# Advisory Visit

# River Irwell

# 5/5/2011

## Introduction

This report is the output of a site visit undertaken by Paul Gaskell of the Wild Trout Trust to the River on 5th May 2011. Comments in this report are based on observations on the day of the site visit and discussions with Mike Duddy, Paul Carr, Nick Carter and Adam Moolna of Salford Friendly Anglers (SFA: a "Trout in the Town" project affiliate).

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.

## 1.0 Catchment / Fishery Overview

The River Irwell is a 39-mile (63 km) long river flowing through the counties of Lancashire and Greater Manchester in North West England. The river's source is at Irwell Springs on Deerplay Moor, approximately 1.5 miles (2.4 km) north of Bacup, Lancashire. The Irwell flows through Rawtenstall, Ramsbottom, Bury, Kearsley, Clifton and Agecroft, Lower Broughton and the city centres of Manchester and Salford, before joining the River Mersey near Irlam. The underlying geology is comprised of Lower Coal Measures overlying Millstone Grit; both of which are underlain by limestone rocks from the lower Carboniferous period. The surface deposits vary between thick peat in the upper reaches to glacial boulder clay, glacial sand and gravel in the lower reaches. The river channel varies in accordance with its progress through the catchment; being a steep freestone spate stream in its upper reaches tending to a lower gradient, heavily modified channel in the lower sections. Impressive spate flows are experienced on the Irwell, although conditions during the site visit approximated to minimal summer flow levels.

Local angler Mike Duddy has re-established the world's oldest angling society "Salford Friendly Anglers" (first constituted on the 2nd of April 1817: http://www.salfordfriendlyanglers.co.uk/) as a means of caring for and campaigning on behalf of the River Irwell. Salford Friendly Anglers also aim to secure and protect free angling access (coarse and game) to a selection of reaches of the river for future generations. Representative reaches spread over approximately 25 miles of river were visited in order to assess both habitat quality and also potential suitability for Riverfly Partnership "Anglers' Monitoring Initiative" stations (http://www.riverflies.org/index/riverfly_monit.html).

The North West River Basin District River Basin Management Plan (Annex C Actions: http://wfdconsultation.environment-agency.gov.uk/wfdcms/Libraries/NW_Consult/C%20-%20Actions.sflb?download=true) identifies the following pressures affecting the Irwell catchment:

- Sediments (as a direct pollutant)
- Nutrients
- Abstraction and other artificial flow pressures
- Direct biological pressures
- Physical modification

Selected actions (necessarily condensed from the full version) that the Management Plan assigns to address these pressures are excerpted here (Table 1).

**Table 1: Excerpted pressures and associated reparatory actions specific to the Irwell catchment identified in the North West River Basin Management Plan (NW RBMP) issued in December 2009**

| Pressure | Actions Assigned (spanning central/local/regional government, Environment Agency. and Water Industry delivery) |
|---|---|
| Direct Biological pressures | Incorporate recovering salmon rivers in Lancashire (Calder), Merseyside and Greater Manchester, not currently formally covered by Salmon Action Plans (SAP), into the new North west Sea Trout and Salmon Management Plan |
| Direct Biological pressures;<br><br>Habitat Manipulation (restoration/improvement) | Study has been commissioned into the current and future maintainance practices and other habitat management in the floodplains of River Irwell, River Croal and River Roch. Following the recommendations from this study, implement actions that provide opportunity for habitat to flourish and possible floodplain reconnection, subject to the conditions of improved ecology and reduced flood risk. |
| Physical modification; Sediments (as a direct pollutant); Alien species | River Restoration studies and fluvial audits to involve land owners, flood risk management personnel and habitats personnel to allow for renaturalising landscape and to restore habitat - regravelling, replanting, removal of alien species etc. Various projects are at feasibility stage and scoping stage |
| Sediments (as a direct pollutant); Temperature; Microbiology; Organic pollutants; Priority Hazardous Substances, Priority Substances and Specific Pollutants; Salinity; Nutrients | Carry out research or targeted local investigations into the origins, causes of and solutions to pollution where most risk. E.g.: Drainage and misconnection surveys of industrial estates. Misconnection of domestic sewerage systems into watercourses, colour coding outfalls etc. |
| Sediments (as a direct pollutant); Priority Hazardous Substances, | Aquatic Litter Programme. Funding the work of a Mersey Basin Campaign (MBC) Project Officer to tackle the problem of |

| Pressure | Actions Assigned (spanning central/local/regional government, Environment Agency. and Water Industry delivery) |
|---|---|
| Priority Substances and Specific Pollutants; Microbiology; Abstraction and other artificial flow pressures | waterborne debris including that prevalent in culverts. In some instances litter traps can be introduced on suitable rivers. |
| Direct biological pressures; Physical modification | The Old Irwell project in Irlam, Greater Manchester, will seek to address pollution incidents and fish kills. Plans are to carry out habitat enhancement works at the site for the local community as well |
| Priority Hazardous Substances, Priority Substances and Specific Pollutants | To address benzo(ghi)perelyene, indeno(123-cd) pyrene, benzo(a)pyrene, identify hot spots for run-off of sediment and other pollutants from highways by 2015 |
| Organic pollutants | 65 intermittent discharges will be improved, either by providing storage, increasing the Pass Forward Flow (so that more flow is treated at the works), or through transfers under Change Protocol C. Screening and event monitoring will also be provided where required |
| BOD; Ammonia; Dissolved Oxygen | AMP5 improvement scheme at Oldham WwTW in the Irwell catchment to meet Water Framework Directive ammonia and BOD standards and the Fresh Water Fish Directive Dissolved Oxygen standards in the Manchester Ship Canal. |
| Aesthetics | Screening will be provided to reduce aesthetic impact of **20 discharges** under “Change Protocol C”. Event monitoring will also be installed where required.<br><br>Screening will be provided to reduce the aesthetic impact of **40 discharges** under “Change Protocol A”. |
| Organic pollutants | Storage will be provided to reduce spills from 2 discharges under “Change Protocol A”. Investigation of the intermittent discharges to the River Irk and Irwell using Integrated Catchment Modelling |

It is recommended that SFA and the WTT work closely together with Fisheries and Biodiversity Officers to ensure the most efficient pursuit of mutually desirable ecological goals. Explanations of actions and “Change Protocols” listed in the management plan should also be sought from Environment Agency (E.A.) personnel. Of immediate note is the highlighting by both SFA and the E.A. of water quality, aesthetics and screening of consented discharges as issues of major concern.

## 2.0 Habitat Assessment

In keeping with the order that sites were visited, the report will consider the reaches sequentially from the furthest downstream to the furthest upstream. The observed features will, consequently, reflect the changes in stream character along a continuum from lowland to approaching the headwaters. A ten-digit National Grid Reference (NGR) with an instrument accuracy of 10 to 30 feet is provided for individual reaches.

### *2.1: Reach 1, NGR SJ 83462 99291 to SD 81665 00455*

This Salford city centre location is typified by the extensively engineered, straightened channel embedded within steep flood banking (e.g. Fig. 1). Steel and concrete pilings are used to define the dimensions of the watercourse at the toe of the embankment and part of the original path of the riverbed (the beginnings of what was a long meandering loop) is visible as a row of boulders and cobbles crossing the contemporary channel at roughly 45 degrees (also Fig. 1).

**Figure 1: Engineered channel with old riverbed just visible (ringed) under low flow conditions during visit**

As with all reaches visited, invasive plant species were present in large stands on the riverbanks. Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and giant hogweed (*Heracleum mantegazzianum*) are all present in prodigious quantities and represent a significant threat to river corridor biodiversity. However, the scale of infestation will require enormous investment to tackle and is currently beyond the scope of local volunteer stakeholders. Recommended suggestions for roles that local stakeholder groups could play in the process are included in section 3.

Members of SFA report huge peaks in coarse fish numbers (as well as trout) on certain occasions in this section. During the visit specimen bream and carp were clearly visible in sizeable shoals. However, dramatic crashes in fish numbers also occur. These could be due to episodic pollution events (and there are certainly fish kill incidents reported). However, crashes are also suggested to be related to huge spate events discharging down the smooth, uniform channel. An obvious improvement to the chances of retaining all species of fish during spate flows would be to securely anchor marginal cover using heavy duty masonry drilled anchor points (expansion bolts). Suitably-sized trees anchored parallel to the bank on short steel cables would provide valuable calm spots of water even in the fiercest spates (section 3). Due to the city centre location, detailed consultation with Development Control and Flood Risk Management personnel from the E.A. would be obligatory.

Another fundamental improvement would be to ensure the best possible longitudinal connectivity (so that fish can move as far up and downstream as possible) via bypassing or reduction/removal of structural barriers throughout the system. Concentrating on strategic improvements to connectivity is likely to be far more productive than the creation of spawning habitat suitable for trout and salmon in these lower (currently periodically polluted and physically unsuitable) reaches. The guiding principles for strategic prioritisation of barriers are to assess a combination of the length and quality of habitat that become available when each barrier is tackled. The top priority goes to barrier removals that give access to the greatest amount of spawning and nursery (or otherwise high quality) habitat. It is, therefore, important to factor in planned habitat improvements when assessing habitat quality during this process. The planned fish pass scheme in the reach above Littleton Bridge (NGR: SD 81665 00455; Fig. 2) could

potentially be enhanced by undertaking the simple improvements to marginal habitat suggested above and in section 3 (Recommendations).

**Figure 2: Section below weir (just visible middle right of frame) and above Littleton bridge (out of frame to left). The same issues exemplified in Fig. 1 are evident here with additional emphasis on the value of habitat improvement that would increase the value of fish pass installation**

### *2.2: Reach 2, area around bridge at NGR SD 76992 04483*

Although suffering from extensive invasive plant infestation (e.g. knotweed to right of frame in Fig. 3), the channel morphology in this section is markedly different from that in Reach 1. For example, the plentiful supply of large cobbles and pebble/gravel substrate, steeper longitudinal slope and appropriate channel width combine to produce some valuable scour and depositional processes. Examples of gravels deposited on the inside of river bends to form “point bars” (Fig. 4, lower right foreground) and mid-channel gravel spits (Fig. 4, mid right background) show these processes in action. Such spatial variety produced by these processes benefits plant, invertebrate and fish communities by providing a broad range of micro-habitats that can support a greater range of species. Even within a single species, the existence of structural variety can meet the varying needs of that species

**Figure 3: Deep bend pool (adult fish habitat) below riffle and pool tail photographed from SD 76992 04483. Note Japanese knotweed stand and compacted earth bank to the right of the picture**

**Figure 4: The tail of the pool/head of riffle just upstream of the bend pool pictured in Figure 3. Note shingle point bar (right foreground) and mid-channel spit (right background) formed by natural erosion and depositional processes.**

across different stages during its individual lifecycle. An obvious example when considering trout lifecycles would be the existence of spawning, nursery/juvenile and adult fish habitat within a short spatial range. To this end, the value of spawning gravels for trout (and in future salmon?) could be enhanced by the installation of structure that promotes localised vertical scour of the stream bed (section 3). Similarly, additional marginal brash cover would be of great benefit to juveniles of all fish species – especially when provided adjacent to spawning habitat. Looking to the future, the size range of river bed particles that are mobilised and deposited in this reach would encompass those larger gravels/cobbles favoured by larger migratory fish such as salmon and large sea trout.

Not far from the reach pictured above, there is a pertinent reminder of one of the major issues faced by the Irwell. As one of the 300 or so consented discharges the scale of the influence potentially exerted by these inputs is brought home by photographs such as Figs. 5 and 6:

**Figure 5: Large Combined Sewer Outfall (CSO) at NGR: SD 76551 04705**

**Figure 6: Treated effluent discharge at SD 76938 04516 - benefitting from recent investment in the plant and treating a huge volume of the Manchester connurbation's sewage - but clearly a significant factor in the nutrient and water quality status of the River Irwell (the river is ~ 35 m wide at this point)**

Clearly, the potential stresses that each of these treated effluent and CSO discharges can place on the Irwell are enormous. However, modest (or preferably significant) improvements in the performance of such outfalls and treatment plants will all translate into significant benefits for the river's ecology. This is a simple function of the sheer volume and frequency of discharges into the river.

### *2.3: Reach 3, Burrs Country Park area NGR SD 79671 12598 to SD 79647 13073*

Further upstream again, the river narrows and hosts a kayaking facility created from installed boulders. Habitat that favours "flow-loving" (rheophilic) fish species like trout and barbel is produced both from the naturally-arising and some of the installed channel characteristics in this reach. In particular the boulder placements that form narrow chutes for

kayaking combine with natural deposition and erosion of the stream bed to form good, variable habitat (Fig. 7). However, there is still a lack of what is

**Figure 7: Boulders (background: centre and right) installed for kayaking amenity are helping to promote good, variable flow and substrate conditions**

termed “well-sorted” or “graded” spawning gravels. Sorting or grading refers to the processes of localised scour and deposition that lead to substrate material occurring in mounds made up of similar sized particles. Simply as a result of their similar and slightly irregular diameters, well-sorted gravels have lots of spaces for water to percolate between the ill-fitting pebbles. By contrast, poorly sorted gravels will have sand and silt clogging these gaps that prevents flow of water through the gravels (e.g. Fig. 8). Since survival of trout eggs laid in gravel beds is crucially dependent upon this “through gravel” flow of oxygenated water, localised bed scour and associated gravel sorting is very important. Again, as for the habitat in Reach 2 exemplified in Figure 4, suggestions for promoting patches of localised scour and sorting of gravels are given in section 3 “Recommendations”.

**Figure 8: Substrate of mixed sand, silt, gravel and pebbles in the Burrs Country Park kayak course. Although suitably-sized gravels exist in the bed substrate, the clogging of gravels with finer sediment means that trout egg survival will be poor due to the lack of "through-gravel" water flow**

The other notable feature of this reach is a truly enormous weir at SD 79647 13073 that is estimated by Mike Duddy to impound at least quarter of a mile of the upstream watercourse (Fig. 9). Mike also made mention of potential

**Figure 9: Weir with an estimated vertical head loss of ~25 feet at SD 79647 13073**

plans to incorporate an existing leat/canalised channel associated with the weir into a fish passage solution. However, the feasibility of this proposal is currently unclear. As highlighted in the RBMP, connectivity between good patches of habitat is very important for healthy and resilient populations of aquatic fauna. In addition to connectivity, there are issues of habitat degradation resulting from impoundment of flowing water. Degradation primarily results from siltation and associated homogenisation of habitat. Weirs of the magnitude exemplified in Figure 9 create substantial challenges for habitat remediation - as their removal (or bypassing) cannot be undertaken lightly. Changes to vertical head loss at the structure that are too radical will lead to extensive, potentially unpredictable, changes to the river bed and river banks upstream (with subsidence/collapse of banks possible). Similarly, the river's industrial past increases the likelihood that sediments trapped behind the weir may be contaminated. Large scale downstream mobilisation of contaminated sediment should, of course, be avoided where possible. Therefore, strategic approaches to structure modification are required and mathematical modelling of predicted impacts undertaken. Typically the proposed changes should be undertaken in phases – with observed responses compared to model predictions before progressing from one phase to the next.

### *2.4: Reach 4, Summerseat area around NGR SD 79367 14574*

Although typically running between the confines of stone walls (and with invasive plant species still a feature of riparian vegetation) the river in this section has many examples of good quality habitat for rheophilic fish. A relatively steep longitudinal bed slope, abundance of small boulders and cobbles and the presence of trees within the river corridor produce a series of pools and riffles with a good degree of variety in flow depths, current speed and a healthy riparian light/shade regime. In the immediate future there is relatively little benefit to concentrating habitat improvement works in this section. Instead, efforts to bring habitat quality elsewhere up to those evident in this reach and to work on water quality and connectivity across the catchment should be undertaken. It may be appropriate, following surveys from the headwaters downstream to identify species and extent of infestation, to consider invasive plant species control in these reaches. The important caveat for this would be to implement control measures sequentially from the upstream limits of infestation. There is also a great deal of value in including this section in the proposed invertebrate

monitoring scheme so that water quality issues can be picked up immediately.

**Figure 10: Generally good quality habitat between the stone walls in Reach 4. Some Himalayan balsam plants are visible between the bankside boulders**

### *2.5: Reach 5, Ewood Bridge area upstream of NGR SD 79557 20874*

Although bordered on one side (RHB) by rough pasture, the presence of a steep wall (and in places livestock fencing) has largely prevented overgrazing and poaching (over-widening by trampling) of the river bank. Consequently, the comments made for Reach 4 are directly applicable to this reach – with the main focus invertebrate/water quality monitoring with possible consideration of invasive plant species control.

## 3.0 Recommendations

The first three recommendations largely concentrate on the influencing of regulatory bodies and stakeholders with direct responsibility for river corridor environments (including landowners/local councils). Areas of overlap into habitat works or direct volunteer activity are also defined.

### *3.1 Invasive species*

Although a major issue on the Irwell, riverbank infestations of invasive plant species are probably beyond the scope of a newly-formed volunteer group to tackle alone. Consequently, the most practical role for such a group will be to campaign to hold governmental bodies and landowners to the obligations of biodiversity and ecological status implied in law. Advice and support on achieving this (e.g. identifying appropriate points of contact and legal advice) could be gained from contacting and joining the Angling Trust (perhaps as a group membership): http://www.anglingtrust.net/. Of course, where contributions of labour to hand pulling of Himalayan balsam or mapping/surveying particular reaches can be made, there may be opportunity for direct volunteer involvement.

**Figure 11: Giant Hogweed individual plant (L) and continuous stand (R) on the Irwell (part of many miles of infestation). Definitely NOT one for hand pulling due to the potential for toxic sap burns in the presence of sunlight**

### *3.2 Water Quality*

As mentioned in the Catchment Overview, Salford Friendly Anglers have secured funding and booked training to establish the Riverfly Partnership's "Anglers Monitoring Initiative". Coupling this monitoring with the knowledge of consented discharges (numbering around 300 outfalls) will be a powerful means of bringing pressure to bear on improving the water quality of the Irwell. Trash screening and aesthetic considerations will be a central aspect of this process, as public perception of the river's value will be directly influenced by visual improvements. The fact that both chemical and aesthetic aspects of consented discharges are recognised in the NW RBMP provides an ideal campaigning opportunity. Again, the Angling Trust could be of assistance in this process. Similarly, forming positive partnerships (e.g.

opportunities for positive publicity) with operators of discharges can be a very effective and progressive measure.

### *3.3 Connectivity*

The current restriction to ecological status imposed by the many significant barriers to longitudinal migration of fish is recognised by the NW RBMP and notable examples were encountered during the site visit. As well as a campaigning role to ensure a timely and appropriate programme of solutions, it is important for Salford Friendly Anglers to maximise the value of barrier removal and bypass measures. To this end, simple habitat improvement measures (especially those that enhance protection against predation) will be important. An example of such works might include installation of marginal brash cover or marginal tree kickers (e.g. Fig. 12).

**Figure 12: Marginal brash (L) and tree kicker (R) examples of marginal cover installation**

It is recommended that liaison with E.A. personnel is undertaken to establish (and potentially influence) the sequence of fish passage solutions. Once the first group of structures to be tackled is known, site-specific habitat improvements can be designed following targeted visits from WTT conservation officer(s). Alternatively, E.A. fisheries, conservation and biodiversity personnel may also be able to provide habitat improvement works proposals associated with each site.

### *3.4 Potential habitat works identified during Advisory Visit*

#### 3.4.1 Reach 1

To combat the downstream flushing of fish during large spates (as well as to provide much-needed cover from predation) marginal tree kicker installation is recommended (Fig. 13). Initially, this could be carried out as a small number of trial installations to verify the security of anchoring arrangements. It is proposed that expansion bolts drilled into the marginal pilings would be combined with 12-mm braided steel cable to provide anchoring with approximately 6000-kg breaking strain. The cables would be kept as short as possible to prevent risk to watercourse users (such as kayakers).

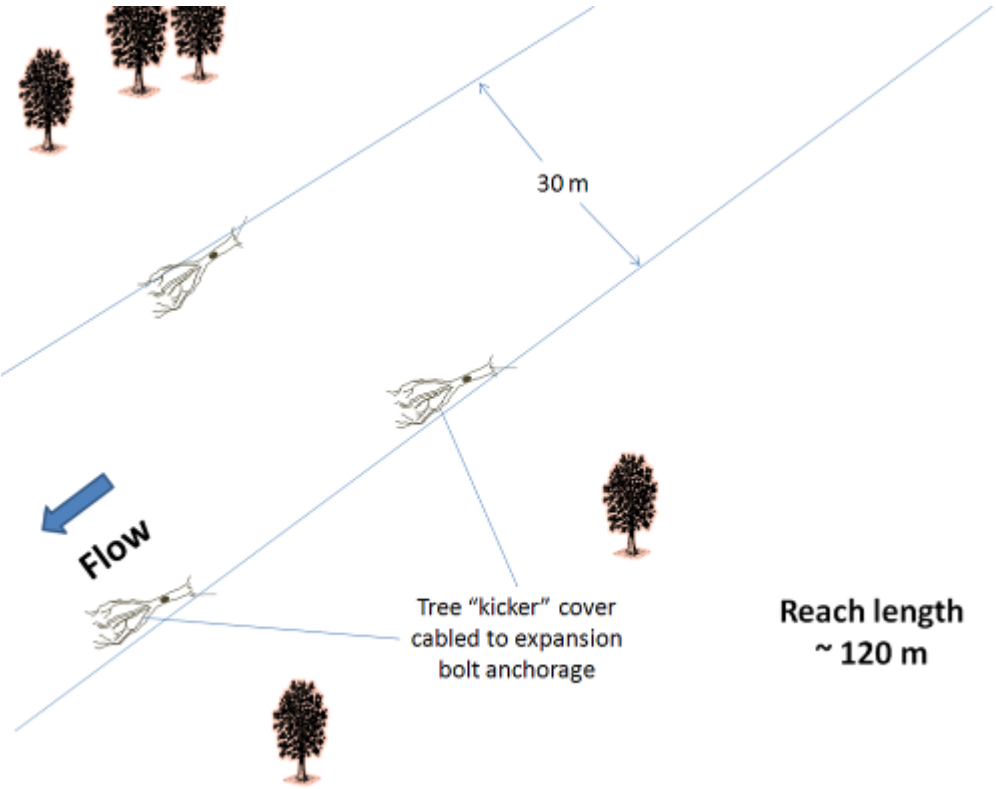


**Figure 13: Potential arrangement of trial tree kicker installation in the straightened channel at Reach 1**

#### 3.4.2 Reach 2

In addition to increasing marginal cover using tree kickers (this time cabled to the stumps and root systems of the felled tree), structures to promote localised gravel sorting are recommended here (Fig. 14). These would take the form of logs or root wads pinned to the riverbed using 2-m long x 19-mm diameter steel reinforcing bar (rebar).

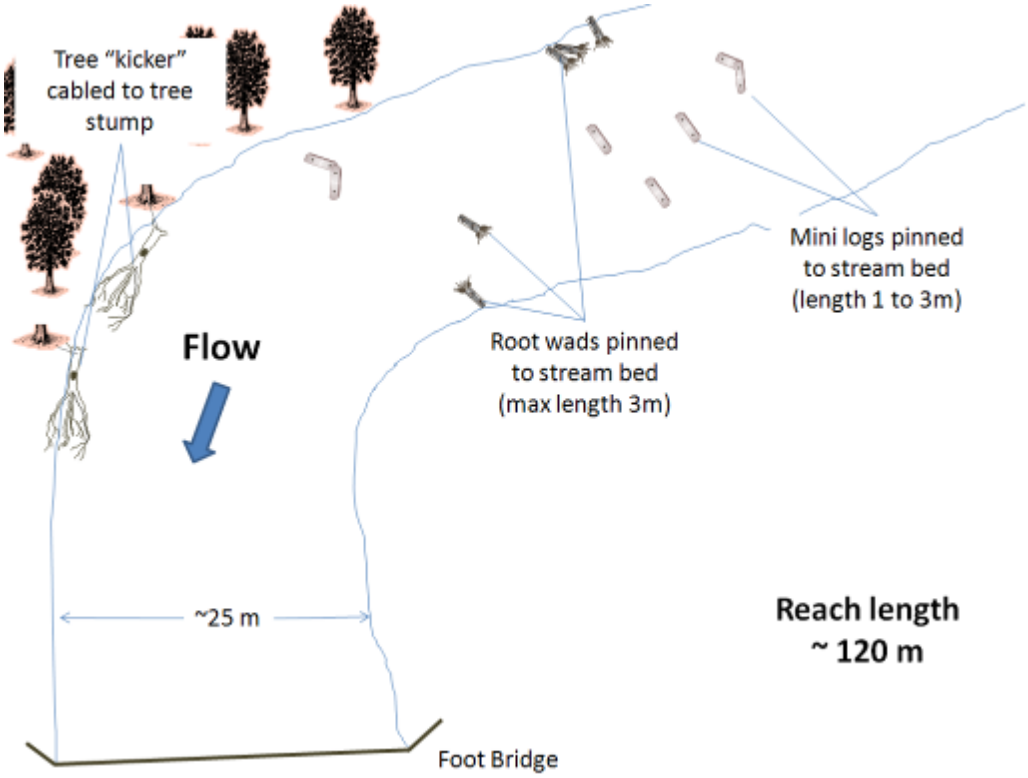


**Figure 14: Example of combined marginal cover (tree kickers) and structures to promote localised bed scour/gravel sorting (mini logs and root wads) on the riffle and bend pool in Reach 2**

### 3.4.3 Reach 3

Tree kickers would not be suggested within the formal kayaking facility in this reach as the dimensions/layout of the course makes it difficult to avoid detracting from that amenity in this case. However, careful placement of mini logs (with rebar pins hidden within the log to avoid risk to water users) could be used to promote gravel sorting without detracting from the kayaking amenity.

## 4.0 Making it Happen

Following the provision of this Advisory Visit report, recipients may become eligible to receive training to help in the completion of habitat works via the WTT Practical Visit programme. This would follow the formal preparation of a project proposal and design that would be used as the basis for a land drainage consent application to the Environment Agency. Practical Visits are typically 1 to 3 days in duration with basic materials and staff costs up to a value of £1800 paid for by the WTT. Demand for Practical Visits is high and all arrangements are subject to availability.

Advice on raising the funds for conservation work is available via the WTT's Funding and Communications Officer Denise Ashton (email: dashton@wildtrout.org) and small seed-corn funding bursaries are allocated each year from the WTT's Advisory Visit bursary fund. In the event that registered charitable status is required from potential funding bodies, it may be possible to host funds centrally at the WTT – with monies ring-fenced specifically for individual projects.

Guidance on the successful operation of Trout in the Town-affiliated chapters is available from the WTT's programme manager Paul Gaskell (pgaskell@wildtrout.org). In the case where an extensive campaigning role is to be undertaken, bodies such as the Angling Trust (http://www.anglingtrust.net/) and the lobbying activities of the Salmon & Trout association (http://www.salmon-trout.org/) may be sources of suitable support. As well as existing contacts with the local council, it could also be valuable for Salford Friendly Anglers to develop partnerships with the local Wildlife Trust (http://www.lancswt.org.uk/) in order to identify areas of common interest.

## 5.0 Acknowledgement

The WTT are grateful to the Environment Agency for the support which made this advisory visit possible.

## 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.

**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.**