actions such as opening up the tree canopy may exacerbate the problem with balsam and it is recommended that BFF undertake working parties to control this plant, particularly in areas where bank erosion is a concern. Hand-pulling of the plant before it flowers in late summer is probably the best approach. Further guidance on control is produced by the EA (http://publications.environment-agency.gov.uk/pdf/GEHO0410BSBR-e-e.pdf).

Please note:

It is a legal requirement that all the works within or alongside the river channel require written Environment Agency (EA) consent prior to undertaking any works.

4.0 Making it Happen

The Wild Trout Trust can provide further assistance to develop detailed project proposals for habitat improvement works and assist in preparation of consents. Help with fund-raising for projects is available and there are more details on our website www.wildtrout.org under the *Practical Help – Funding* links. Practical demonstrations of habitat improvement techniques are also available through our Practical Visit programme. Please note that there is currently a high demand for these services; please enquire via projects@wildtrout.org.

The potential for tackling larger projects such as weir removal or fish pass installation should be discussed with the EA. The Irwell Rivers Trust may also be a potential partner; contact Matthew Schofield matthew@irwellriverstrust.com .

The Wild Trout Trust's *Trout in the Town Project* is specifically aimed at improving the stewardship of rivers in urban areas by supporting local volunteer and community groups. There has been an expression of interest from local people further downstream on un-adopted sections of the brook

and River Croal. The potential to work in partnership with these people should be considered in order to safeguard the fish stocks of the river, and the best means to do this is by contacting the *Trout in the Town Project* programme manager, Paul Gaskell (07919 157267, pgaskell@wildtrout.org).

5.0 Acknowledgement

WTT would like to thank the Environment Agency for supporting its advisory visit programme.

6.0 Disclaimer