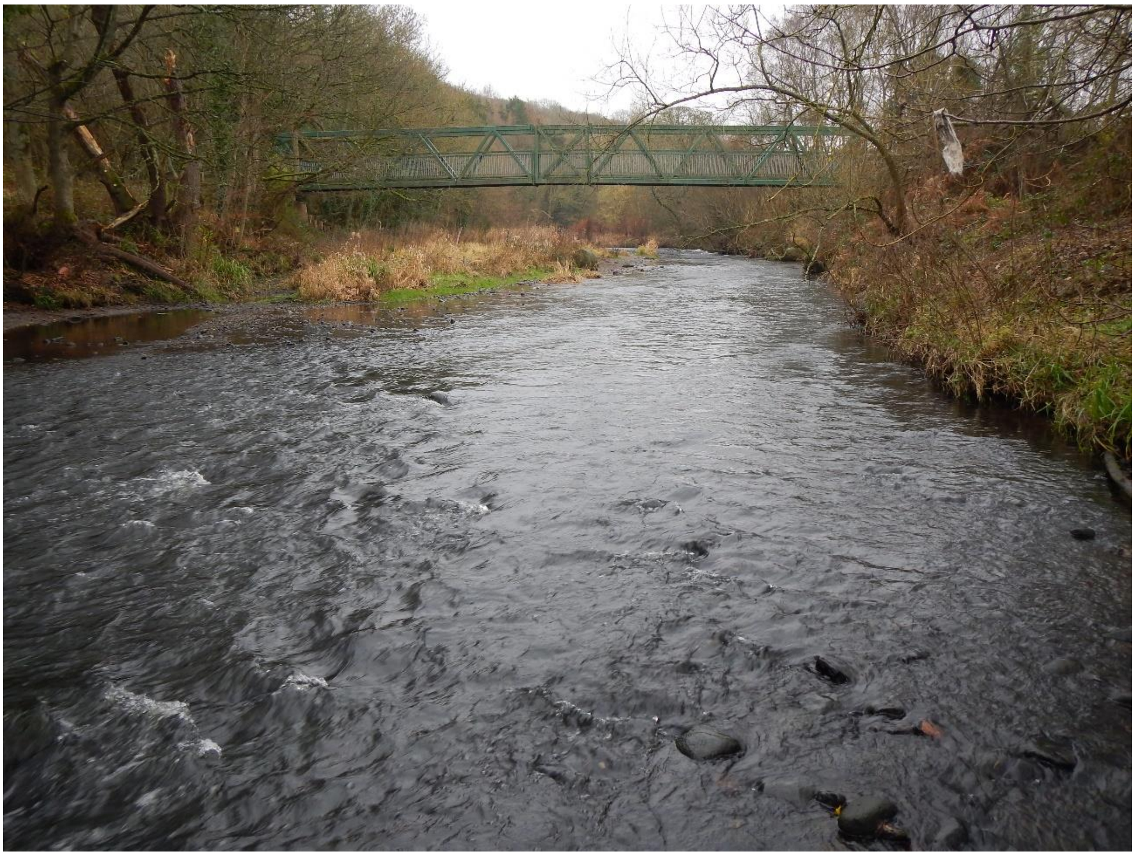
Advisory Visit

River Derwent

(River Tyne Catchment)



Undertaken by Gareth Pedley (WTT)

Key Findings

- The River Derwent is clearly capable of supporting wild fish populations, as is evident by catches of fish well below the sizes stocked. Observations during the advisory visit support that assertion, with areas of good quality habitat for resident fish and general salmonid spawning observed throughout reach inspected.
- Obstructions within the river degrade habitat quality and restrict fish movement, which undoubtedly impacts upon the trout and grayling, but are unlikely to limit the sustainability of wild fish populations.
- Ceasing stocking the river with poorly adapted, hatchery reared fish would reduce competition for space and other resources and would benefit the river’s wild fish populations.

1. Introduction

This report is the output of a visit to Axwell Park and Derwent Valley Angling Association's (APDVAA) section of the River Derwent in Tyne and Wear, on the 16th January 2019. The visit was requested by the association to provide an independent perspective on ways to developed to improve the river for wild fish.

Normal convention is applied throughout this report with respect to bank identification, i.e. the banks are designated left bank (LB) or right bank (RB) whilst looking downstream. The Ordnance Survey National Grid Reference system is used for identifying specific locations.

2. Catchment and Fishery Overview

The River Derwent is a lower tributary of the River Tyne, which it joins within the tidal reach. As such, they support similar fish populations, although the species of primary importance to angling on the Derwent are the resident brown trout and grayling. In recent years, improvements in fish passage on the Derwent catchment have reinstated access for sea trout and salmon, which are now occasionally caught, as are coarse fish (primarily in the lower reaches).

The Derwent catchment originates on the Pennines, with an underlying geology initially of the Yoredale Group (limestone, sandstone, siltstone and mudstone) but an increasing influence of coal measures progressing downstream. Surface deposits comprise predominantly glacial till. As a result, the Derwent valley and river are relatively productive, which can be observed in the aquatic flora, with a greater occurrence of water crowfoot and starwort than would be encountered on many other Pennine streams.

Derwent Reservoir fragments the catchment, forming a complete barrier to fish movement, and the altered flow regime undoubtedly impacts upon the hydrology and ecology of the river. Plans are now in place to reinstate a more natural flow regime to the river, which should be of benefit to the fish and invertebrate populations.

The waterbody downstream of the reservoir (in which the APDVAA water is located) is classified as Derwent from Burnhope Burn to the Tyne under the Water Framework Directive (WFD); the basic details for which can be found in Tables 1 & 2. The waterbody is classed as a 'Heavily Modified Waterbody' and therefore assessed against ecological 'potential' (rather than 'status'), for which it achieves a classification of 'moderate', driven by a failure for 'Surface Water', owing to the impact of the reservoir. Other parameters achieve good or better.

Table 1. Overview of the waterbody details for the section visited	
	Waterbody details
River	River Derwent
Waterbody ID	GB103023074790
Waterbody Name(s)	River Derwent from Burnhope Burn to River Tyne
River Basin District	Northumbria
Current Ecological Quality (2016)	**Moderate**: being moderate for 'Surface Water' owing to the presence of Derwent Reservoir upstream of the waterbody and the unnatural flow regime the reservoir and its abstraction regime creates. Consequently, the river is classified as a 'Heavily Modified Waterbody (HMWB)'.
Grid Ref	NZ 18722 60940
Length of river inspected (km)	2

Table 2. Waterbody status

Classifications

Cycle 2 classifications

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Classification Item	2013	2014	2015	2016
Overall Water Body	Moderate	Moderate	Moderate	Moderate
Ecological	Moderate	Moderate	Moderate	Moderate
Supporting elements (Surface Water)	Moderate	Moderate	Moderate	Moderate
Mitigation Measures Assessment	Moderate or less	Moderate or less	Moderate or less	Moderate or less
Biological quality elements	Good	Good	Good	Good
Hydromorphological Supporting Elements	-	Supports Good	-	-
Physico-chemical quality elements	Good	Good	High	High
Specific pollutants	High	High	High	High
Chemical	Fail	Good	Good	Good

(https://environment.data.gov.uk/catchment-planning/WaterBody/GB103023074790)

3. Habitat assessment

At the upstream extent inspected, the raised footings of Burnopfield Road bridge create an obstruction to fish passage (Fig. 1). The step into shallow water over an angled apron greatly reduces passability and the obstruction is made worse by the additional steeper crump flow gauging weir on top. This creates a barrier to smaller fish in most flows and both a physical and behavioural deterrent to larger fish in low and medium flows.

Simply seeing fish pass a structure is not sufficient to rule it out as a problem; there are likely to be many more fish that are missed or do not even attempt to pass until higher flows. Any unnatural delays potentially prevent fish from reaching suitable habitat at the times required, for example, when adults are ready to spawn, or smolts ready to migrate to the sea. Such delays increase stress levels for the fish and their susceptibility to disease and predation.

Obstructions of this size have been overlooked historically, applying the outdated view that upstream passage for large migratory salmonids in high flows is sufficient. With greater understanding of fish dispersal and migration within river catchments (to allow optimal habitat utilisation and maximise survival) it is now apparent that a much wider range of obstructions have the potential to limit fish populations.

Consider that the progeny of any fish spawned below the weir are likely to be prevented from dispersing upstream to access space and different habitat as their requirements change. This means that any over-production of juvenile fish in the reach downstream will be wasted once the available habitat is utilised, limiting the rate of population recovery now and following poor survival years, pollution events or other impacts. Numerous redds observed on the bed downstream of the barrier highlight this potential issue. It is a similar situation for grayling, which are poor at ascending barriers, particularly those with a step (where a jump is required). While it may at first seem beneficial to retain fish within a specific section of river, the overall detriment to a river's fish populations far outweighs any perceived benefit.

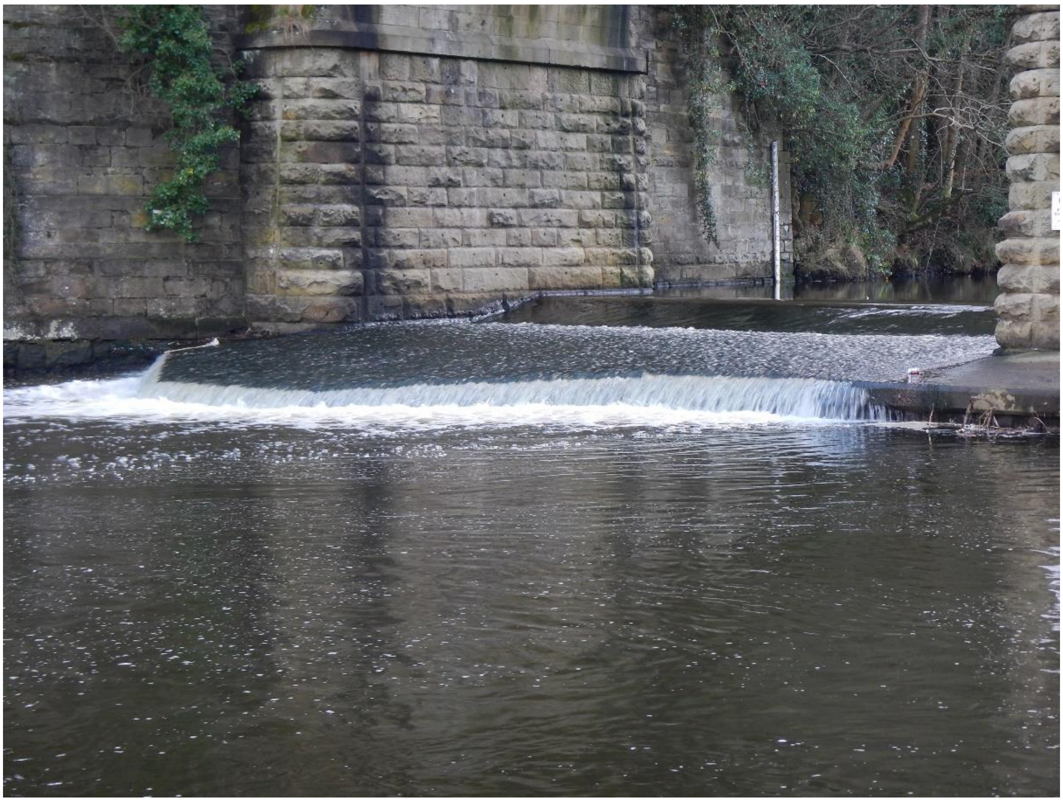

Figure 1. Bridge footings and gauging weir at the upstream end of the river reach inspected. The step into shallow water over an angled apron greatly reduces its passability. The obstruction is made worse by the additional steeper crump on top of the footings.

Downstream of the bridge, good quality habitat was observed with a range of pool, riffle and glide habitat supporting varied substrate, ranging from boulder down to gravel. In the gravel/cobble areas, numerous salmonid redds (nests in the gravel where eggs have been laid) were observed.

A fallen tree along the RB greatly increases habitat variability and fish-holding potential (Fig. 2). By taking up a small amount of channel capacity locally, the structure deflects flow down into the bed, scouring a deeper pool that runs along the front, side and behind of the branch. As well as creating depth, that scour helps sort the bed material as flow will carry smaller particles further than large ones, effectively grading them along the riverbed. A regular occurrence of this sorting along a river's length liberates fine sediment from the bed and helps to maintain free gaps between the gravel that allow flow-though of water and provide good quality habitat for invertebrates and salmonid egg incubation.

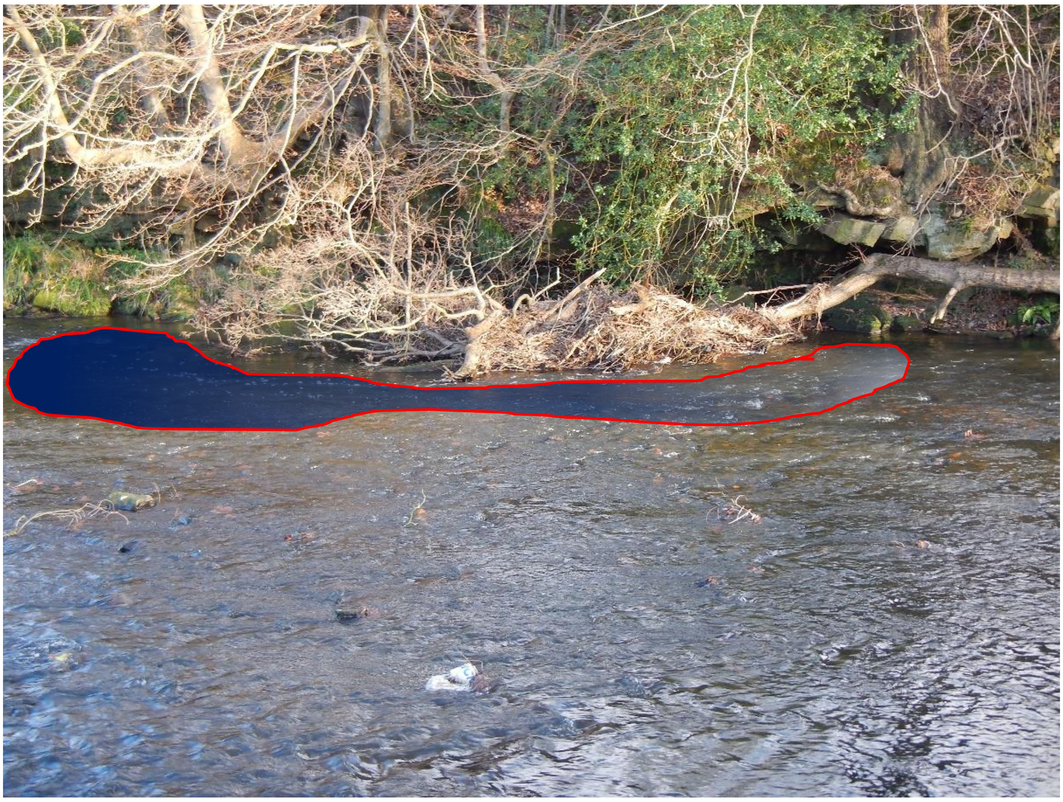

Figure 2. Valuable bed scour and substrate sorting diversifies an area of shallow juvenile salmonid habitat so that larger adult fish can now also hold in the deeper water created along the far bank side.

Further downstream, another great example of in-channel woody material is provided where a beech tree has fallen across the channel (Fig. 3). Often, there is a desire to remove or adjust these features, but the first thought should always be whether it can just be left *in situ* as a perfectly natural habitat enhancement. The cover and shelter provided greatly benefits fish, affording the protection from cormorants, goosander and other predators that is so often lacking (because it's usually removed or altered!). Located in such a wide channel, and with lack of infrastructure nearby, the risks of retaining the structure are minimal, especially as it still appears to be connected at the root and may even continue to grow.

Leaving the tree in place has the potential to improve channel morphology locally, as high flows deflected under the structure are likely to scour the bed to develop a deeper pool. As debris collects against the tree the cover provided will increase and on a channel this size, the potential for blocking fish passage is negligible. Should it begin to retain too much debris, the increasing weight of water building upstream should simply swing the tree round to lie along the bank anyway (anchored by the root and/or heavy rootball). Removing or even altering such structures is therefore seldom productive unless they are in a very high flood risk area, which this isn't.

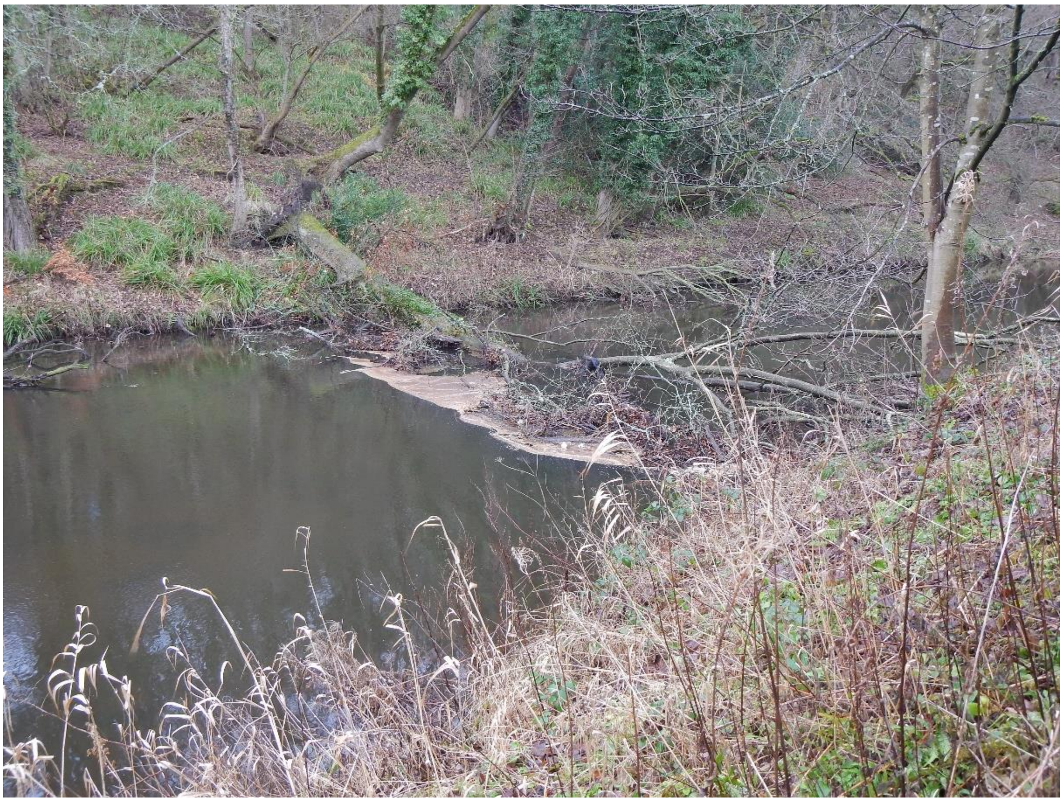

Figure 3. A fallen beech tree provides a great natural habitat enhancement within a relatively open pool. This structure offers much needed shelter from predators, with the potentially benefit of developing new features within the bed of the pool.

In contrast to the high value habitat created by the fallen tree, the next pool downstream is relatively open, lacking structure and flow diversity (Fig. 4). Bankside trees and their roots provide some habitat diversity that will hold fish, but the area would be enhanced by additional in-channel structure that would undoubtedly increase its fish-holding capacity, along with its interest for anglers.

The pools are interspersed with areas of high quality juvenile salmonid habitat, with quite small gravels observed in the wider areas, suitable for small resident trout and grayling spawning (Fig. 5). Such areas are a great asset, especially with the impeded fish passage upstream. However, a high loading of fine sediment was also apparent among the gravel. This suggests elevated inputs further upstream which should be addressed. More locally, trampling denudes the banks and river margin of vegetation, with the lack of root structure to bind the banks increasing erosion rates and fine sediment input.

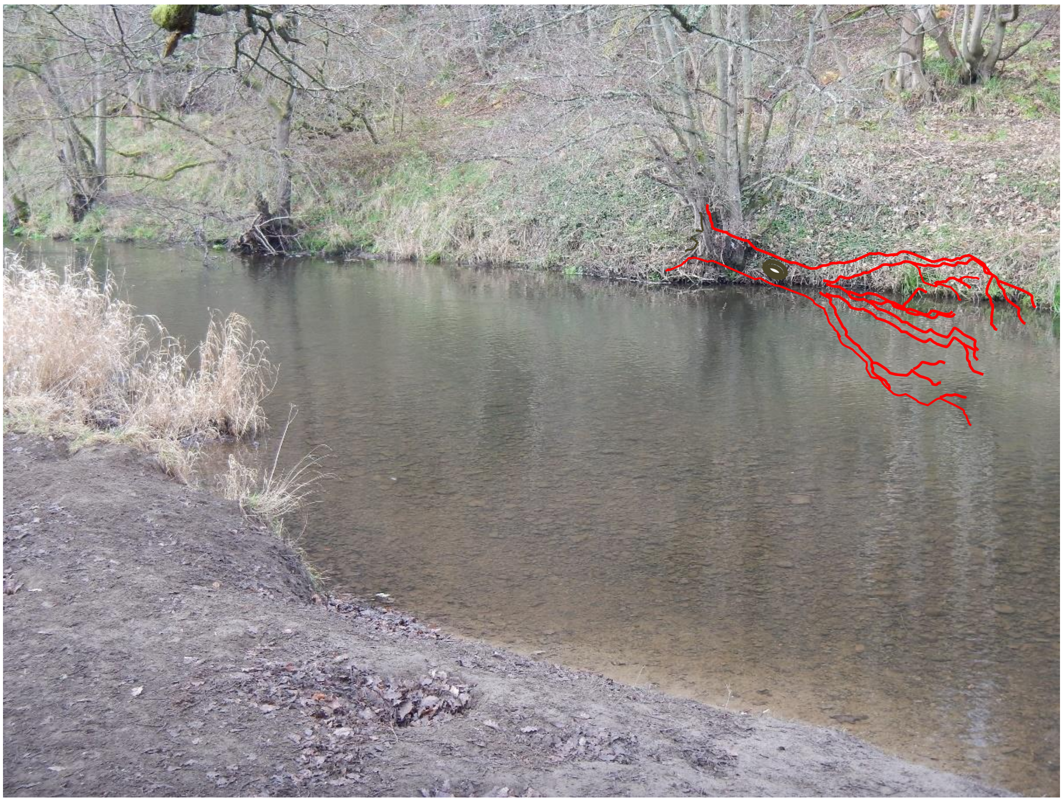

Figure 4. A wide, relatively open pool that is lacking structure and flow diversity. Although it undoubtedly holds fish, providing additional in-channel structure would increase its appeal to fish and anglers alike. Where multiple tree trunks are in close proximity, they provide an excellent anchor for natural, lodged woody material or tethering a tree kicker (see **5.0 Recommendations**).

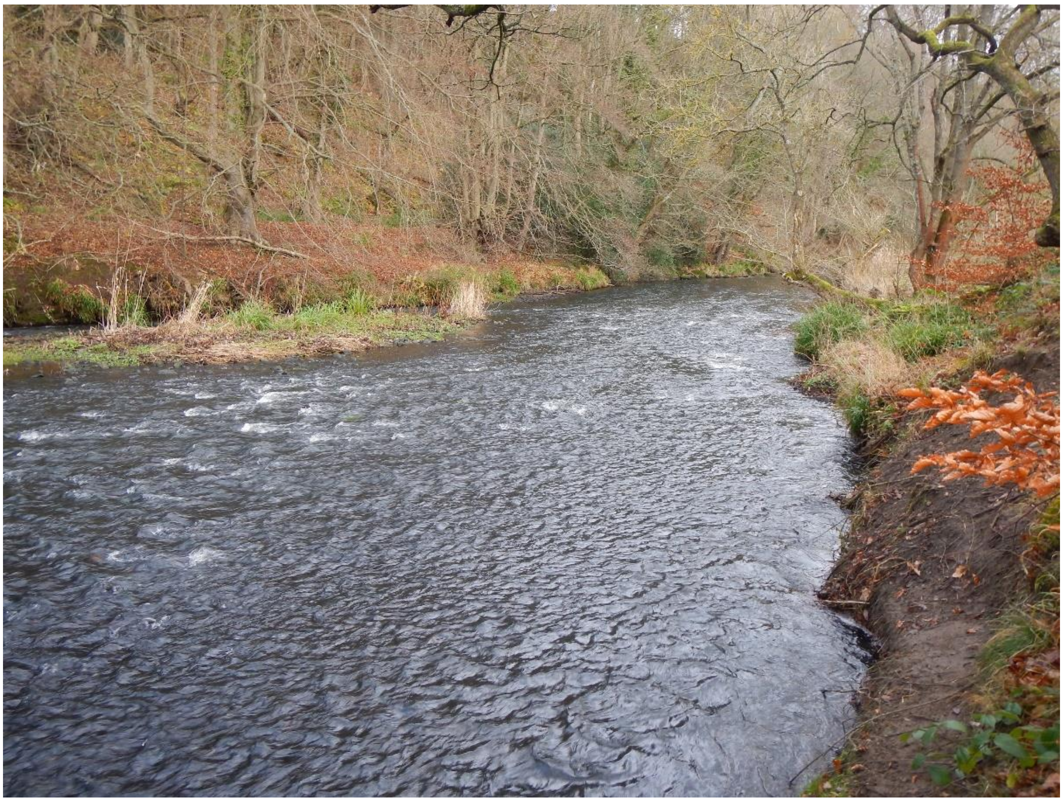

Figure 5. High quality riffle habitat that will support a range of juvenile salmonids and invertebrates. The slower flowing margins retain gravels that are suitable for smaller resident trout and grayling spawning, however, fine sediment loading limits their potential. Also note the bare, eroding banks as a result of dog and human access.

Progressing downstream, the river becomes impounded by the remains of an old weir structure and flow diversity decreases. Woody material (Fig. 6) and overhanging and trailing trees (Fig. 7) provide some fish-holding features within the impounded reach but without the impoundment, a more natural flow regime and morphology would provide higher quality habitat, with more discrete pool and riffle habitat.

The weir has been eased for fish passage with the creation of a small channel along the RB side, which does improve fish passage. Maintaining this channel at a gradual gradient would improve its passability further (Fig. 8). This work could easily be undertaken as a work party, rearranging the substrate with hand tools.

The easement is clearly an improvement, but it is by no means the ideal solution. Weirs are incredibly damaging to river morphology and ecology, with far too many redundant structures being unnecessarily retained through a lack of regard for the habitat they degrade. All too often, words like heritage and aesthetics are used are used in arguments to preserve these man-made impacts, with minimal consideration of the natural heritage and aesthetics they degrade.

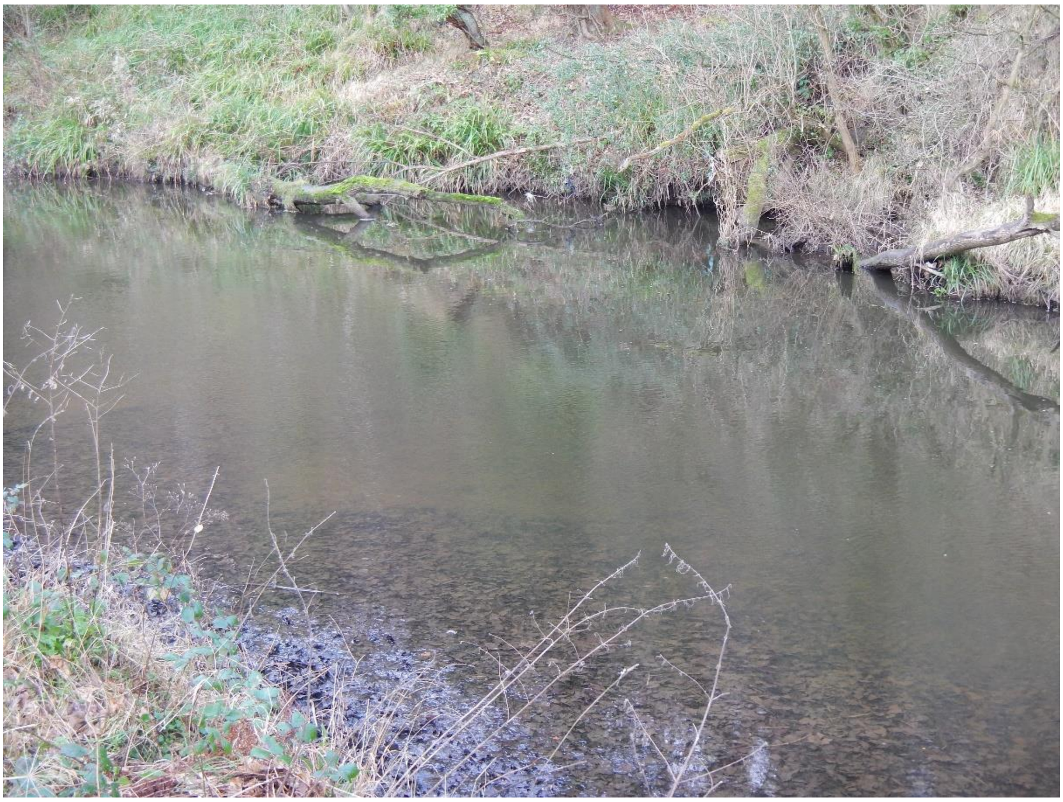

Figure 6. The remains of old tree trunks protruding into the channel create some cover and flow diversity, and are an enhancement to the impounded section, although the advanced state of decay means that these structures provide less fish-holding benefit than they once did. Decomposing branches do however provide valuable habitat and food for a range of detritivorous invertebrates as they degrade.

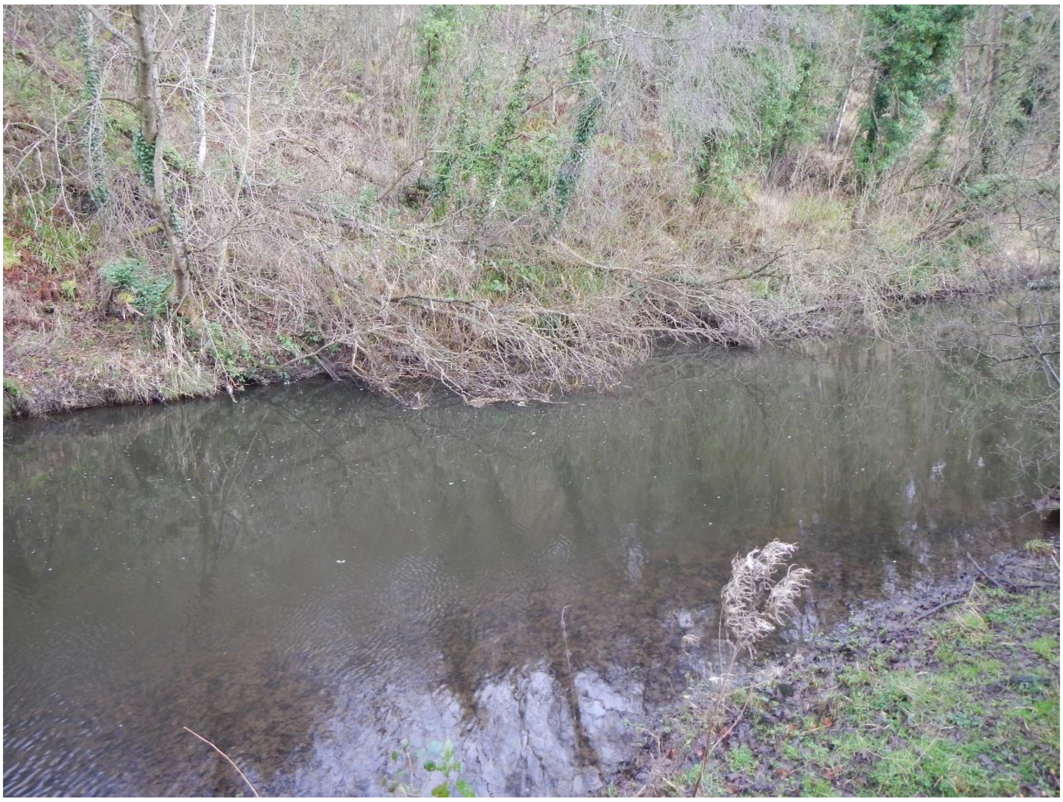

Figure 7. Overhanging and trailing branches provide valuable habitat improvements within the impounded river section.

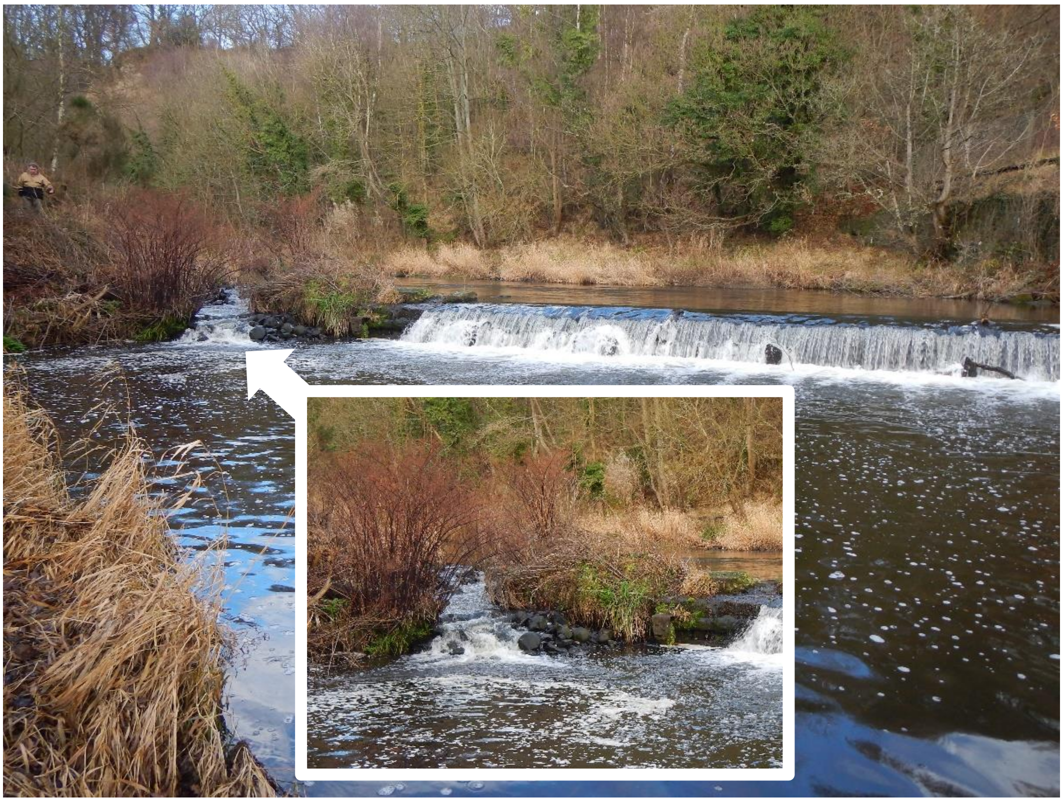

Figure 8. The now redundant weir has been eased for fish passage, but this still a poor second to removal of at least a significant portion of the weir. Both flows and channel morphology upstream remain impacted, as does the ease of fish movement. Adjusting some of the coarse material at the downstream end of the easement would improve its passability but the whole weir structure should ideally be removed.

Away from the impoundments, good, natural flow diversity was observed in most areas. Much of the channel in the lower reach inspected (around Winlaton Mill) is relatively straight and so lacks the depth of pools that would be associated with sharper bends; however, the pools and glides that are present offer good holding water for wild fish. Unlike stocked fish that favour slower pool habitat and survive poorly in natural river conditions, wild salmonids are perfectly capable of effectively utilising this habitat (see Appendix - **Fish Population Management**).

The faster riffle areas again provide good habitat for invertebrates and large salmonid spawning, and the gravel/cobble lifts towards the tail of the pools offer potential spawning areas for smaller salmonids. There is a general lack of low trailing and overhanging cover and such features should be retained wherever occurring (particularly as and when new trees and branches fall into the channel).

Japanese knotweed was observed in several locations throughout the walkover and those infestations should be addressed (Fig. 9). Being a particularly fast-growing and invasive, non-native species, knotweed invariably out-competes our native plants. This eventually leads to a mon-culture of knotweed that dies back in the winter to leave poorly consolidated and protected banks. At low levels the issues are less obvious but as knotweed begins to dominate the banks, severe erosion issues will ensue.

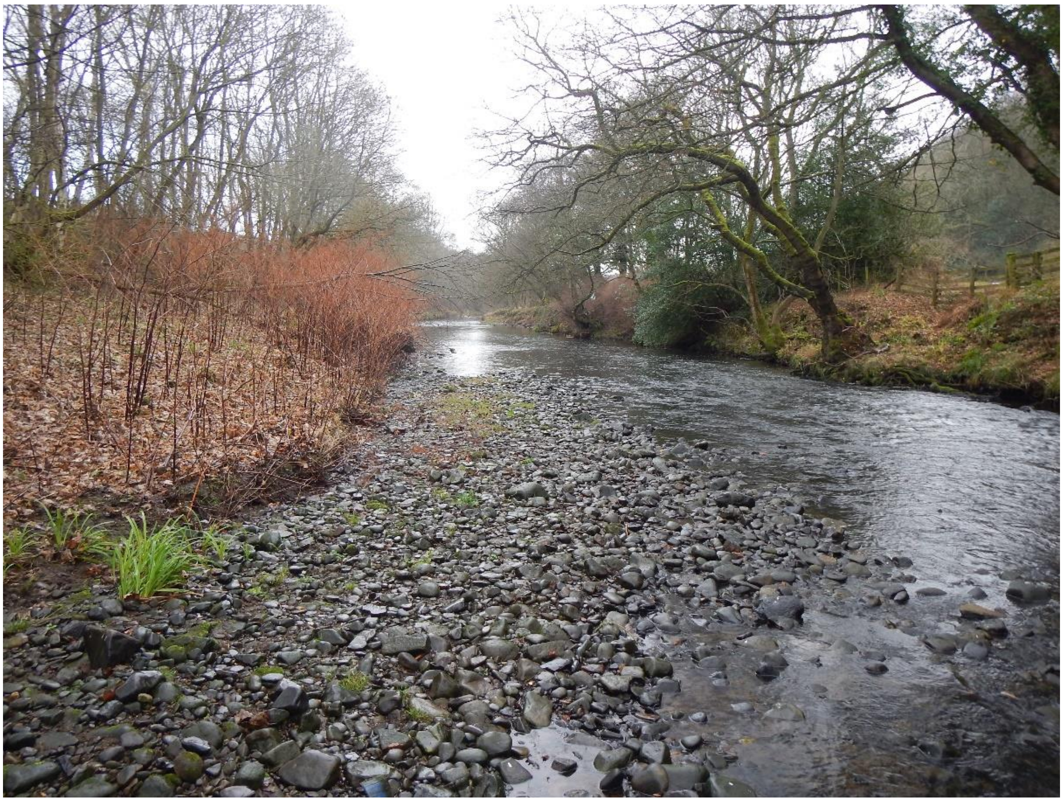

Figure 9. Good flow diversity and basic habitat, if lacking a little in-channel structure and cover. The shallow nature of the reach is no issue for wild fish populations which will grow to a size and abundance suitable to the available habitat and can therefore be increased through habitat improvements. Also note the Japanese knotweed to the left of shot. This should be addressed as a priority before the infestation becomes worse.

4. Summary

The general habitat of the APDVAA water is good, providing ample opportunity for the river's resident trout and grayling, as well as the recovering migratory fish populations. In-channel obstructions remain an impact but they are not prohibitive, as highlighted by the healthy catches of wild fish already being made, below the size stocked. Nonetheless, further fish passage improvements should be sought if optimal fish populations are to be achieved on APDVAA water and the broader catchment.

Retaining habitat structure and cover in the channel will assist the wild fish populations, breaking up the available habitat and providing additional lies, thereby allowing the river to support more fish. Increased structure within the channel will also help to develop the bed morphology and the quality of habitat it provides. It would therefore be beneficial to increase the occurrence of in-channel structure in some of the more open, featureless areas.

5. Recommendations

5.1. Habitat

Naturally occurring woody material should be retained wherever possible to complement the existing habitat of the river. In areas where in-channel structure is lacking, the following techniques could be employed to increase the availability of cover and improve the fish holding potential:

5.1.1. Lodged woody material/flow deflectors

Lodged woody material is a relatively new technique but is quick to install, secure and effective. The bonus being that it is secured, without the requirement for manmade fixings.

The process involves cutting the desired length of tree or branch (ideally from a species that coppices well, so as not to kill the stump) and lodging it between two or more closely adjacent bankside trees. Figure 10 depicts the technique with a single stem flow deflector that has been winched between two trees. The leverage of the flow against the deflector securely locks it in place against the upright trunks (where multiple stem trees are present additional points of contact can be made). This technique simply mimics the natural and regular occurrence of trees or limbs falling between standing stems/trunks, where the structure will invariably remain in place until it disintegrates.

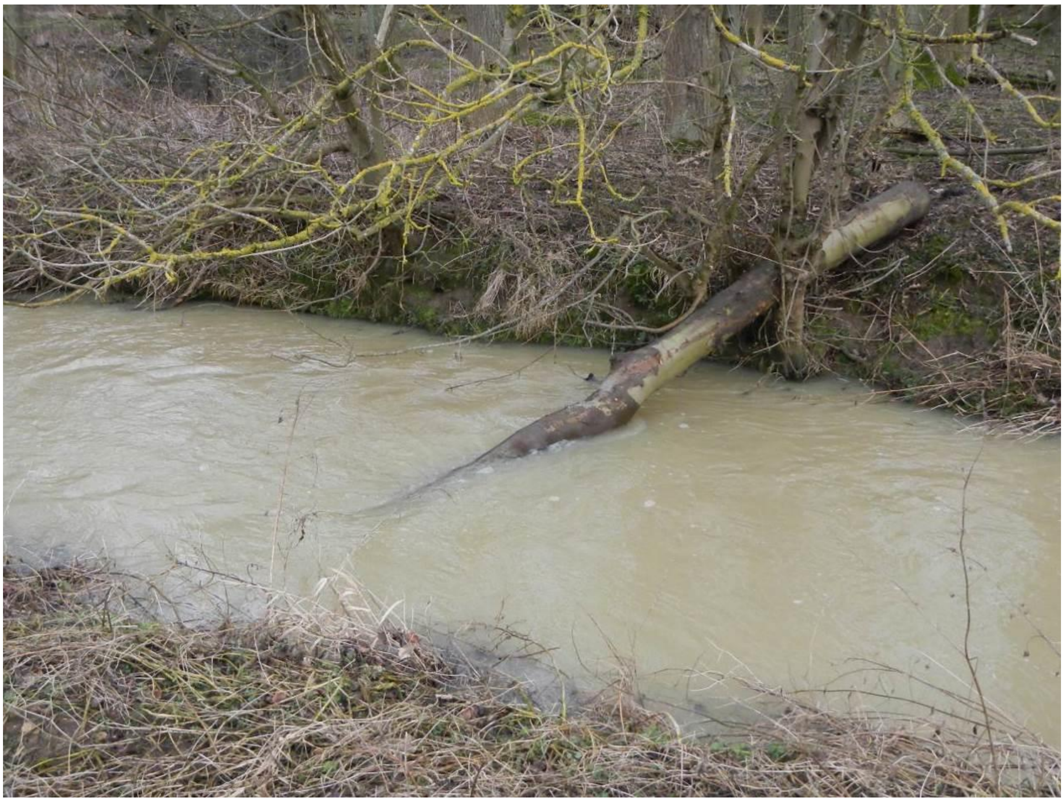

Figure 10. A lodged flow deflector – the technique can be used with a single pole (primarily to increase scour) or a branched limb (to create greater flow dissipation). The elevated butt end (bank end) reduces the potential detrimental bank scour usually associated with d/s deflectors as a through-flow is maintained along the bank.

The alternative lodged flow deflector method is equally simple but relies upon a deflector with multiple branches and simply involves hooking one of the branches around an upright tree (Fig. 11). The example uses a medium sized branch, but any size of branch or tree can be employed providing the anchor tree is stable and of sufficient size. A winch can be used to manoeuvre larger deflectors.

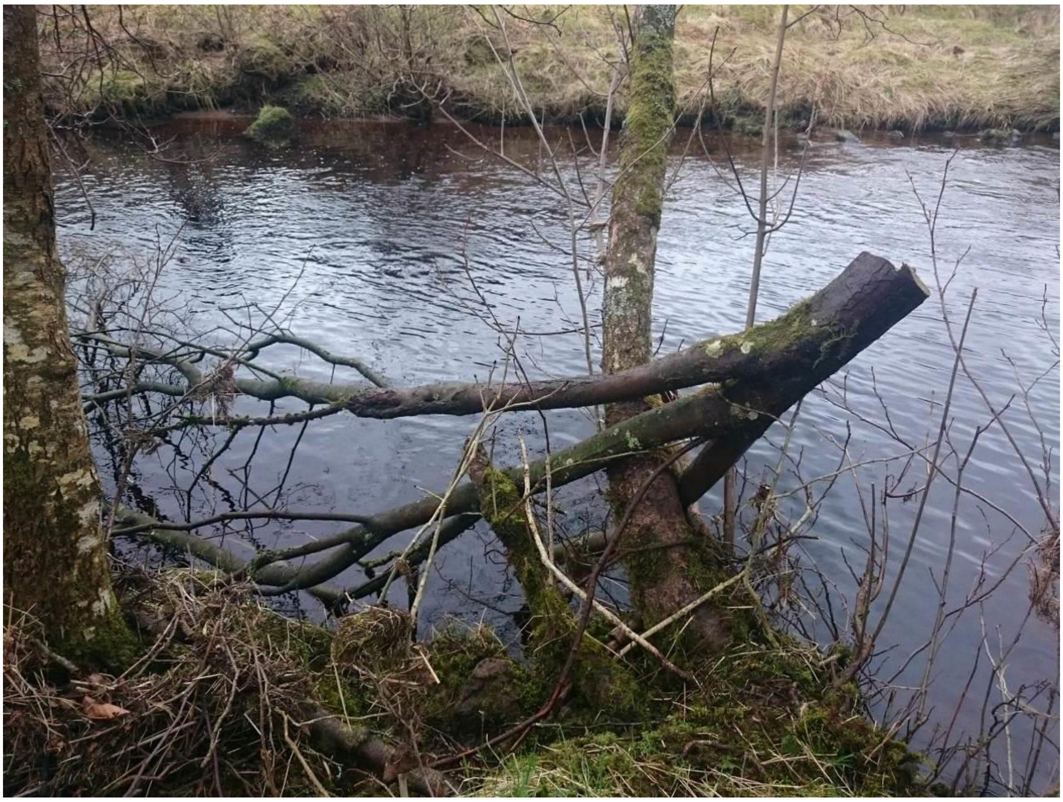

Figure 11. A medium sized piece of lodged woody material which is securely anchored in place against an upright tree to provide cover and structure within a pool.

Either of these techniques would work well for the location shown in Fig. 4, to increase the availability of structure within the pool without the requirement for additional fixings. The multi-stem alder trees would provide an ideal anchor point.

5.1.2. Tree Kickers

Woody material can also be secured within the channel as a tree kicker (Fig. 12). The technique is slightly less natural but mimics natural features by cabling an appropriately sized tree/shrub to its own or an adjacent stump/tree (Fig. 13).

If diffuse branches are employed, sediment deposition in and around the limbs will further secure the structure in place as the lower parts become buried (as is occurring in Fig. 12). The orientation of the structure and its streamlined shape, with the tree butt upstream, means that once it is partially submerged and high flows are passing over it, the structure will be forced in a d/s direction, but also downward towards the bed, further securing it in place.

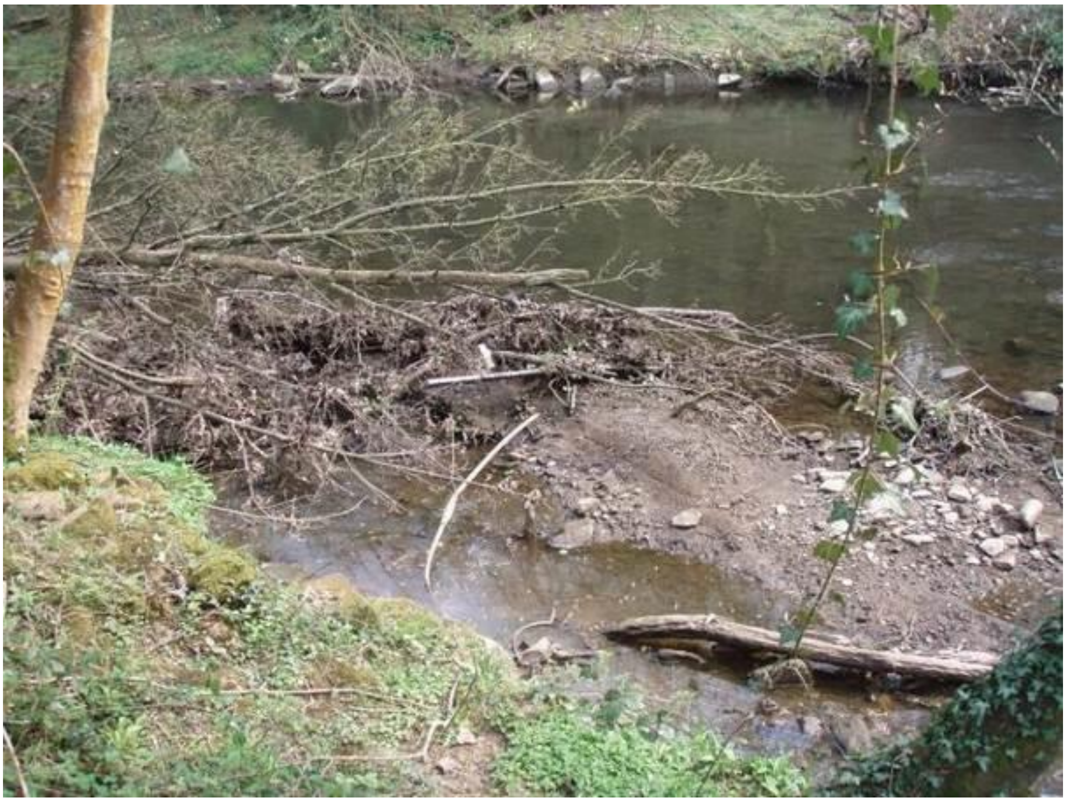

Figure 12. A perfect example of how a tree kicker can be employed to diversify flow and increase deposition in the river margin that further focusses flow down the far side of the channel. A similar effect can be achieved with the use of lodged woody material.

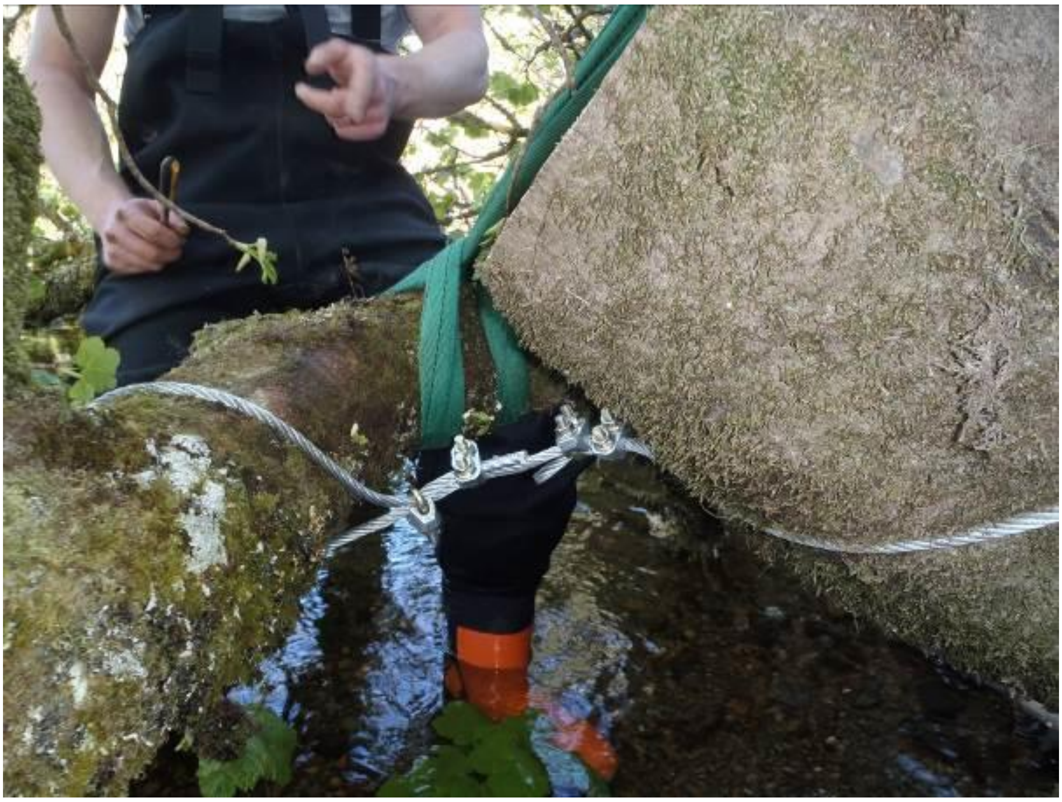

Figure 13. A basic tree kicker cable setup using 4000 kg breaking strain cable and two sets of cable clamps. The webbing strap in the background is used to pull the kicker close to the stump for fastening but is removed once the cable is fully fixed in place.

5.2. Obstructions

5.2.1. Burnopfield Road bridge footings/gauging weir

Ideally, the bridge footing would be removed down to bed level, although this is unlikely to be possible owing to the dependent infrastructure. Even lowering the crump weir on top of the footings would be a significant improvement.

At manty sites around the country, a stable bed cross-section is sufficient to provide the accuracy of flow monitoring that is actually required, be that level data, or more accurate acoustic flow monitoring. Alternative monitoring options for the site may therefore allow the crump to be removed and the obstruction reduced, ideally in conjunction with a fish pass or easement. The potential for this should therefore be investigated with the Environment Agency who gauge flow at the site.

In the short-term, less effective but potentially achievable options are likely to include:

- A rock ramp easement
- Installing baffles to retain water depth and create an easier swim across the apron.
- Installing an adherent nappe to the step at the downstream end to provide swim-through conditions onto the apron (i.e. no jump required)

These options would work in conjunction with removal of the crump.

5.2.2. High Dam weir

Ideally, this redundant structure should be removed to reinstate a more natural channel. Removing a large portion of the structure (at least equal to the natural channel capacity) would be the next best option. In the meantime, it should be ensured that the easement to the RB side of the weir is maintained to as low a gradient as possible.

5.3. Fishery management

This habitat assessment and angler catches support the assertion that the River Derwent is already capable of supporting wild fish populations. Those populations would be better protected by ceasing stocking the river with poorly adapted hatchery fish (for more background, see Appendix – **Fish population management**). Telephone discussions with the local Environment Agency Fisheries Team confirms that they support APDVAA in ceasing stocking and developing a wild fish only policy (Niall Cook, **pers.comm.**).

It is understood there is currently a requirement to stock the river stipulated in one of the APDVAA fishing leases. As such, it is recommended this clause be reviewed with the owner to see whether it can be withdrawn, for the benefit of the fishery. Both the WTT and EA are happy to provide support and input to any liaison with the owner of the fishing right.

6. Next steps

WTT may be able to offer further assistance such as:

Support with cessation of stocking. Further to this report, the Wild Trout Trust will be happy to provide input to any discussions around the recommendation to cease stocking, whether this be within the association or in negotiations with the owner of the fishing rights.

WTT Practical Visit

- Where recipients require assistance to carry out the improvements highlighted in an advisory visit report, there is the possibility of WTT staff conducting a practical visit. This would consist of 1-3 days' work, with a WTT Conservation Officer(s) teaming up with interested parties to demonstrate habitat enhancement methods (e.g. tree kickers and willow laying etc.).

The recipient would be asked to contribute to the reasonable travel and subsistence costs of the WTT Officer. Some subsidisation of those costs may be possible, depending upon the availability of funding and the range WTT projects that are running at the time.

In addition, the WTT website library has a wide range of free materials in video and PDF format on habitat management and improvement:

www.wildtrout.org/content/wtt-publications

We have also 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 populations 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.

7. Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programme in England, through a partnership funded using rod licence income.

8. Disclaimer

This report is produced for guidance; 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 guidance made in this report.

Fish population management

The management of wild fish populations is a complex but interesting subject, well-worthy of a dedicated section within this report. The following is an overview of the main considerations.

The native salmonid populations of Britain possess great genetic diversity, being the product of several separate colonisations following the last ice age. Most are now further distinct from each other, having specifically adapted to their local environments over time. The natural genetic variability of these populations makes them amazingly resilient and adaptable to changing environmental conditions, which they should continue to do, providing human impacts upon them and their habitats can be limited.

However, over the last 150 years or so, human impacts upon fish populations have increased exponentially, with major issues arising from the way in which we manage land and rivers. To compound these issues, direct interference with wild fish populations also increased, with large numbers of hatchery-bred fish being introduced to rivers.

The artificial mating that occurs within hatcheries bypasses vital chemical and visual aspects of mate selection; a process that ensures mate compatibility and maximises the fitness of wild fish. Hatchery reared fish (both diploid and triploid), are also affected by domestication and selection for the farm environment, even within one generation in the hatchery (<u>so this includes fish from wild brood-stock schemes</u>). After all, farmed fish are individuals that have survived within a concrete raceway, earth pond or tank and have become conditioned to those habitats. They are therefore poorly adapted for the very different conditions of a natural river. This adaptation to a farm environment is cumulative, with genetic diversity, natural behaviours, and survival rates when released to the wild all decreasing with each generation in captivity.

Stocking fish therefore produces a *'no-win'* situation: if the fish don't successfully reproduce in the wild, or are infertile (triploids), they are simply a drain on the resources of the ecosystem; if they do survive long enough to breed, their offspring have much poorer survival than the offspring of wild fish. Stocked fish do, however, temporarily take up space and resources within a river that could have been used much more effectively by wild fish which would then contribute to the population.

Naïve hatchery fish also make an easy prey target, potentially increasing the survival rates of predators and the time they spend in areas with stocked fish, thereby increasing the impact they have. Why waste money introducing unfit stocked fish that are destined to do poorly in the wild when a river will produce its own healthy wild fish populations for free, if allowed to do so?

So, what about the wild fishery option?

Natural rivers (without stocking) have a far greater capacity to produce and hold healthy fish populations. They were successfully producing an abundance of fish for a long time before we started interfering.

A major key to the success of wild salmonids is their life strategy: over-production of offspring that are then subject to density-dependant mortality. So, the greater the availability of habitat in any year, the greater the potential for trout to survive, thereby mitigating for mortalities and annual fluctuations in the population. This also means that underperforming populations can be easily increased by simply improving habitat quality, or increasing access to it (removing barriers).

As soon as trout fry emerge from the gravel they disperse throughout the available habitat, constantly competing to maintain territories. This ensures that the fittest, dominant fish control the best lies with easy feeding for low energy expenditure. They will remain there until they challenge for a new territory or are displaced by a more dominant individual. Wild fish production therefore helps to ensure that habitat is fully utilised and that a river holds the optimal number of fish, with the available space being naturally repopulated by the over-production of juveniles each year. Such efficient habitat utilisation is impossible to achieve through artificial stocking or even alongside stocking, because stocked fish disrupt the hierarchies and structure of a wild population.

Wild fish constantly defend their adopted territory and strive to retain it, while hatchery fish have little affinity or suitability to the arbitrary reach in which they are introduced. A large proportion of fish stocked into rivers therefore leave the stocking location and/or lose condition and die within a short time, particularly during adverse conditions (high/low flow or temperatures). Consider where the thousands of fish stocked all over the country in previous years are at the beginning of each season, and why there is even a requirement to restock. In contrast, un-stocked wild fisheries provide some of their finest fishing early season as the resident wild fish take advantage of insect hatches to regain condition after the winter.

Consequently, most angling clubs actually report increased catches after ceasing stocking as demonstrated by the ever-increasing number of case studies on the WTT website - www.wildtrout.org/content/trout-stocking. There is sometimes a lag period as the wild fish population recovers from the impacts of stocking, but increased catches of trout are often reported from year one. Anecdotal evidence from an increasing number of fisheries suggests that overall grayling populations often proliferate too, once trout stocking ceases.

An excellent video produced by Wild Fish Conservancy North West documents how the whole state of Montana in North America ceased stocking after realising the major negative impact it was having on their fisheries – www.youtube.com/watch?v=U_rjouN65-Q&app=desktop

To further improve the river's wild trout populations, it is also recommended that catch and release (C&R) is strongly promoted. C&R is an excellent way of ensuring trout achieve their full size potential. This is well-demonstrated on numerous wild fisheries that now support many more large fish than have appeared in catches historically (in the past 100-150 years).

Consider that a take-able fish may be four or more years old (depending upon river productivity and growth rates), with a 0.5kg fish (1lb +) usually five or more. It is a myth to think that just because some rivers are less productive that the fish cannot attain large sizes, they often just need to be left in the river long enough to do so. Once established, those larger wild fish are very valuable, taking the longest to replace, but their natural survival rate actually improves (fewer other animals can eat them), making them more likely to remain in the river long-term if anglers do return them. These fish will continue to grow, attaining even larger sizes and further contributing to the spawning population – improving angling opportunities each year. C&R is therefore a win-win. Catch and kill angling on the other hand usually artificially limits the sizes fish can attain and, potentially, the overall success of their population.

This document is intended as a brief overview of wild fish population management and the pitfalls of stocking. The fully referenced WTT position paper can be found at - www.wildtrout.org/sites/default/files/library/Stocking_position_2012_final.pdf