Advisory Visit to the River Cole, Sparkhill (Birmingham)

22nd November, 2014

1.0 Introduction

This report is the output of a site visit undertaken by Paul Gaskell of the Wild Trout Trust to the River Cole on 22nd November, 2014, following prior discussions with Lee Copplestone and Louise North (Keep Britain Tidy) and by agreement with Malcolm Beach, leader of the local Waterside Care group active at Burberry Brickworks reserve – that forms part of Birmingham City Council's "Shire Country Park". Comments in this report are based on observations on the day of the visit and discussions with Malcolm Beach and Debbie Brittle (Waterside Care group committee).

Normal convention is applied throughout the report with respect to bank identification, i.e. the banks are designated left hand bank (LB) or right hand bank (RB) whilst looking downstream. Location coordinates are given using the Ordnance Survey National Grid Reference system.

2.0 Catchment / Fishery Overview

Fishery details	
River	**Cole**
Waterbody Name	**River Cole from Springfield to Hatchford-Kingshurst Brook**
Waterbody ID	**GB104028042502**
Management Catchment	**Tame Anker and Mease**
River Basin District	**Humber**
Current Ecological Potential	**Moderate Potential**
U/S Grid Ref	**SP 09976 83081**
D/S Grid Ref	**SP 09843 83663**
Length of fishery inspected (km)	**0.75**

The River Cole rises on the south western area of the Birmingham plateau at Hob Hill, near Wythal. The geology of its catchment is characterised by Kueper marl clay overlain by drift deposits. It flows in a generally north-easterly direction across the plateau to enter the River Blythe below Coleshill just before the Blythe meets the Tame. It is quite remarkable to note that this river system ultimately discharges into the North Sea through the Humber Estuary.

3.0 Habitat Assessment

The approach that the WTT adopts to habitat assessment is based on three critical lifecycle stages – and the specific habitat required for each:

- Spawning
- Juvenile (normally 0 – 2 years of age)
- Adult (normally 3 years and older)

Each of these lifecycle stages has associated specific habitat features that are crucial for the successful completion of that stage (Figs. 1-3). The existence of (and access to) these crucial habitat types provides many benefits to a wide range of aquatic species in addition to trout. Physical habitat variety is necessary for biological variety to exist. In addition, the completion of lifecycles for many aquatic invertebrate species relies on good variety in the habitat and flora present on the land adjacent to the river. For these reasons, the overall health of a river corridor habitat (whether below or above the water-line) is essential if it is to support the widest variety of species. The ways that calories produced by plants growing on land or water are consumed by herbivores and then passed throughout both aquatic and terrestrial communities (through a whole variety of feeding strategies) means that the "dry land" and "wetted channel" parts of every river corridor are tightly connected and inter-dependent (e.g. Fig. 1).

As is generally true across the salmonid family, trout suffer very high mortality rates between hatching from the egg and reaching one year of age. Even in very high quality habitat, around 95% of trout will die within their first year. This is the reason that female trout lay a large number of eggs (around 900 eggs per pound of maternal bodyweight). However, when

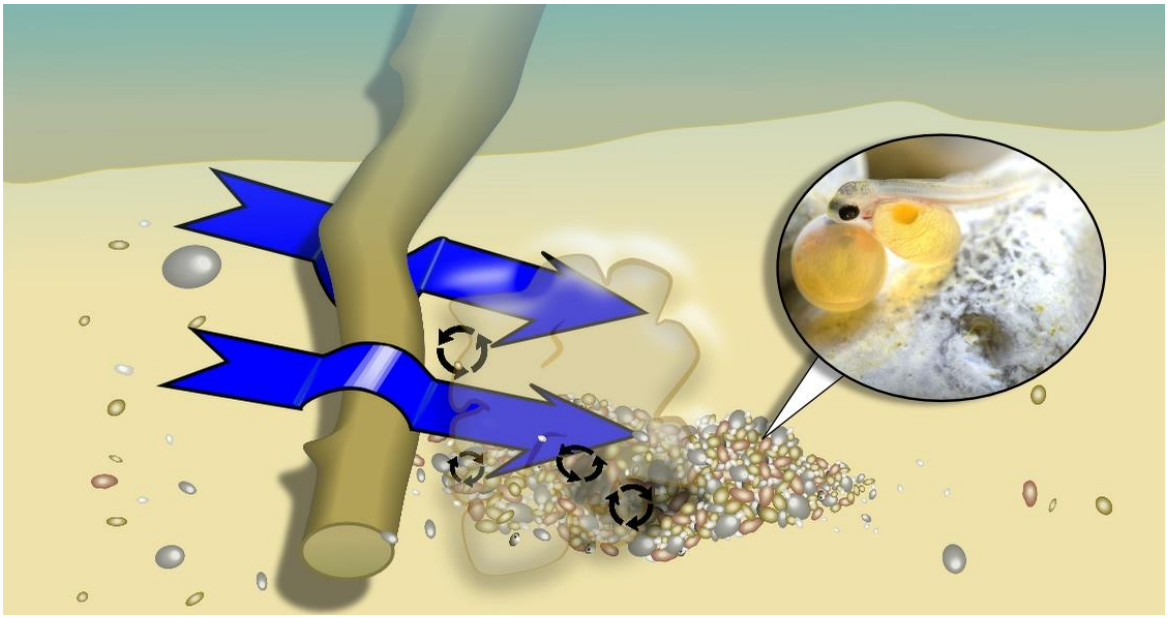

Figure 1: Features associated with successful trout spawning habitat include the presence of silt-free gravels. Here the action of fallen tree limb is focusing the flows (both under and over the limb as indicated by the blue arrows) on a small area of river-bed that results in silt being blown out from between gravel grains. A small mound of gravel is deposited just below the hollow dug by focused flows. In these silt-free gaps between the grains of gravel it is possible for sufficient oxygen-rich water to flow over the developing eggs and newly-hatched "alevins" to keep them alive as they hide within the gravel mound (inset) until emerging in spring.

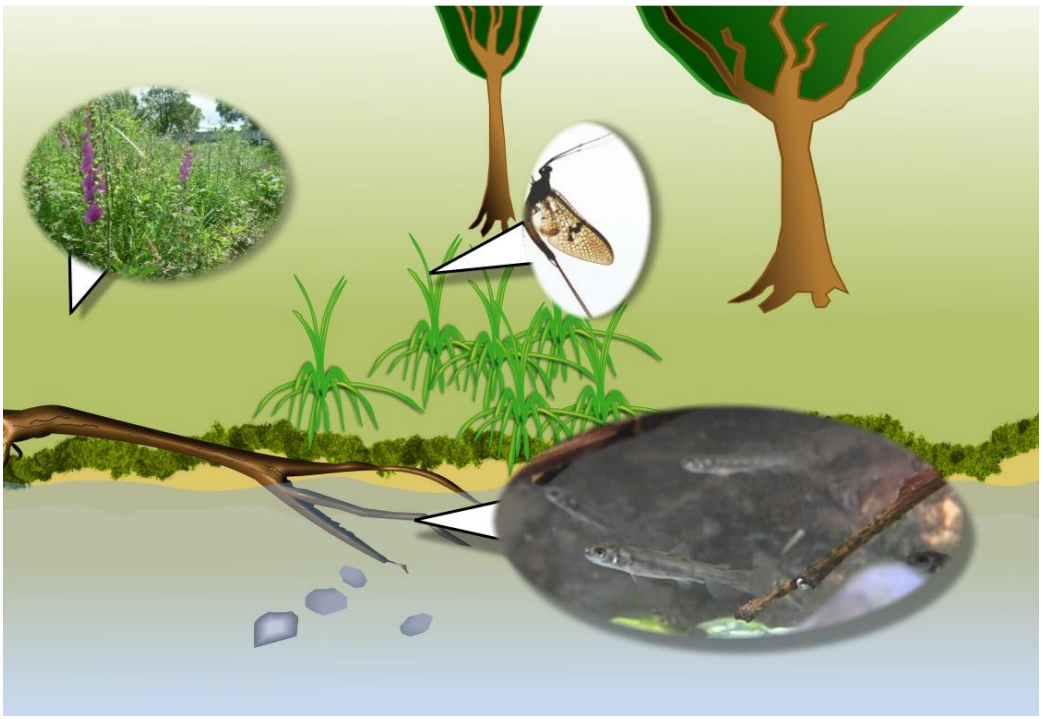

Figure 2: Larger cobbles and submerged "brashy" cover and/or exposed fronds of tree roots provide vital cover from predation and spate flows to tiny juvenile fish in shallower water (<30cm deep). Trailing overhanging vegetation also provides a similar function and diverse bank-side vegetation has many benefits for invertebrate populations (some of which will provide a ready food supply for the juvenile fish).

Figure 3: The availability of deeper water bolt holes (>30cm to several metres), low overhanging cover and larger submerged structures such as boulders, fallen trees, large root-wads etc. close to a good food supply (e.g. below a riffle in this case) are all strong components of adult trout habitat requirements.

habitat bottlenecks exist that lower egg and/or juvenile survival, the impacts on populations can be devastating. Of course, if there is no access to suitable adult habitat, then resident trout populations will be similarly restricted – unless there is ready access to marine migration that could support a sea-trout population (both resident and sea trout belong to the same species *Salmo trutta*).

The report assesses the status of the section of the river Cole as visited in November 2014 and identifies where there may be opportunities to improve aspects of the habitat for the benefit of wild trout and the wider river corridor flora and fauna. This may be of potential use for augmenting the already excellent works carried out by the Waterside Care group that look after and manage the habitat within and around the river corridor.

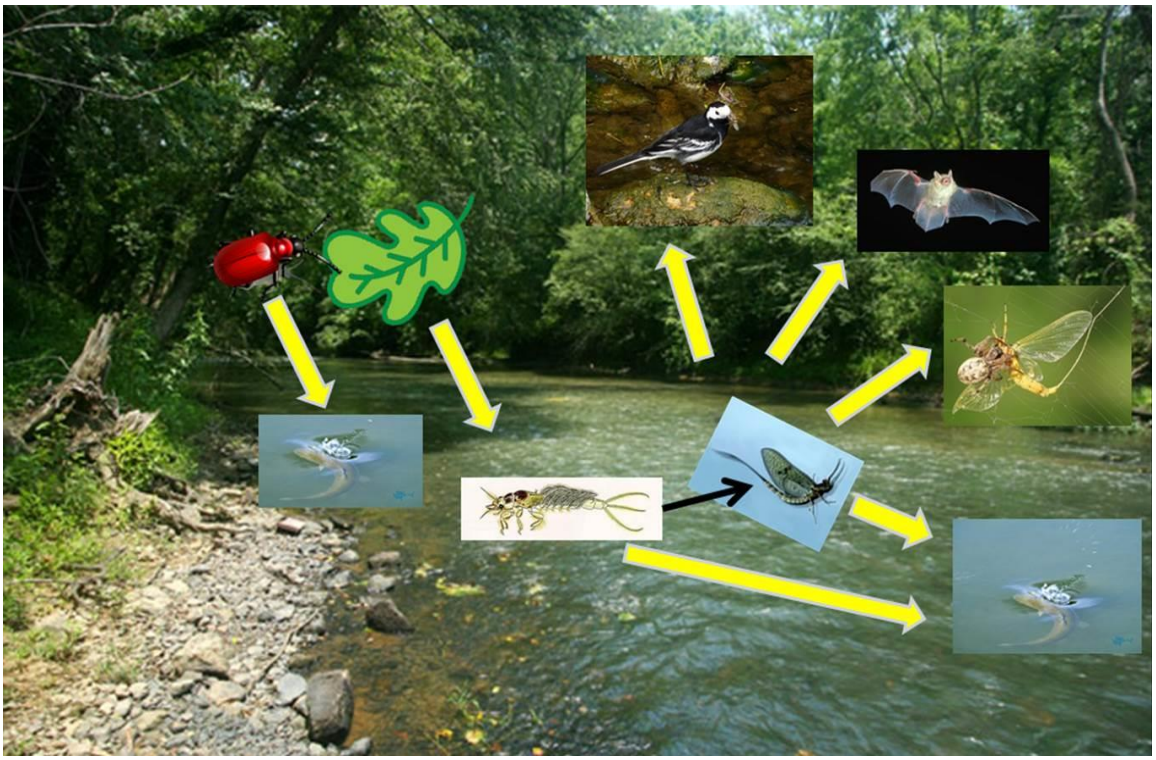

Figure 4: Examples of how "terrestrial" and "aquatic" foodwebs are not possible to separate. This underlines the importance of habitat quality both above and below the waterline for the overall health of the river corridor and its flora and fauna

For ease of reference, the report is divided into two sections – with the bridge on Formans Road forming a convenient division between the described reaches.

3.1 Below Formans Road Bridge

Progressing upstream from the lower limit visited on this occasion (National Grid Reference SP 09843 83663) the first observation to make is the notable artificial straightening of the channel (Fig. 5). Throughout the visit the river level was relatively high as a result of heavy prior rainfall, so some features of the riverbed were not possible to observe closely (although a previous Advisory Visit report, available on request, considering reaches of the Cole both up and downstream on the same river gives relevant clues).

There was quite good marginal overhead cover provided by the shaggy growth of bank-side plants (predominantly brambles) – but a general lack of diversity in flow depth and pace due to the straightened nature of the channel (Fig. 5). The overall value of the bank-side cover could possibly be

enhanced by some management of the bramble patches to allow other native species to also colonise.

Figure 5: Artificially straight channel but with dense (low-level) overhead/trailing cover provided primarily by dense brambles. Submerged structural cover would increase the value of this section to adult fish and a more diverse flora would benefit associated invertebrate communities.

The presence of surface water drainage outfalls from a variety of apparently industrial properties (e.g. Fig. 6) provides a visual reminder of the ever-present risks to water quality due to accidental spillages of chemicals (or misconnections) in almost all urban watercourses (see http://www.connectright.org.uk/ for more information). Consequently, there can be great benefit to undertaking monitoring of pollution-sensitive aquatic fauna as a means of detecting and tackling pollution (see section 4: Recommendations).

More difficult issues that arise from urban drainage arise from the large areas of pavement/relatively impervious surfaces that include roof drainage systems (e.g. Fig. 7). The lack of opportunity for rainfall to soak into the ground before percolating either to the groundwater or into river systems leads to extremely rapid rises in river levels. It also reduces the opportunities for pollution to be removed from that water before it enters a watercourse. This is a much broader issue to tackle than the main scope of this report – but there is additional information here and also a call for

people to respond to the current E.A. consultation on managing flood risk: http://urbantrout.blogspot.co.uk/2014/10/please-watch-before-responsing-to-ea.html)

Figure 6: Surface water drainage outfall

Figure 7: Drain pipes at SP 09845 83636 funnelling roof drainage to a single discharge point onto the riverbank (which may provide at least some small opportunity for soakaway and/or removal of pollutants prior to entry into watercourse. This protective effect may be quite limited during heavy downpours.

Approximately 10 m upstream of the photographed roof-drainage pipes there was a nice example of in-stream cover generated by fallen dead wood (Fig. 8).

Figure 8: Good quality submerged cover formed by fallen wood. This effect can be augmented by deliberate introduction of comparable woody material and using secure anchoring techniques to stabilise introduced material

A section with greater variation in the riverbed profile was evident around SP 09860 83577 (Fig. 9) and also included the opportunity to use non-native sycamore as a source of securely-anchored submerged cover (Fig. 10). As well as the benefits of cover to adult fish, there is also potential for such material to help to "grade" gravels in the stream bed into mounds made up of particles suitable for trout spawning (as illustrated in Fig. 1).

Just upstream at SP09858 83539 there was a combined sewer outfall ("CSO" which under normal conditions carries and discharges relatively clean surface water but also has the capacity for foul-sewer discharge under heavy rainfall). Depending on maintenance and also the proportion of misconnections to these systems, they can represent a significant source of pollution to surface watercourses (i.e. rivers and streams).

Figure 9: Section with greater variation in understory vegetation species and more varied riverbed profile (left) as well as the opportunity to augment the currently very sparse in-stream woody material by using material arising from non-native sycamore (right). Photos both taken from SP 09860 83577

Figure 10: Combined Sewer Outfall (CSO) at SP 09858 83539 (left) sited beneath footbridge (right) that carries the river-side footpath

The steep banks evident in the reach photographed at SP 09856 83527 show a risk of unwelcome inputs into the channel from sources such as the rubble pile that is breaching the fencing at this location (Fig. 11). It would be desirable for local Council and Environment Agency representatives to help

site operators/owners to establish better control of accidental collapse/release of materials from such sites.

Figure 11: Steep-sided opposite bank at SP 09856 83527 with fencing panels being breached by collapsing rubble pile (and associated litter inputs)

Although reported during the visit to be smaller than originally planned due to the line taken by a gas main through the site, there is a valuable wetland scrape that has been created and periodically connected at its upstream end (during high flows) to the main river channel (Figs. 12 and 13). Waterside Care members are concerned that the large growth of weed (and possibly algae) during summer months could be tackled by connecting the scrape at both upstream *and* downstream ends to provide a sweetening flow. This could, potentially be beneficial; although this will critically depend on the water in the river being "cleaner" than that which seeps into the scrape currently from the surrounding land (the likely source of the nutrients which support the vigorous aquatic plant growth especially during hot summer months). *Topographical surveys would also be required to determine*

whether there is sufficient vertical head difference between inlet and outlet to generate a flow through the pond. Currently the scrape is providing additional biodiversity benefits and a degree of increased flood water storage capacity. Adopting some invertebrate monitoring (see section 4: Recommendations) to try to understand the likely nutrient/pollution status of the main river would enable a better judgement of the possible costs/benefits of generating a sweetening flow through the pool (and to establish whether the end results would justify the expense of burying a connecting pipe beneath the footpath.

Figure 12: Elevated walkway platforms giving sustainable access to the wetland scrape (and associated wetland plants). This is a valuable addition to biodiversity in the flood plain and also may provide a degree of flood water storage that could help to reduce potential flooding of properties and infrastructure downstream. It is currently uncertain whether increasing the ease and frequency of exchange of water between wetland and main river would result in benefits to flora and fauna in the wetland. If water quality was found to be good enough, there may be a benefit to increasing the ease with which fish can enter/exit the pond such that it functions as a refuge during spate-flow conditions in the main river.

Figure 13: Ephemeral connecting channel between main river and the upstream side of the wetland scrape at SP 09891 83485

Although sited in the middle of an extremely urbanised section of Birmingham, the sheer size of the historic brickworks site that has been reclaimed and re-vegetated has created an impressive nature reserve around the River Cole corridor at this location. An overview of the swamp/heath (Fig. 14) and methane vent for reclaimed buried site (Fig. 15) provide a context for other details and suggestions within this report.

Figure 14: Extensive haven for birds, wetland flora and fauna in urban Birmingham (taken at SP 10032 83610)

Figure 15: Vent to release gases from buried site standing above entrance to Shire Country Park at SP09959 83723

3.2 Upstream of Bridge

The Bridge on Formans Road is located at SP 09910 83358 (view facing downstream from this bridge; Fig. 16)

Figure 16: Walled channel directly downstream of bridge on Formans Road

The channel on the Left Bank (LB) above the bridge is bordered by allotments and there are apparent litter problems associated with those that back directly onto the river (Fig. 17). Tree density along the riverbanks is generally greater in the reaches upstream of the bridge – providing ample potential material to be used for in-stream structural enhancements (Fig. 17).

Figure 17: Channel backing onto allotments at SP 09943 83264 - litter issues (L) and increased tree density (R) relative to the majority of the reach below the bridge

A further outfall at SP 09941 83222 (Fig. 18) may be worth inspecting for possible misconnections (Malcolm Beach reports that there is a 3 °C temperature difference in the reaches below this outfall compared to those above).

Figure 18: Small quantity of grey water issuing under low outfall discharge conditions at SP09941 83222 – a potential indication of blockage or misconnection in the system

A riffle (gravel and cobble) formed at SP 09970 83097 (Fig.19) may (under future investigation with clearer water) offer an opportunity to improve prospective spawning success. Just upstream of the riffle (Fig. 19), secure installation of suitable woody structure may promote beneficial localised scour and sorting of spawning gravel as illustrated in Fig. 1.

Figure 19: Riffle (L) and the glide just above it (R) at SP 09970 83097 providing valuable variety to riverbed profile. Secure installation of a suitable woody debris structure towards the tail of the glide could significantly improve spawning success for gravel-spawning fish species.

The upstream limit of the river observed around 10-m upstream of SP09976 83081 during this visit consisted of examples of good quality habitat associated with a meandering path of the channel (Fig. 20) as well as some useful cover provided by understory vegetation. The channel meandering was also associated with the formation of another riffle as well as valuable "scour pool" habitat formed as the river carved a deeper slot on the outside of the bend. It is likely that the secure introduction of some submerged, dense "brash" cover in this area of the river would substantially improve the survival prospects of juvenile fish – as well as aiding in the patchy retention of leaf-litter material (along with associated invertebrate communities). More detailed advice on specific measures is given in Section 4.

Figure 20: Probably the best quality river corridor habitat observed during the current visit. Greater structural variety around SP09976 83081 translates into more diverse opportunities for wildlife.

4.0 Recommendations

Habitat in reaches of the Cole both upstream and downstream of those visited for the purposes of this report support trout (Advisory Visit report from 2010 available on request). This means that, as long as water quality can reasonably be expected to meet a minimum requirement for trout, there is value in ensuring that suitable wild trout habitat exists in the Burberry Brickworks reaches. Promoting healthy structural diversity offers benefits to a range of flora and fauna as well as providing habitat that could be used intermittently (by ephemeral populations) or on a more permanent basis (by fully resident populations). Even intermittent use of such habitat would provide significant enhancements to the overall resilience of self-sustaining

wild trout populations within the Cole. The ability of trout to emigrate/recolonise following impacts such as predation, pollution or extreme flow conditions is reliant upon there being a sufficient "network" of sites within which they can thrive and then potentially seed juvenile (or adult) fish to other areas.

Specific actions that could help to provide those benefits would include:

- To continue (and possibly extend) existing Himalayan Balsam (*Impatiens glandulifera*) control efforts carried out by the Waterside Care volunteers and other custodians (including local council). This would help to generate valuable understory vegetation cover – including regeneration of trees whose seedlings will currently be outcompeted where balsam stands are dense and vigorous.

- On a similar theme to above, maintaining a diverse "patchy" distribution of brambles by cutting back the centres of the thickest stands (if suitable equipment and operators are available)

- Where opportunities exist – to securely cable suitable woody debris to existing tree root masses in the margins of the river to increase available cover for juvenile and adult fish (an example is shown in the video on the following link – but note that these structures can be scaled to ensure that they are appropriately-sized to each individual river channel: https://vimeo.com/72720550).

- In addition to cabled tree limbs/crowns, some areas (such as those pictured in Fig. 20) provide good opportunities to "lay" or "hinge" bankside sapling and scrub growth down so that it trails in the water – providing some of the ideal juvenile habitat illustrated in Figs. 2 & 21

Figure 21: Hinged marginal brash creating cover for juvenile fish

- Keep an eye on CSO discharges that could be misconnected – and report foul discharges that occur when the river is at low-flow levels. Both the Environment Agency (0800 80 70 60) and local Utilities company (Severn Trent: 024 7771 5000) should be informed of such incidents.

- Consider undertaking training from the **Riverfly Partnership** in order to monitor overall water quality status and identify pollution incidents more effectively: http://www.riverflies.org/get-involved. This would also help to inform discussions on whether or not it would be appropriate or desirable to pursue the connection of the wetland pool to the main river at both upstream and downstream ends. Indications that the main river tends to be nutrient-enriched would limit the potential benefit of going to the expense of creating what would be hoped to be a "sweetening" flow through the pool.

- At suitable location/locations (for instance SP 09970 83097) secure installation of woody structures that would promote localised sorting of riverbed gravels (as illustrated in Fig. 1) could provide valuable opportunities for successful recruitment of gravel-spawning species such as trout. As an example, see structures outlined from 4 minutes and 13 seconds in this online video guide: https://vimeo.com/32317564)

5.0 Making it Happen

For the in-channel structural habitat enhancements proposed in Section 4, The Wild Trout Trust may be able to offer assistance in acquiring appropriate skills and knowledge for the physical installation of suggested structures. Demonstration plots can be completed during the course of training events (see "Practical Visits" below). In addition, The Wild Trout Trust can offer support in applying for the necessary permissions to carry out works within the River Cole.

The Wild Trout Trust has produced a 70 minute DVD called 'Rivers: Working for Wild Trout' which graphically illustrates the challenges of managing river habitat for wild trout, with examples of good and poor habitat and practical demonstrations of habitat improvement. Additional sections of film cover key topics in greater depth, such as woody debris, enhancing fish stocks and managing invasive species.

The DVD is available to buy for £10.00 from our website shop http://www.wildtrout.org/product/rivers-working-wild-trout-dvd-0 or by calling the WTT office on 02392 570985.

There is also the possibility that the WTT could help via a **Practical Visit** (PV). PV's typically comprise a 1-3 day visit where WTT Conservation Officers will complete a demonstration plot on the site to be restored.
This enables recipients 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 (or their supporting bodies) will be expected to cover travel and accommodation (if required) expenses of the WTT attendees and the activities to be carried out would be confirmed by way of a separate "project proposal" document.

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 organisations and landowners through guidance and linking them up with others that have had experience in improving river habitat.

6.0 Acknowledgement

The Wild trout Trust would like to thank the Environment Agency for their continued support of the advisory visit service.

7.0 Disclaimer

This report is produced for guidance only. 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.