Derwent Angling Association (Consett) habitat works proposal

Introduction

The following recommendations are based on the site visit made by Paul Gaskell (Wild Trout Trust) hosted by Alan Farbridge (Derwent Angling Association) on 20th April 2011. Hands-on training that results in the installation of a proportion of the suggested works can be provided as part of a Wild Trout Trust (WTT) "Practical Visit". All of the techniques required to subsequently complete the proposed works will either be covered during this training – or else suitably qualified specialists may be contracted to assist with tasks that are unsuitable for volunteers. Throughout the report the left hand bank (LHB) and right hand bank (RHB) are designated when facing downstream, according to convention.

There are many examples of high quality habitat along the Derwent, particularly in the upper reaches. Derwent AA members are to be commended for retaining the excellent marginal fallen woody debris (where it occurs) as well as allowing for examples of low, overhanging vegetation cover. The upper reaches also display an excellent variety of native plant species within the river corridor – a fantastic boost to the plant biodiversity. Not only that, the diverse riverbank vegetation also supports a wealth of associated invertebrates that form part of the food chain that supports the fish of the river.

Figure 1: Naturally-occurring marginal debris - a credit to the club policy of retaining this valuable habitat resource in the river channel. In the example pictured, the survival of juvenile fish will be greatly enhanced.

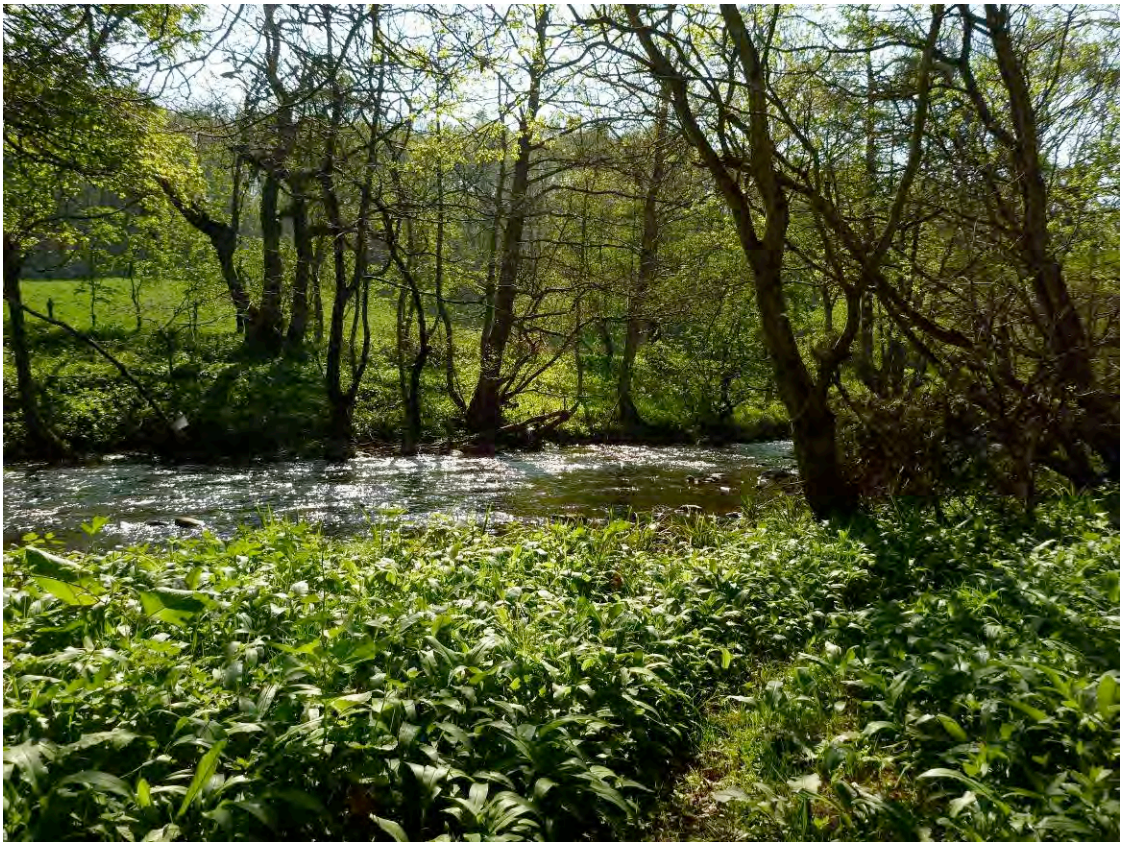

Figure 2: Diverse herbaceous understory vegetation and a varied age-structure of trees providing superb conditions for a healthy river and healthy fish. The mix of light and shade is just right, there is a wide range of microhabitats for invertebrates associated with the varied plant life and there is a good supply of deciduous leaf litter that is the lifeblood of most upland rivers. In addition, the healthy bankside vegetation is maintaining the channel at an optimum width to promote good pool and riffle characteristics. Excellent habitat.

There is little value (but potential risk) associated with attempting to "improve" habitat that is already of high quality. It is, however, extremely important to protect and retain what is already good. The prime example here is the lack of invasive plant species such as Himalayan Balsam and Japanese Knotweed in the upper reaches of the river. Patches of both Japanese Knotweed (national grid reference NZ 10005 55789) and Himalayan Balsam (NZ 10448 55891) were encountered on the sections further down the system. It is imperative that anglers or walkers do not spread either the seed of Himalayan balsam or stem/root material from Japanese Knotweed to the upper reaches (e.g. via mud in cleated soles). One recommendation for this habitat proposal, therefore, is to incorporate a "biosecurity" advice section on the Derwent AA website. Anglers should brush and pick off all mud from waders and clothing after fishing the lower beats and, ideally, should thoroughly dry waders before fishing the upper beats.

Proposed works rationale

The subsequent proposals can be used to form the basis of a pre-project meeting with local Environment Agency (E.A.) “development control” and “flood risk management” personnel. Ideally, this meeting will then guide the requirements for any land drainage consent application process.

Weir and impoundment at NZ 08507 51596.

It is clear from discussion with Alan Farbridge that this structure (Fig. 3) is an important amenity to the club during introductory days for young anglers and events for anglers with restricted mobility. It provides a ponded area that retains stock fish and has good bankside access.

Figure 3: Weir at NZ 08507 51596

Therefore, we would not seek to notch and reduce the vertical head of the structure (as would be more usually recommended). Instead, the potential for linking good quality patches of habitat should be maximised to allow resident fish to exploit their preferred resources. It should be possible to fit a simple “baulk” easement such as the example from the Wye and Usk catchment illustrated here (Fig. 4) and included in the plan of works (Fig. 13). It is worth bearing in mind that, for the smaller weirs just above this section, there are likely to be many benefits from partial removal of impounding structures (cutting slots that are approximately 1/6th of the channel width would be appropriate).

Figure 4: Baulk easement installed by the Wye and Usk Foundation. Sleepers are attached to the face of the weir by means of expansion bolts drilled into placements within the stonework (see Appendix 1 for E.A. guidance)

To maximize the potential of both the existing habitat and the value of the baulk easement, the impounded water upstream (Fig. 5) would benefit from installation of submerged structure (mid channel and in margins). This kind of cover is probably the best protection that fish have against predation – especially from birds. Rebar pinning of root wad material and whole trees along with "hinging" (Fig. 6) of bank-side trees or attaching trees to their stumps with 12-mm diameter braided steel cable (Fig. 7) are appropriate here; as detailed in work plans (Figs. 13 and 14). Test attempts to drive 2-m long rebar pins (19-mm diameter) into the stream bed would be required to confirm viability of pinning in advance of works

Figure 5: Uniform habitat and impounded water above the weir that would benefit from additional structure and variety

Figure 6: Hinged tree on the River Derwent

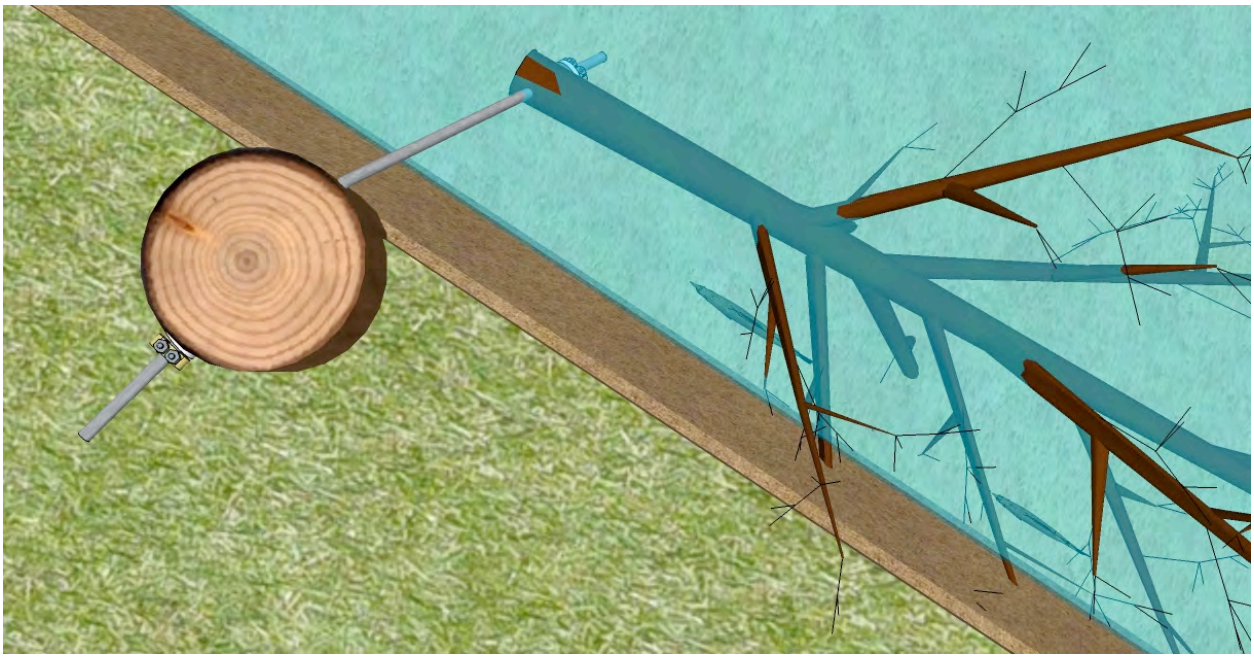

Figure 7: Plan view of tree "kicker" secured to its stump via 12-mm steel cable and cable crimps

Tree kicker on pool at NZ 0852550951

Figure 8: Pool that may benefit from tree kicker marginal cover

There is some potential to improve the available cover for trout along the RHB margin of this pool by tree kicker installation. This cover would augment the existing good depth adjacent to the main tongue of current feeding into the head of the pool to provide high quality lies for adult trout. Some of the denser brash cover would also be likely to be utilized by younger age classes of fish. The plan view for this proposal is given in Figure 15.

Tree planting at NZ 08455 50721

Once above the impounded section, a short riffle sequence is encountered along with some very good habitat. Further upstream again, there is a large slow pool lacking tree cover on the LHB (Fig.9) with fenced grazing exclusion in place. Planting out “whips” of goat or grey willow as well as other slower growing species (alder or oak) throughout this open area is recommended here. Trees planted directly adjacent to the watercourse can be hinged when large enough – or used for tree kickers (coppice regrowth will occur). A plan for the proposed scheme is given in Figure 16. It may also be possible for Derwent AA members to identify other suitable areas that may benefit from a little tree planting (e.g. NZ 10208 55850) and to obtain a better price for a bulk order of whips.

Figure 9: Long slow pool with treeless left hand bank (photo taken facing upstream)

Field drainage/footpath at NZ 10329 55852

Figure 10: Impaction of footpath (left) is causing sediment inputs to the river (right) from adjacent ploughed field

Further downstream (below Ebchester), drainage during heavy rainfall from a ploughed field adjacent to the river is currently bypassing the generally well-vegetated riparian zone (Fig. 10). This is primarily a result of ground impaction due to footfall and is elevating the sediment load entering the river. As well as physical smothering of the stream bed, the sediment from agricultural land will tend to introduce additional nutrients as well as any pesticides or fungicides necessary for economically viable farming. Fine silt and filamentous algae (Fig. 11) are signs of the smothering/enriching effects of agricultural

runoff (exacerbated during low flow and warm weather). Proposed measures to mitigate sediment inputs are given in the next section (Fig. 17).

Figure 11: Signs of elevated sediment and nutrient inputs to the river – brown sludge and filamentous algae coating the riverbed. These signs are particularly evident under low flow conditions in warm weather. Elevated sediment and nutrient levels tend to degrade spawning areas and reduce invertebrate diversity

Proposed works plans and location maps

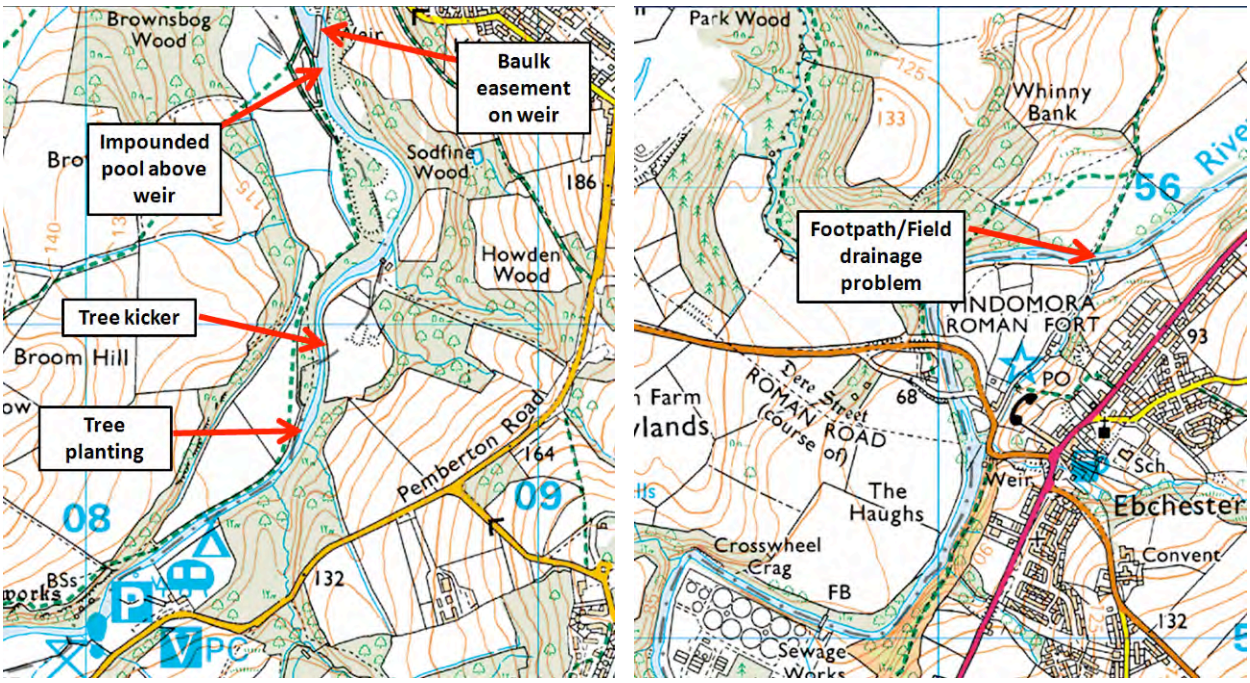

Figure 12: Upstream section (left) and downstream location (right) for proposed habitat works

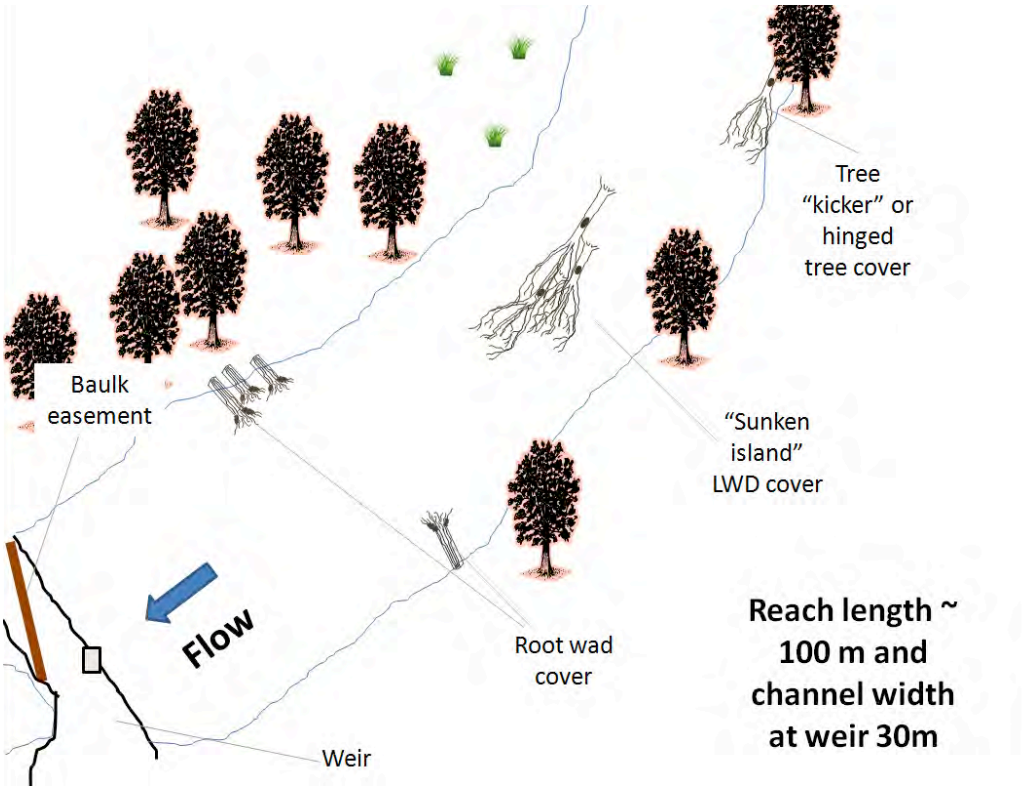

Figure 13: Weir at NZ 08507 51596 with baulk easement and woody debris installations above. The top right of the diagram adjoins the bottom left of the following plan

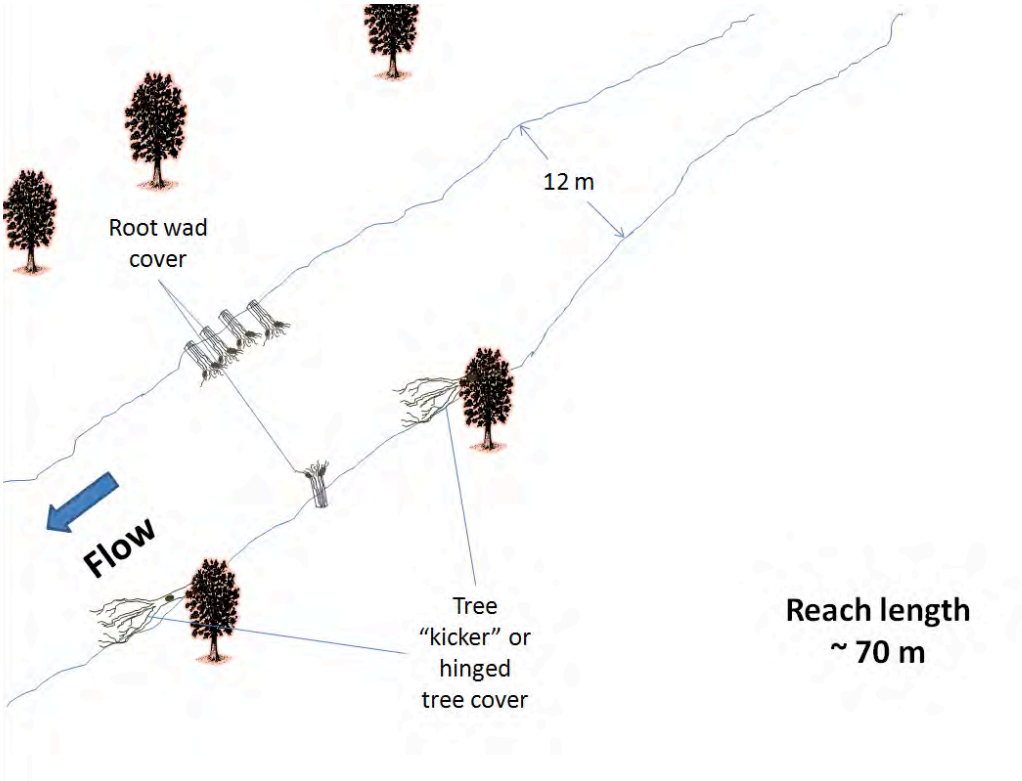

Figure 14: Top of impounded section above weir at NZ 08507 51596

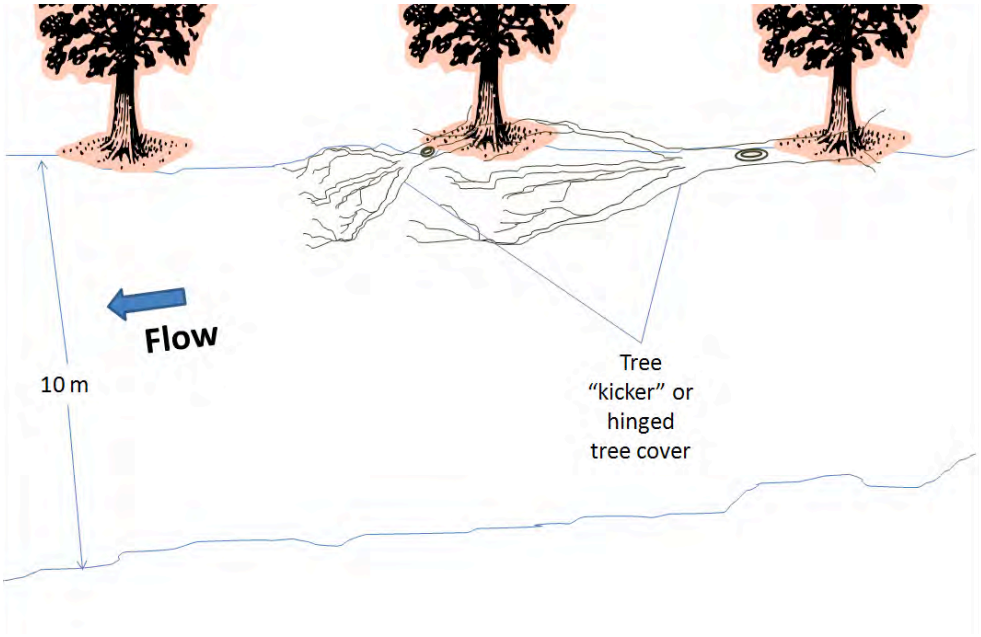

Figure 15: Tree kicker on pool at NZ 0852550951

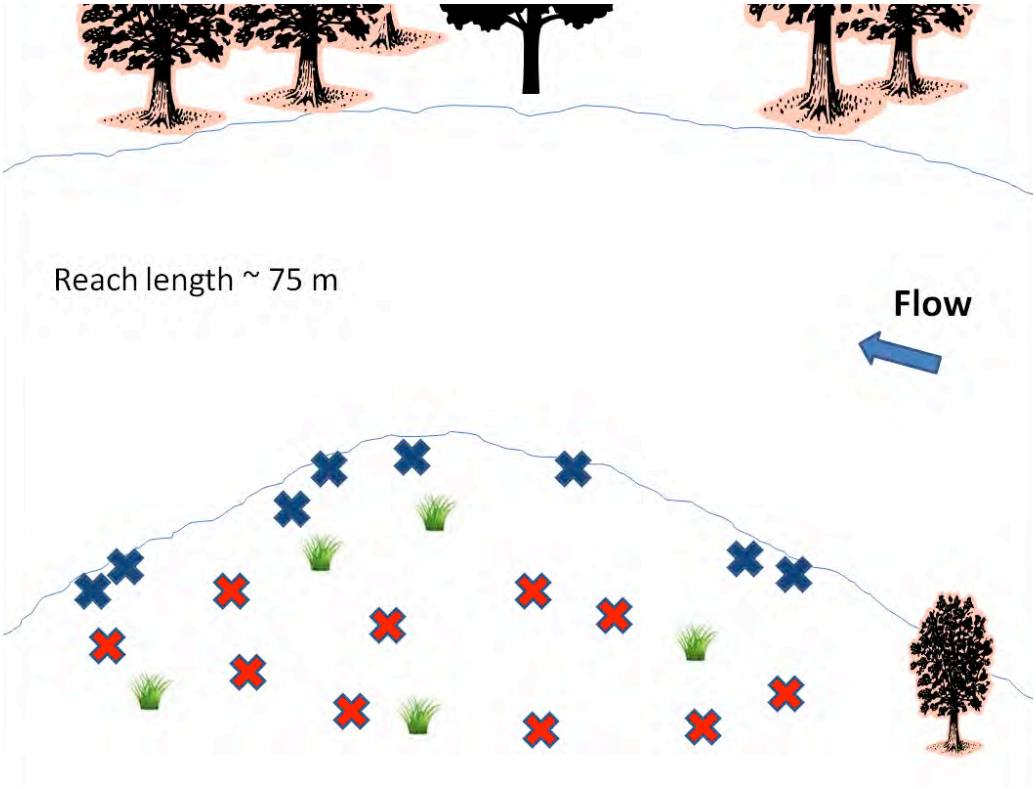

Figure 16: Tree planting at NZ 08455 50721. Blue crosses (adjacent to margin) to be a mixture of alder and goat willow. Red crosses suggested to be a mix of goat willow and oak. Additional advice could be sought from supplier/arboriculturist. Tree hinging and kickers on both banks should be phased in as vegetation establishes.

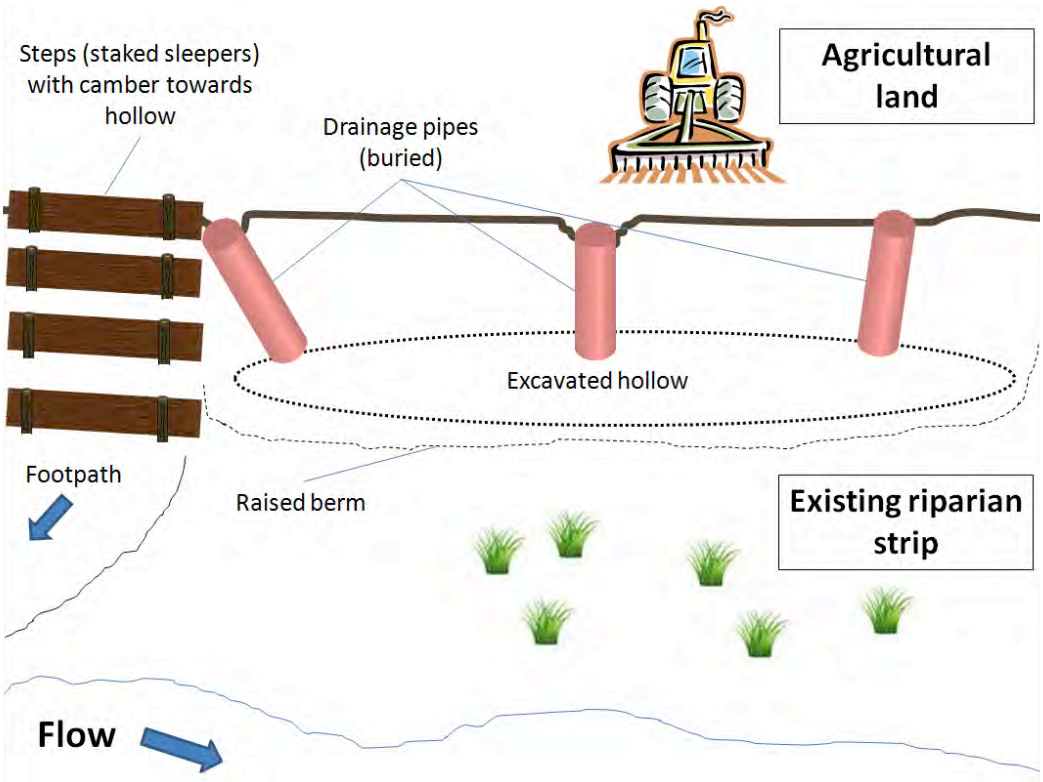

Figure 17: Field drainage/footpath at NZ 10329 55852. The worn/impacted footpath up the incline that runs up to the ploughed field should be fitted with cambered steps (left of diagram) in order to channel runoff into hollow wetland area. However, the main drainage will be achieved via buried drainage pipes (350-mm internal diameter PVC or equivalent) that lead into an excavated wetland area that will intercept runoff.

Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programmes.

Disclaimer

One Appended document excerpt over page.

Appendix 1: E.A. guidance manual excerpt giving details on baulk easements

Baulks

Baulks are a form of easement that may be considered for existing weirs, however they are not considered to be suitable for new structures. Baulks are effective in weirs with a low gradient downstream glacis. They are constructed using a timber beam or a fillet of concrete or other material, placed diagonally across the face of the weir. It extends the full distance from the crest of the weir to the toe. The baulk gathers water over-spilling the crest of the weir to concentrate it in a diagonal run across the glacis, which acts both to provide an attractive jet at the toe and to provide a suitable depth of water to allow fish to negotiate the structure. The flow down the baulk is usually enhanced by putting a notch in the weir crest at the top of the baulk. This also permits operation of the pass in low flows. Total flow on the baulk can be controlled by adjusting (i.e. raising) the height of the length of weir crest directly upstream of the baulk. The toe of the baulk should be constructed so that it is drowned at all times, allowing fish to enter the pass without having to negotiate a drop or step. The characteristics of a baulk type fish pass are shown in Figure 36.

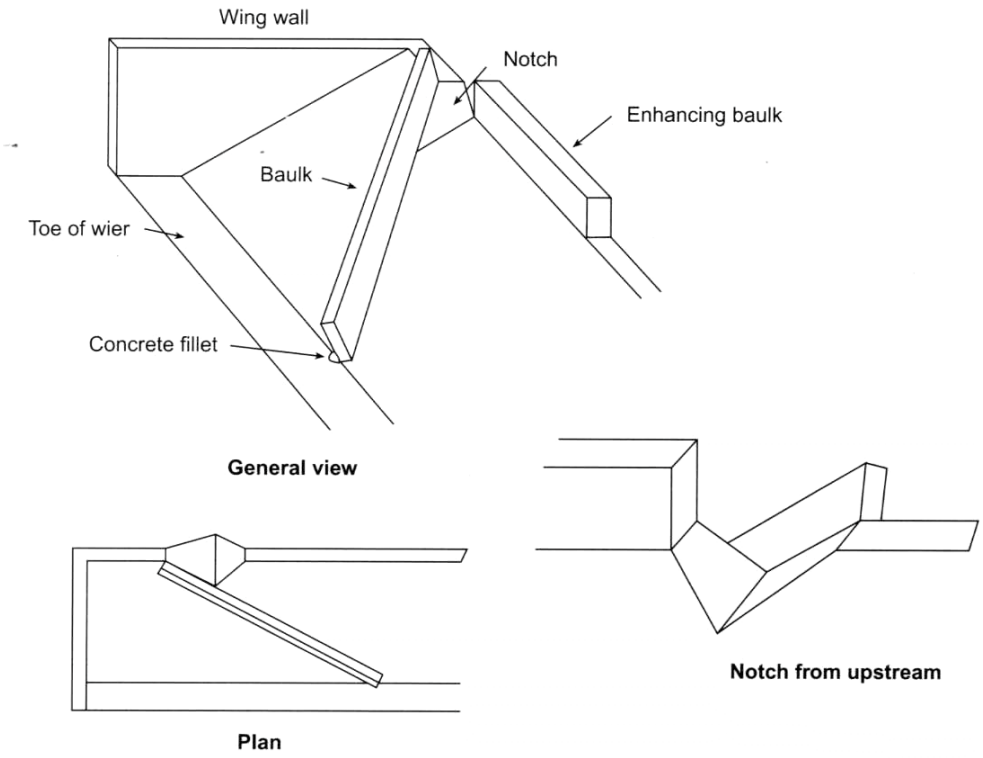

Figure 36: Schematic diagram of a Baulk pass (after Fort & Brayshaw, 1961)

There is a distinct lack of sound information available giving guidance on the design and installation of baulks to ensure effective operation. Some information, presumably based on empirical experience, is given by Pryce-Tannatt (1938), as follows:

• Optimum head difference:..... c. 2m

• Maximum glacis gradient:..... 1 in 4

• Maximum length of baulk: ..... c. 20m

• Angle of baulk in relation to weir crest:..... between 25º and 45º

Suitable Species: typically used for salmonids, but may be effective for some coarse species,depending on head differences, lengths and gradients.

Strengths: cheap and easy to construct and maintain, relatively simple to retro-fit to existing weirs.

Weaknesses: limited application for fish species, limited range of operation. lack of sound design criteria.