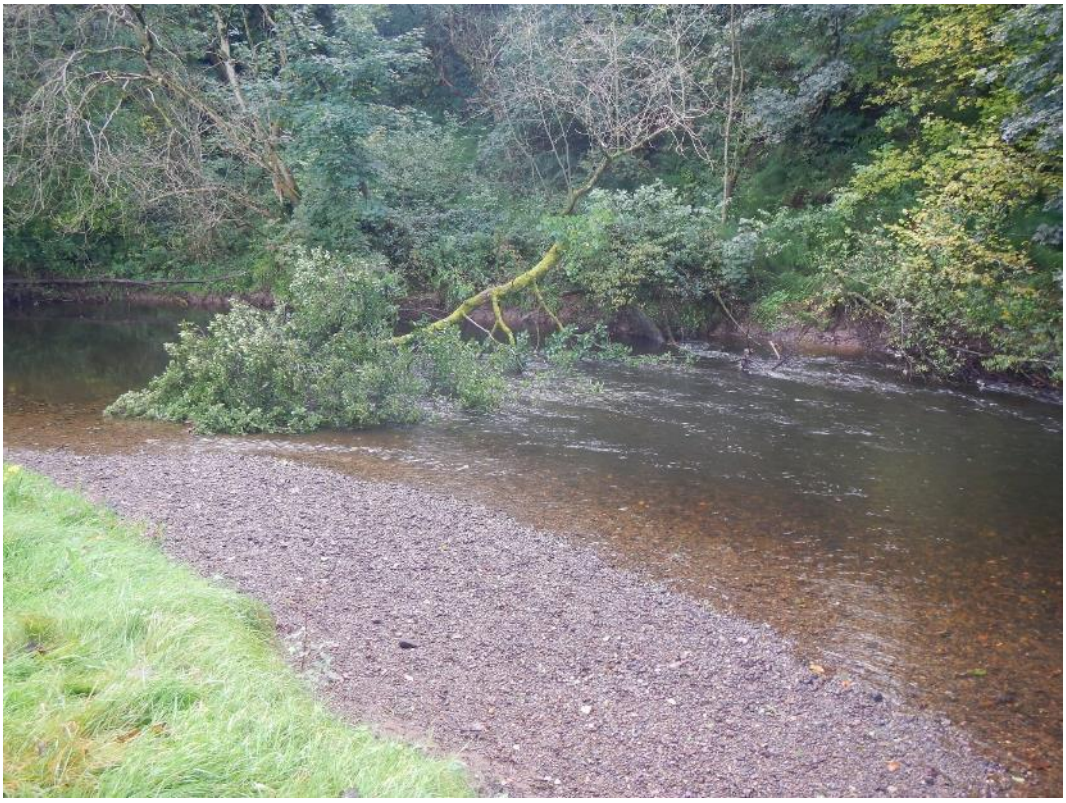
WILD TROUT TRUST

River Irt

Bertol Angling Club

(West Cumbria)

01/10/2020



Author: Gareth Pedley (gpedley@wildtrout.org tel. 07500 870583)

Table of Contents

Summary

- This section of the River Irt is clearly cared for, with active habitat management and improvements like bank protection being undertaken. This is having a positive impact in many areas but is no substitute for addressing the major issue affecting the reach, namely livestock access to the banks of the watercourse.

- Installing buffer fencing would be the greatest habitat improvement that could be undertaken throughout the river section visited (and almost certainly in areas upstream too). This single action could greatly reduce erosion rates and improve both in-channel and riparian habitat quality.

- Some light-touch tree work to diversify the existing canopies would be beneficial in localised areas but overall, the trees require minimal management.

- Increasing the availability of woody material within the channel would be beneficial in several locations; this could utilise material generated by tree management.

1. Introduction

The Wild Trout Trust and local Environment Agency fisheries officer were invited to undertake an advisory visit to the River Irt in West Cumbria, by Bertol Angling Club, who operate the fishing on around 2km of the river upstream of Holmrook. West Cumbria Rivers Trust also attended the visit. This report will assess the general habitat quality of the river section visited and make recommendations of any improvements that could be made.

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 to identify specific locations.

2. Background

River	Irt	
Waterbody Name	Esk (W)	River Irt (d/s Bleng confluence) - most relevant
Waterbody ID	GB531207408400	GB112074070070 - most relevant
Operational Catchment	Irt-Mite-Esk-Annas	Irt-Mite-Esk-Annas
Management Catchment	South West Lakes	South West Lakes
River Basin District	North West	North West
Current Ecological Quality	Moderate	Moderate
U/S Grid Ref inspected	NY 08714 00720	
D/S Grid Ref inspected	SD 07935 99895	
Length of river inspected (KM)	2	

The River Irt forms the outflow to Wast Water, originating from the south western Lake District around Kirk Fell, fed by the major tributaries of Mosedale Beck and Lingmell Beck. The geology of the upper catchment is dominated by tough igneous rock and granite, creating a steep and often constrained channel in many areas. Sandstone becomes an increasing influence further downstream, a fact reflected in the wider, shallower gradient valley and sandy, friable soils of the middle and lower catchment.

As with much of the Lake District, upper areas of the catchment are predominantly moorland sheep grazing, with limited tree regeneration and depleted vegetation diversity. Progressing downstream, riparian woodlands become an increasing feature and the increasingly productive land is also used for cattle grazing and some arable agriculture, which is the case for the section reported here.

The section of river visited appears to fall under the Water Framework Directive (WFD) waterbody **Esk (W)(GB531207408400)**, which is a transitional waterbody (supposed to be tidal waters) that encompasses the

Rivers Irt, Mite and Esk, any assessment therefore will have no relevance on the discrete section of non-tidal River Irt it appears to cover.

The more relevant assessment is therefore likely to be the catchment upstream, **River Irt (d/s Bleng confluence)(GB112074070070)** waterbody, that achieves a moderate status, being good or high for all parameters other than priority substances (Polybrominated diphenyl ethers (PBDE) and Perfluorooctane sulphonate (PFOS)). These newly tested chemical parameters are now resulting in failures on most waterbodies.

Classifications

Cycle 2 classifications

Download as CSV

Classification Item	2013	2014	2015	2016	2019
Overall Water Body	Good	Good	Good	Good	Moderate
Ecological	Good	Good	Good	Good	Good
Chemical	Good	Good	Good	Good	Fail

https://environment.data.gov.uk/catchment-planning/WaterBody/GB112074070070

3. Habitat Assessment

The river was assessed walking in an upstream direction from Holmrook. River flow and turbidity were slightly elevated on the day of the visit following intermittent rain; however, observation of the bed was possible in all but the deeper pools areas, facilitating adequate habitat assessment.

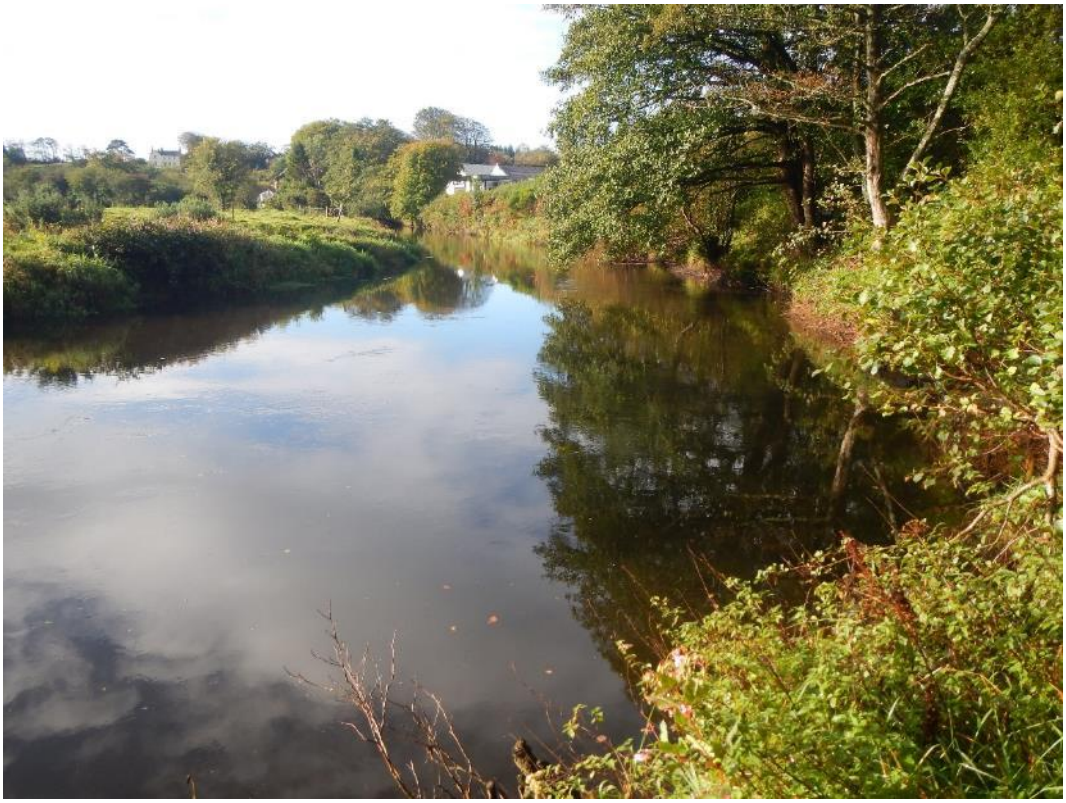


Figure 1. At the downstream end of the beat, a deep pool provides ideal cover and holding water for migratory salmonids. Overhanging bankside trees and vegetation add to cover availability in the river margins, particularly on the RB.

On many rivers, a legacy of 'maintenance' persists that is often detrimental to habitat quality. While well-meaning, cutting, moving, or otherwise altering naturally occurring woody material within a channel is generally counterproductive. Removing a tree to ease angler access will almost invariably reduce the fish-holding potential of that area. While the impact will vary depending by the action taken, simply leaving fallen trees and branches within a channel will usually deliver the greatest habitat benefits. Many rivers now lack the extent of in-channel structure they should support, owing to years of well-meaning but unnecessary removal.

Moreover, it is usually hard to replicate the scale of important habitat features lost. Consider that a large tree (rootball attached), is likely to remain where it falls for an extended period, owing to the weight of the rootball and hydro dynamics of the structure that help it to lodge within the channel, where small natural adjustments and associated bed scour will develop additional beneficial habitat features. Cut trees or branches lacking the anchor point of a rootball usually require artificial fixings, facilitating less natural adjustment and beneficial scour. They are also more susceptible to wash out in high flows and less likely to then be retained within the reach unless otherwise unnecessary substantial fixings are put in place. There are scenarios where a material falls close to flood-sensitive structures and action must be taken, but elsewhere it is far better to leave well-alone and learn to fish around the natural features that develop.

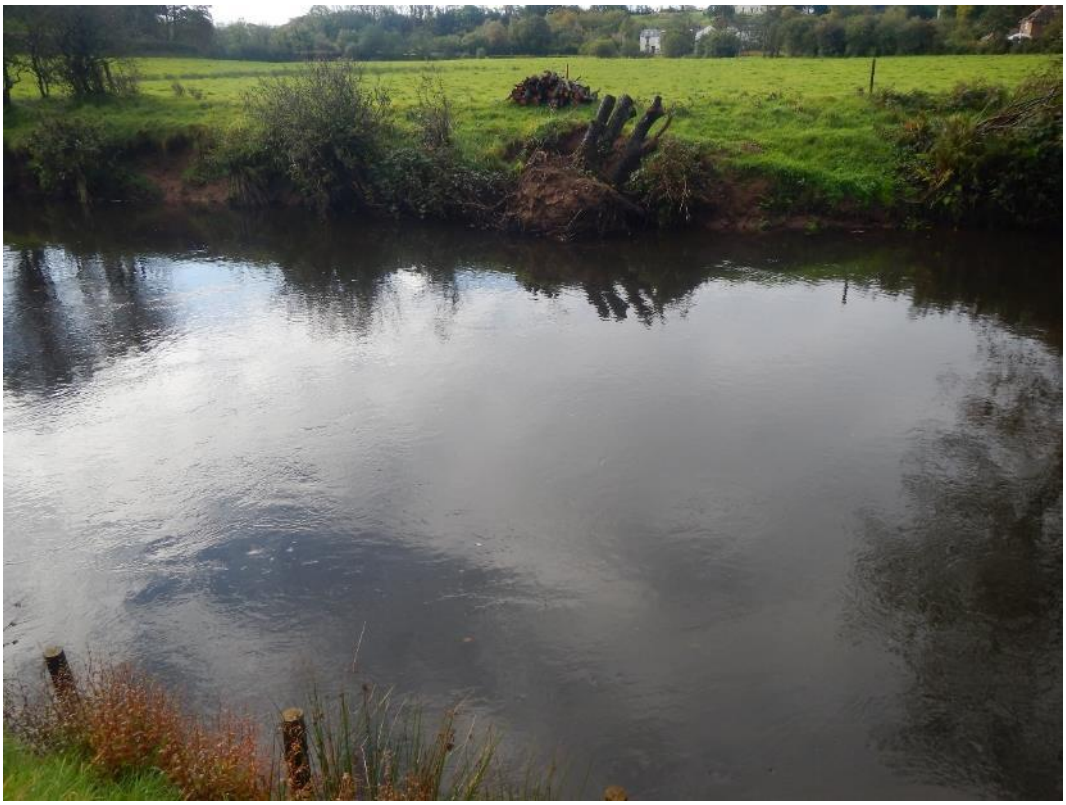


Figure 2. Tree clearance on the LB has reduced the availability of cover along the bank and in-channel, with a toppled tree cut to a pollard and pulled back to the bank. Wherever possible, retaining fallen trees where they fall in the channel, with minimal pruning or maintenance, and allowing them to naturally adjust is the best course of action. This will facilitate increased flow diversity and the sculpting of new bed features, in addition to providing in-channel cover, which will benefit invertebrates, fish and anglers alike.

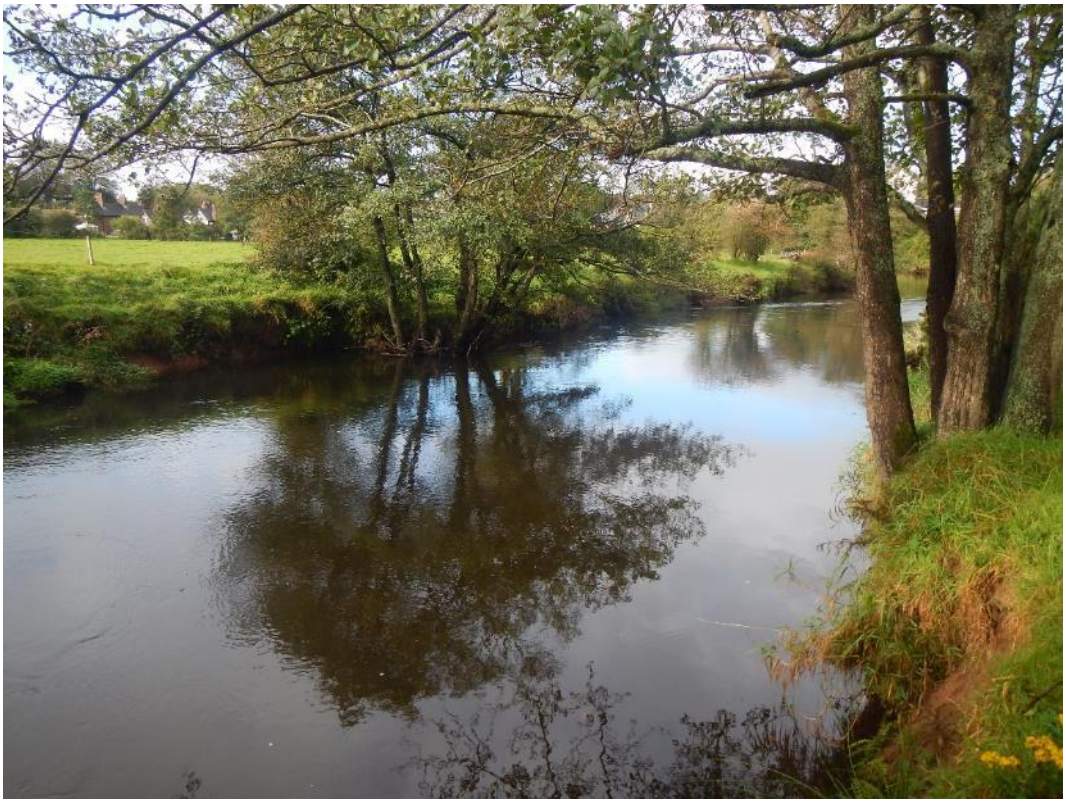


Figure 3. A similar scenario applies to pruning. Often undertaken to improve casting access, the loss of low and trailing branches is detrimental to habitat quality and the fish-holding potential of an area. Note how open and lacking cover this scene is owing to historic low-level pruning, despite the presence of bankside trees. Selective coppicing is now required to encourage low regrowth – pruning has reduced habitat quality and created more work!

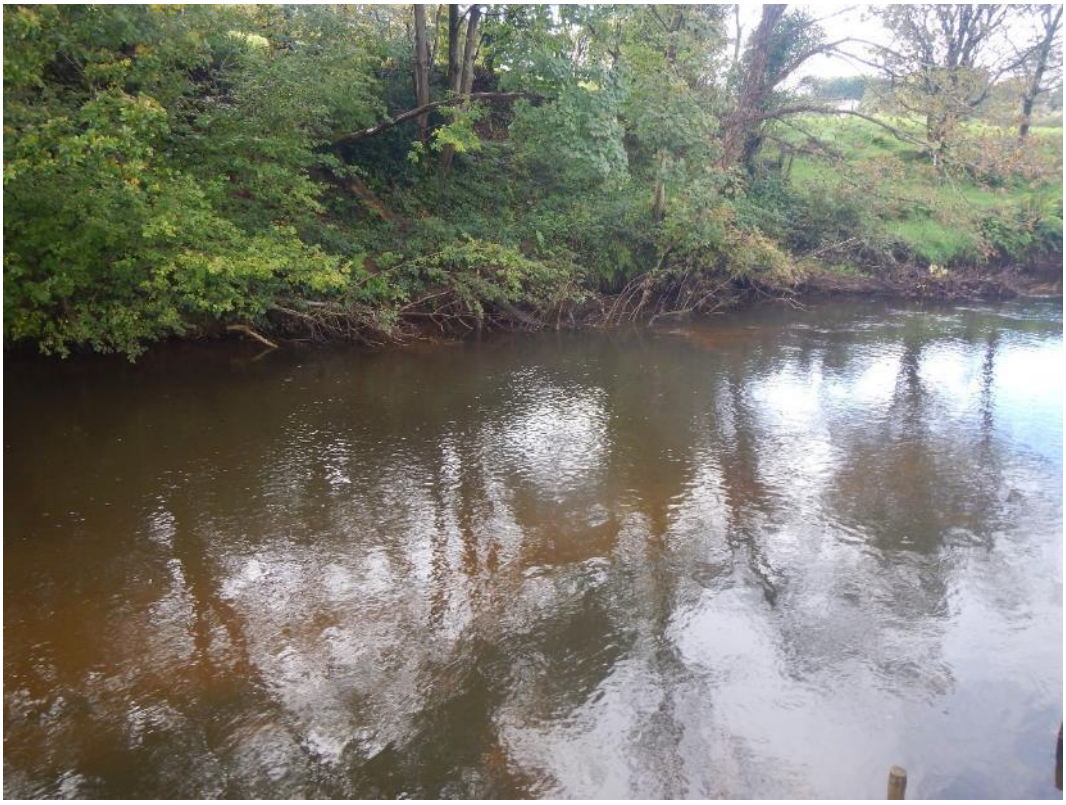


Figure 4. In contrast to the overly cleared/managed areas, the well-treed LB upstream supports high quality low cover and woody material, both naturally retained and introduced. This diversity provides important refuge areas for fish to shelter from high flows and predators – it also creates excellent fish-holding features to cast to. Very few rivers now support the extent of woody material structure and overhanging trees they should do naturally, and this is reflected in elevated predation rates by piscivorous birds.

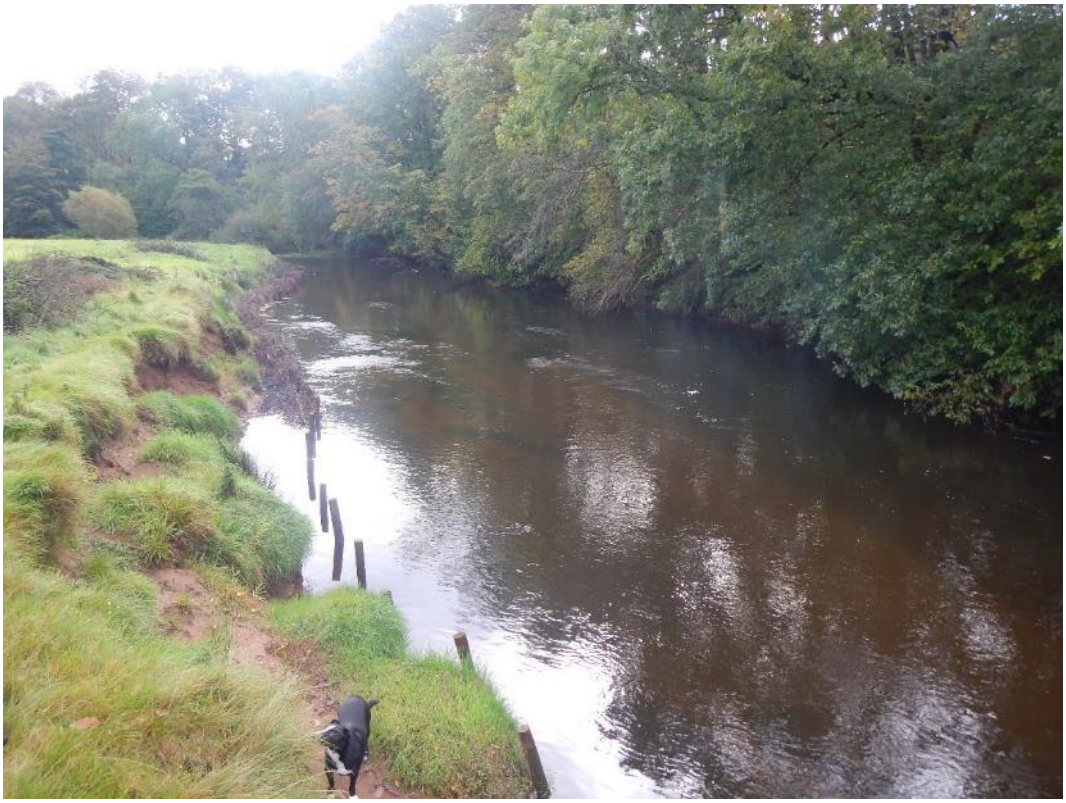


Figure 5. High quality, natural, low-level cover along the far LB, in contrast to the grazed, denuded and destabilised RB (left of shot), with a lack of vegetation diversity and obvious erosion issues (SD 08144 99828). Simple livestock exclusion would solve this issue on an area of bank that would not be eroding naturally. Note the lack of trees and tree regeneration owing to the grazing which left unchecked, can ultimately lead to a complete loss of trees over time and even greater erosion.

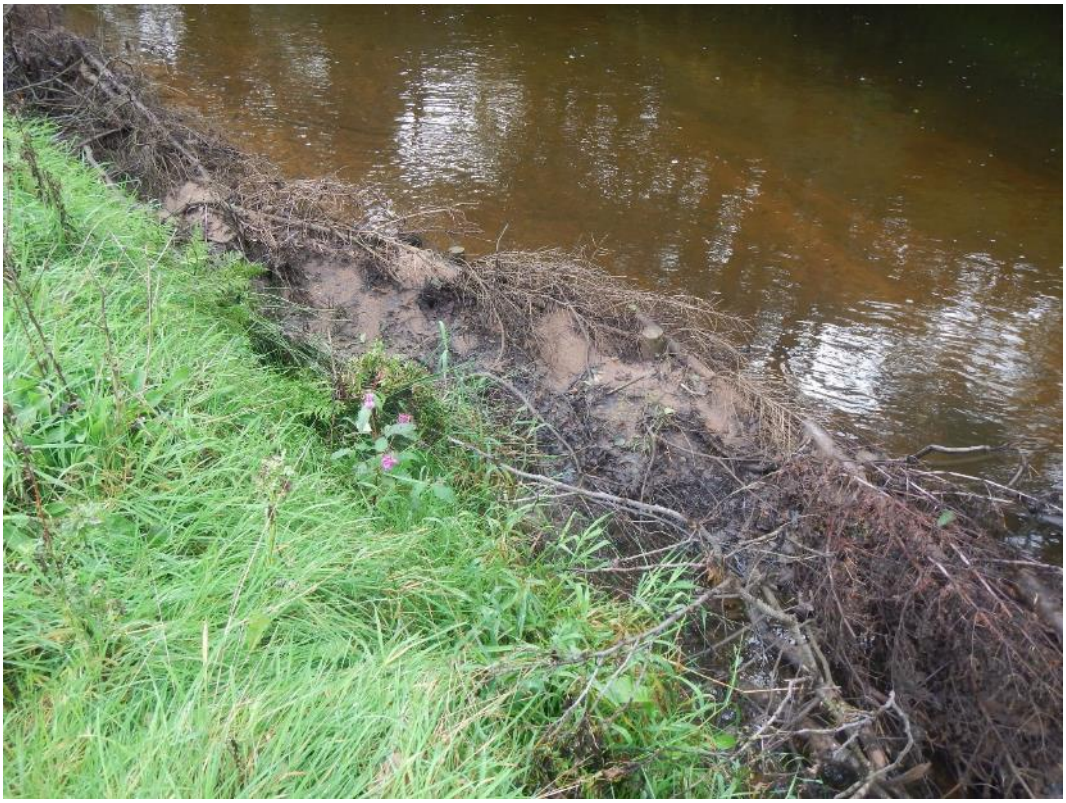


Figure 6. In the absence of agreement to buffer fence the watercourse, the brash bank protection installed is working well to trap fine sediment and consolidate the lower bank. However, this only likely to be a short-term fix unless livestock can be excluded to allow the banks to properly revegetate and become consolidated.

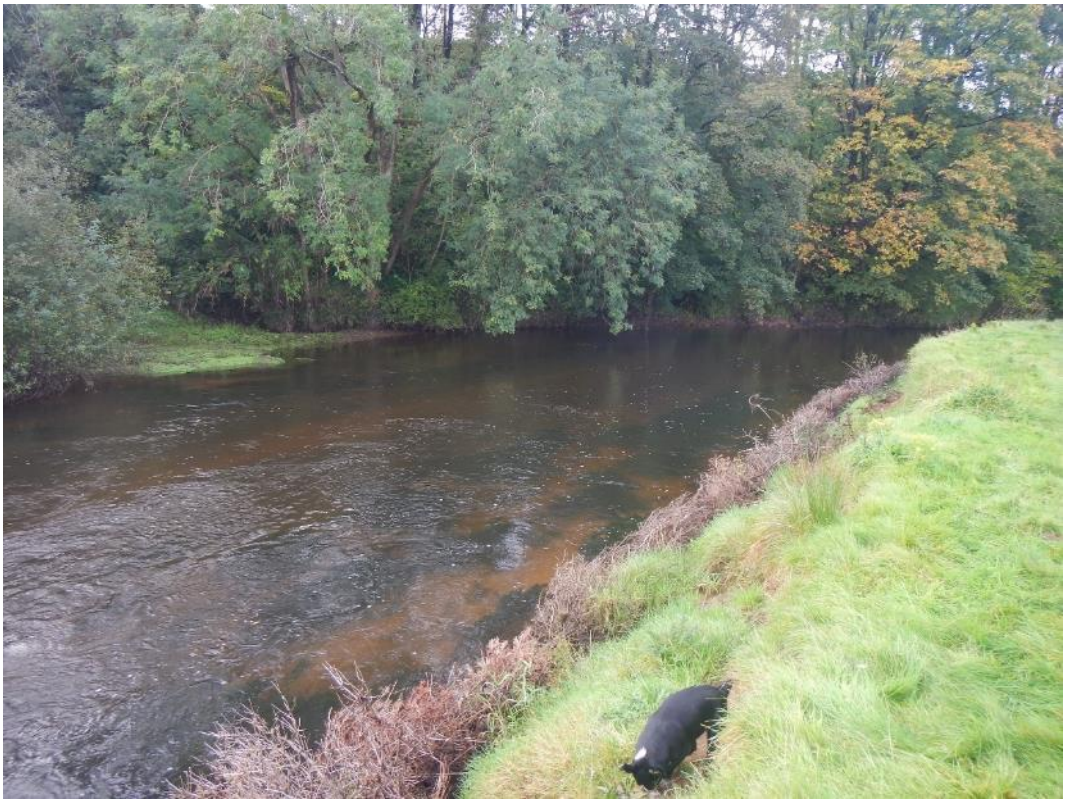


Figure 7. Erosion on the inside of the bend has widened the channel sufficiently to reduce flow velocities such that they now have insufficient energy to scour and maintain the pool. Correspondingly, a significant known pool is now reduced in depth. Again, consolidating the bank with more diverse vegetation would help to rectify this issue over time.

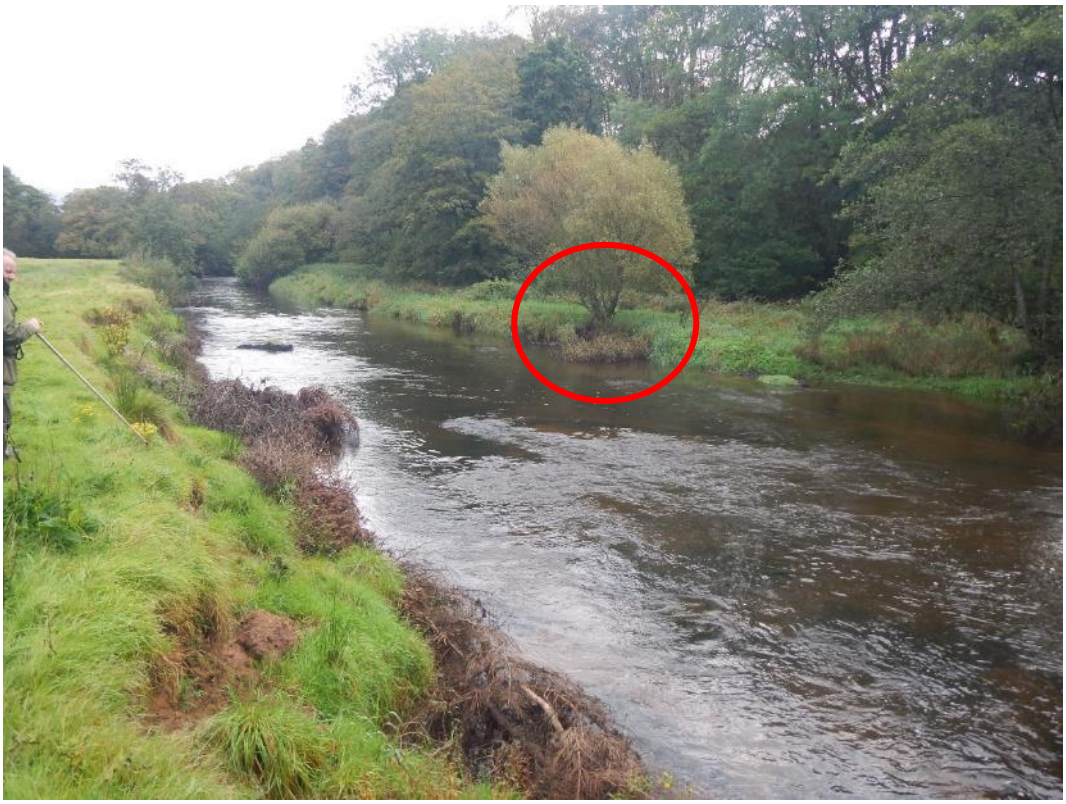


Figure 8. The brash bank protection continues for an extended length upstream and while it is beneficial in stabilising the bank and reducing fine sediment input, it should not be required. The lower branches of a willow on the far bank have been laid into the channel to provide valuable low and trailing cover (red circle). Ideally, more of the tree could have been laid into the channel, but with the present unstable state of the opposite LB, this is likely to have increased erosion. Further laying would be beneficial once the bank is stabilised.

Having to line long sections of bank with protection is far from ideal. In this instance, the initiative to protect the bank is a compromise in response to the issue of accelerated erosion that should not exist. Simply fencing the watercourse would benefit all parties by facilitating tree and vegetation regeneration that will consolidate the bank and reduce erosion to a more natural rate; thereby reducing land loss and the negative impact of large volumes of fine sediment being input to the river. In this instance, little more than livestock exclusion is actually required in many areas.

A specific farm advisory visit from the EA, Natural England would be greatly beneficial to try and gain agreement for buffer fencing. If voluntary agreement for fencing is still not gained, the EA are likely to seek action under the new Farming Rules For Water (https://www.gov.uk/government/news/new-farming-rules-for-water) as the current impact upon general river habitat and the protected freshwater pearl mussels is not acceptable. The erosion issues are not limited to one farmer or landholding here, the friable soils of the River Irt catchment mean that more sympathetic, environmentally friendly farming practices are required throughout – namely adequate buffer fencing.

Erosion and deposition are not bad, they are vital, natural processes. A healthy river channel must be allowed to adjust to find a natural equilibrium, at which it will become stable. That equilibrium can be disrupted periodically by extreme flows (high or low) or changes in channel capacity (e.g. woody material input), but providing that natural regeneration of trees and vegetation is occurring, channel stability is usually restored naturally. Major floods may create greater instability which may take longer to recover, but those events also provide other major benefits, like re-sorting of river substrate and the creation of in-channel features like pools and riffles.

Unfortunately, dredging, revetment and adjacent land use can all disrupt the equilibrium within a channel, often accelerating rates of erosion and/or deposition. It is therefore important to understand before undertaking bank protection why erosion is occurring and whether it is a natural response, or whether one or more anthropogenic impacts may be contributing. If the underlying cause of the erosion is not addressed, bank protection will only be a short-term fix and the issue will resurface as soon as the bank protection degrades. As such, bank protection should only ever be a means to stabilise sufficiently for it to consolidate with diverse vegetation, which is only likely to occur following livestock exclusion. Artificially constraining extended sections of channel is not a solution as it disrupts the natural channel processes already discussed. If overly constrained, the increased flow velocities can accelerate erosion elsewhere and prevent the deposition of natural features required to maintain a varied channel morphology. The result can be a uniform bed that lacks the discreet gravel bars and riffles required a high-quality habitat for invertebrates and salmonid spawning.

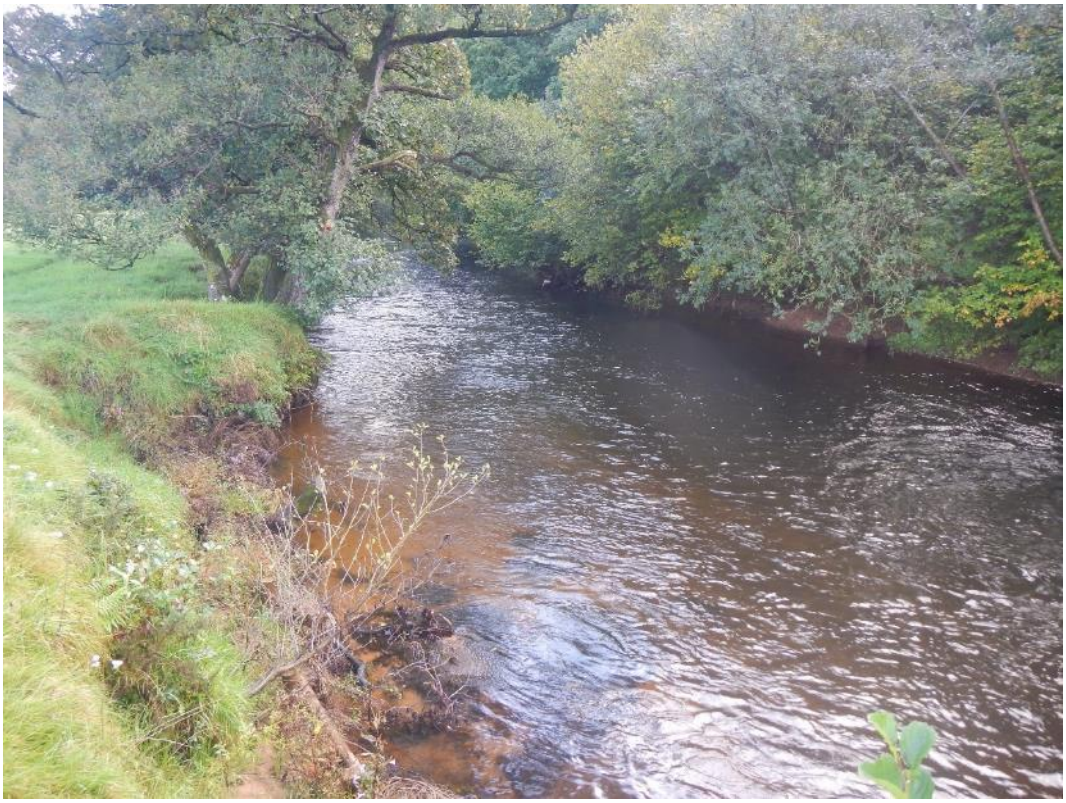


Figure 9. Where the occasional tree remains, the benefit on bank stability is immediately apparent, with a much narrower channel and deeper, fish-holding run present. Note the small saplings in the foreground struggling to take a hold, out of the reach of livestock.

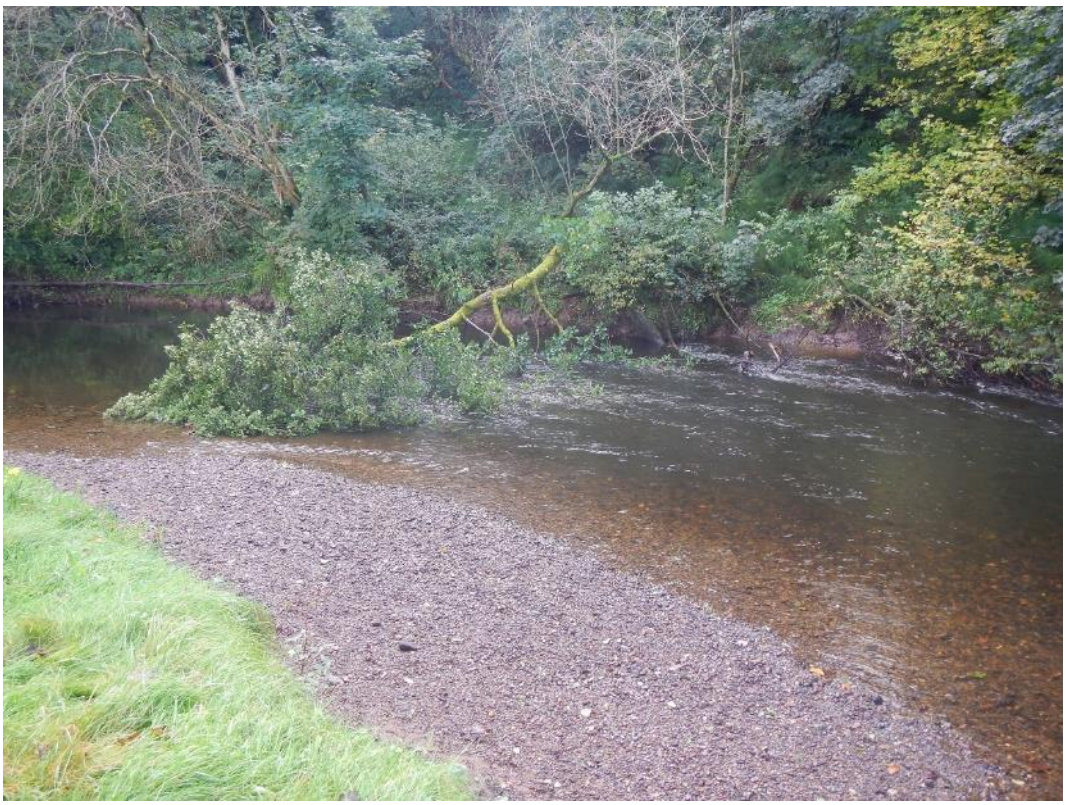


Figure 10. A leaning tree on the outside of a bend upstream has been hinged into the river and now provides in-channel structure. A case could be made for allowing such trees to naturally topple into the river as they may have a greater chance of remaining in situ, but any such woody material in the channel is beneficial. It is hoped that the trunk will remain in place, with subsequent high flows driving beneficial scour into the bed to clean and sort the substrate into valuable spawning habitat. The tree may swing round under the pressure of high flows, to end up lying more parallel to the bank, but will still provide valuable cover.

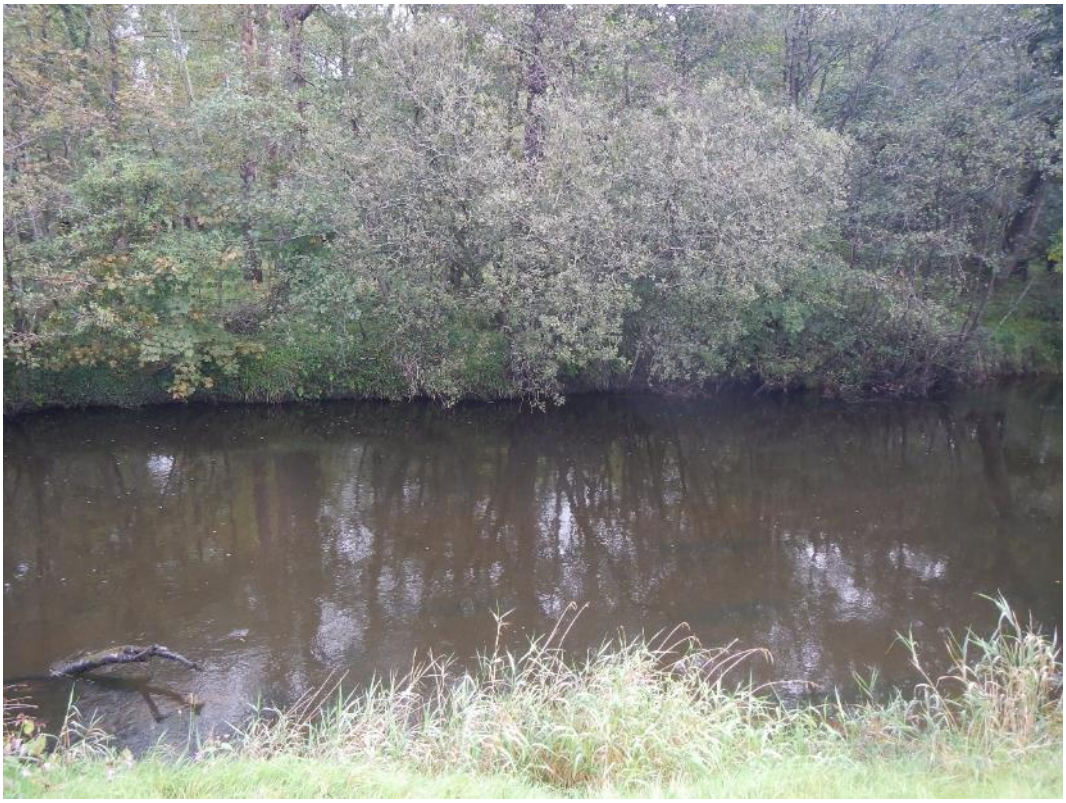


Figure 11. Further round the bend, the channel is relatively uniform, lacking structure and flow diversity. Laying some of the bankside willows down into the channel could increase flow diversity and provide valuable fish-holding/refuge. Alternatively (or in addition), woody material could be lodged between or against the bankside trees (see recommendations).

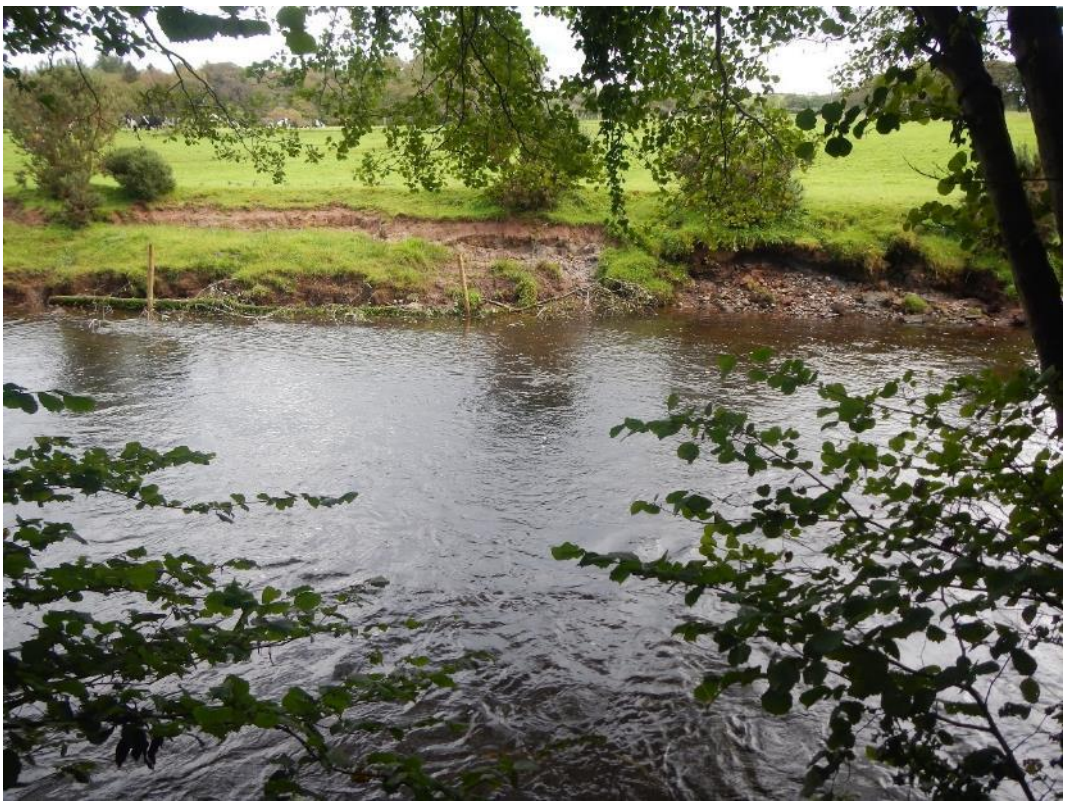


Figure 12. Upstream of the wooded LB section, further livestock access and bank erosion issues were observed (NY 08336 00129). Again, these could be easily addressed through fencing that would also benefit the landowner/tenant without the need for costly and time-consuming bank protection that could ultimately lead to homogenisation of the habitat. Too much of any one thing (or habitat type) can ultimately be a bad thing.

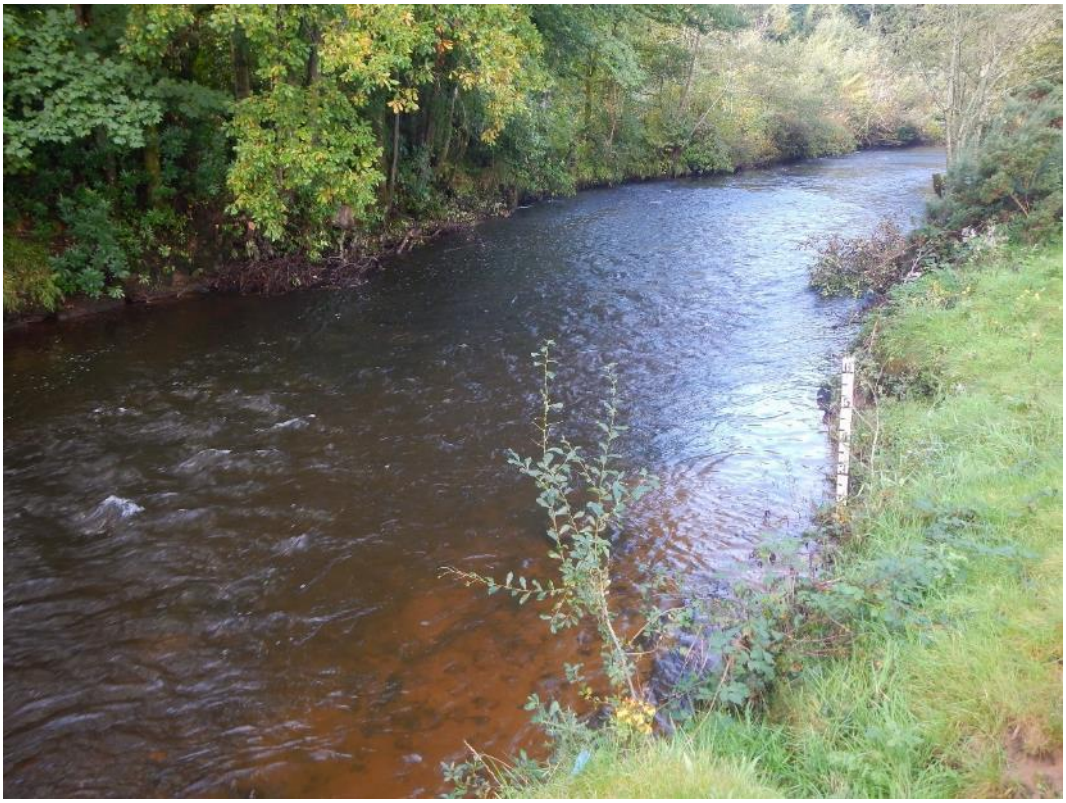


Figure 13. Upstream of the bridge (NY 08287 00141), the area has been cleared of low branches in response to a trunk falling into the channel and fear of the same occurring with other trees. Trees falling into the channel is a highly beneficial, natural occurrence and should be promoted wherever possible. The shallow gravelly areas provide potential spawning habitat, but the lack of cover leaves fish vulnerable and less likely to remain here long. More cover could really improve this area for adult and emerging juvenile fish.

The tree lined bank in this area (Figure 13. Upstream of the bridge (NY 08287 00141), the area has been cleared of low branches in response to a trunk falling into the channel and fear of the same occurring with other trees. Trees falling into the channel is a highly beneficial, natural occurrence and should be promoted wherever possible. The shallow gravelly areas provide potential spawning habitat, but the lack of cover leaves fish vulnerable and less likely to remain here long. More cover could really improve this area for adult and emerging juvenile fish.) is well consolidated with tree root matrices and is unlikely to become significantly destabilised even if the odd tree does fall in. It is therefore usually beneficial to seek advice before undertaking major tree management that could negatively impact upon habitat quality. Retaining one of the trunks within the river margin has helped to provide some in-channel structure here, but a lack of low and trailing branches is still evident.

To counteract the canopy lifting, the ideal solution would be to rotationally coppice some of the trees, thereby reinstating a more diverse canopy and encouraging low-level regrowth. Coppicing should always be undertaken sparingly, with only one in every four or five trees treated in a year, and usually no more than half of the total number being coppiced. This should promote a natural level of light and shade, avoiding the uniform regrowth and overshading that can occur as multiple coppiced stools regrow at the same time.

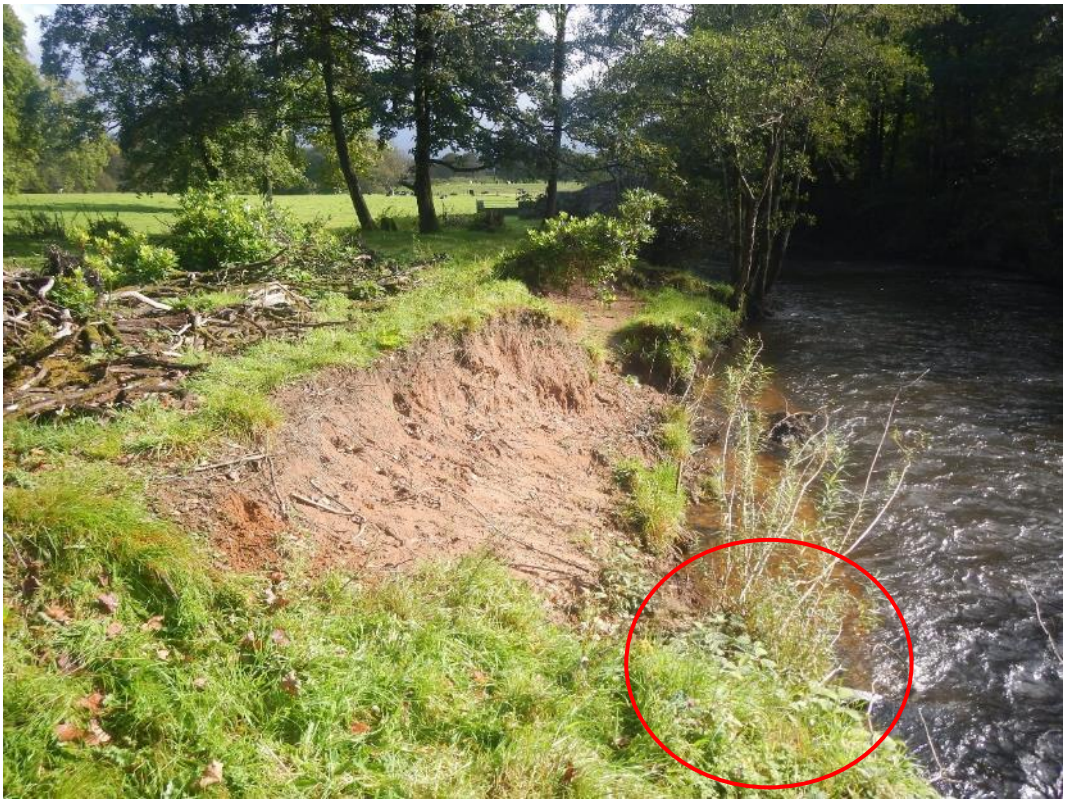


Figure 14. Further erosion issues where the physical damage of cattle hooves is all too apparent. Japanese knotweed (visible in the foreground – red circle) exacerbates the issue and should be treated with herbicide by a licenced operative (NY 08199 00155).

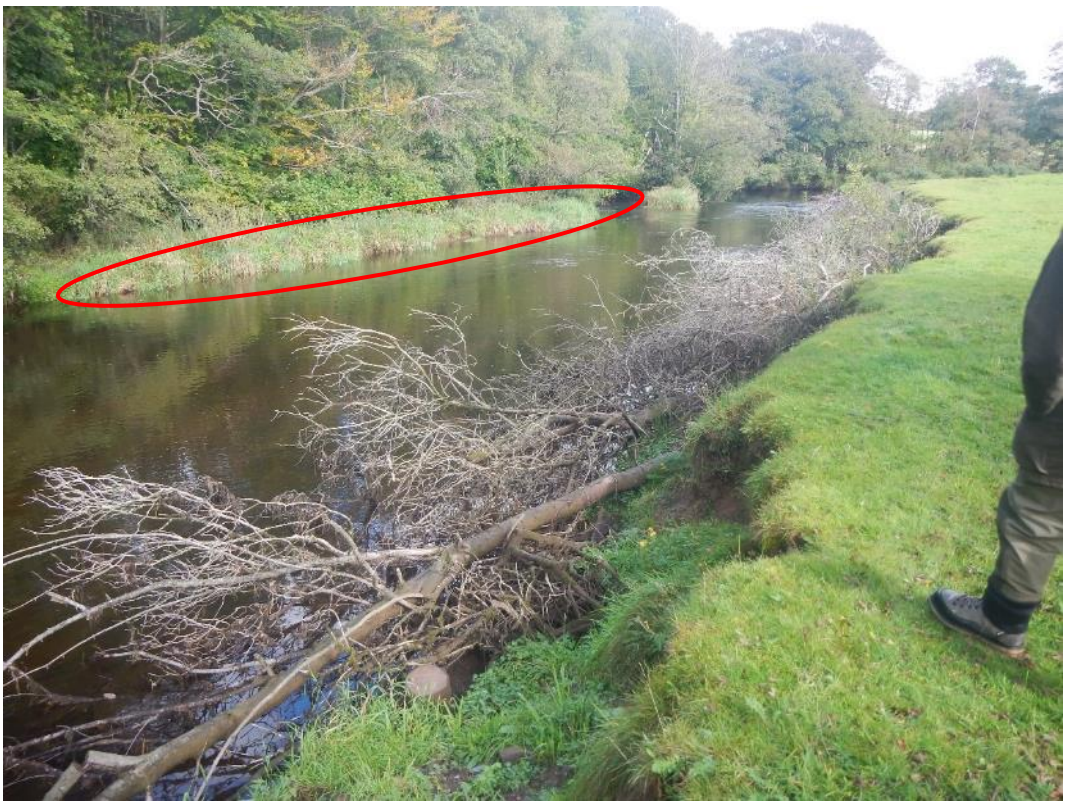


Figure 15. More, somewhat beneficial, brash bank protection. The technique employed here is exactly the right one for protecting riverbanks but again, simply should not be required on a section of bank, which would naturally stabilise if livestock were excluded. The technique is working effectively to protect the bank and trap fine sediment in high flows but it not a long-term solution to the grazing issue. Planting two or three goat willow whips into the far bank could provide valuable fish-holding areas as they grow over the channel (red ellipse).

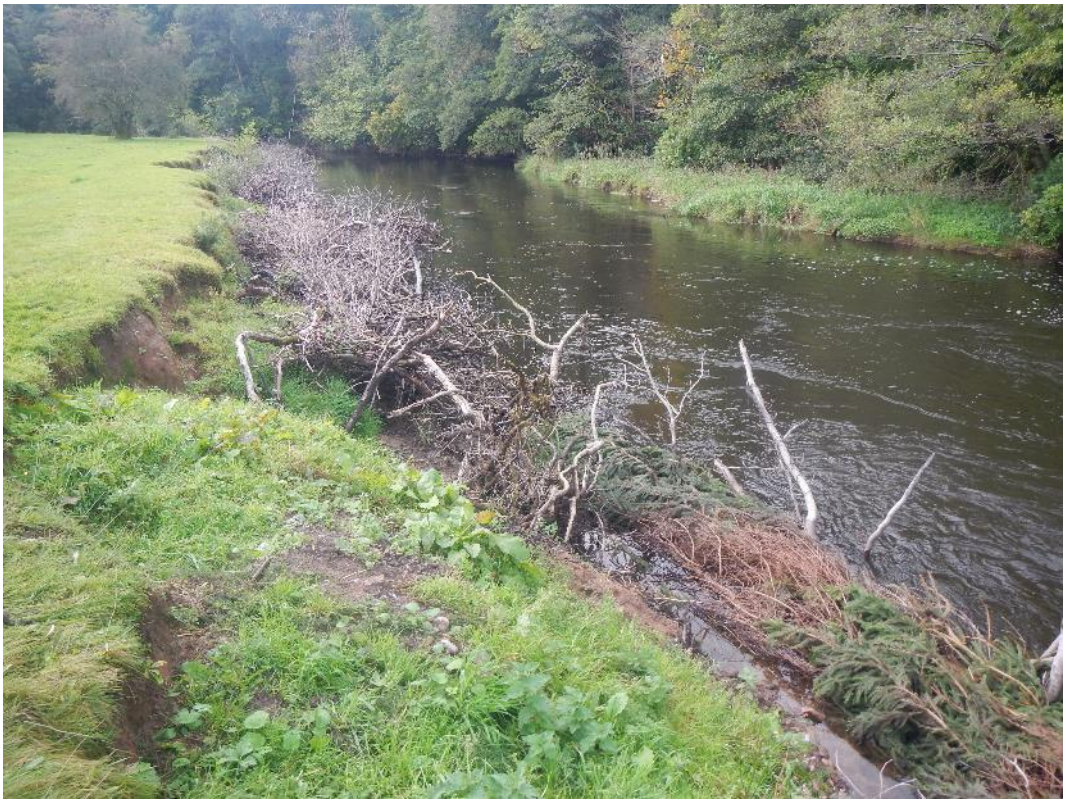


Figure 16. Looking downstream at the same reach (NY 08209 00305). One of many examples where earth (including farm waste) has been dumped along the river, usually in erosion voids and behind bank protection. Dumping any waste material on the bank is inappropriate and most likely in breach of regulations; even appropriate backfilling requires a permit. Artificially dictating the river width for long sections is not advisable, it would be better to allow natural bank adjustment and reinstatement through stock exclusion.

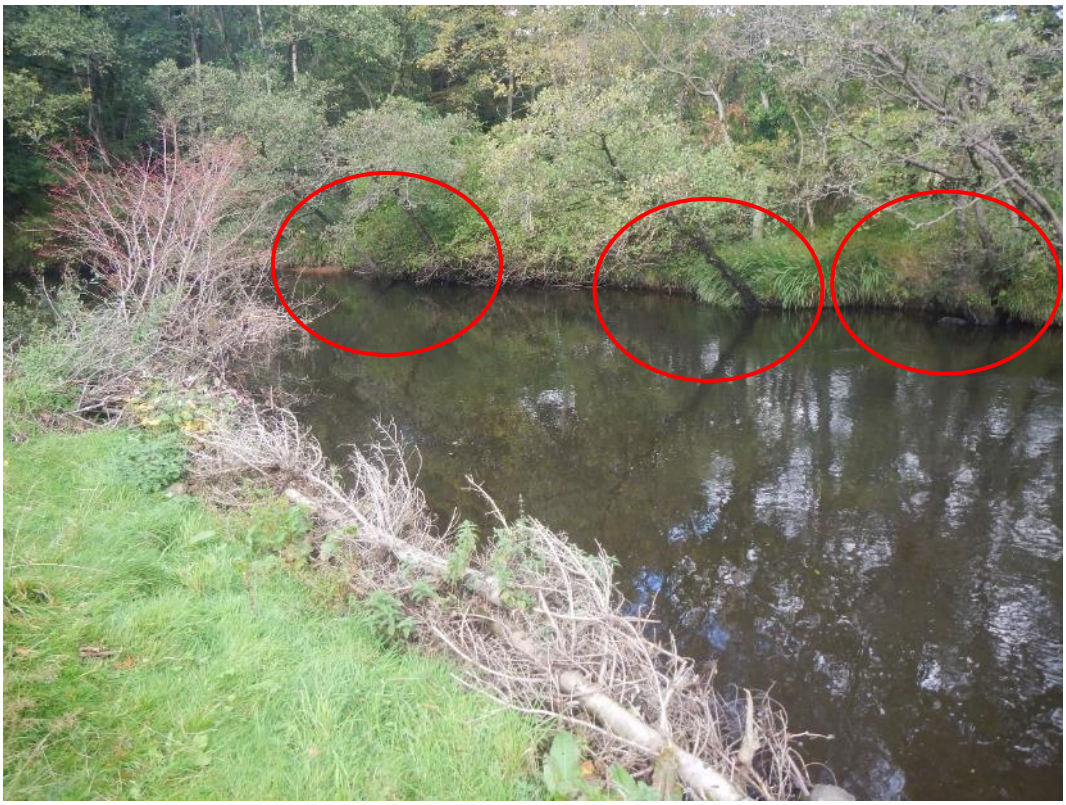


Figure 17. More evidence of past pruning of low-level branches. Some low regrowth has occurred, but it is rare for trees to put significant effort into replacing branches below their own canopy as they would just over-shade themselves. As such, judicious coppicing of the affected trees could be used to encourage the required low regrowth and gradually rectify the issue over several years.

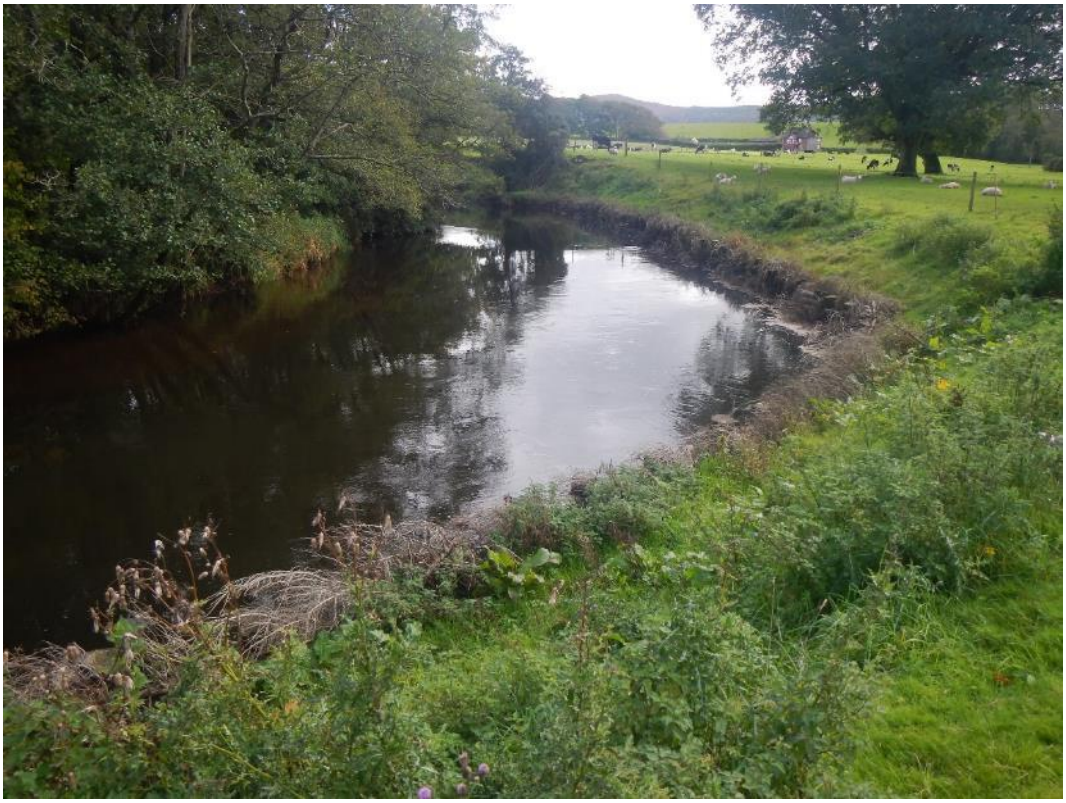


Figure 18. More bank protection, in a short section where at least cattle have been excluded, reducing the physical damage to the banks. However, note the lack of tree regeneration and low species diversity resulting from sheep browsing. Without full livestock exclusion to allow tree regeneration, the benefits gained in stabilising the bank will be lost over time as the brash protection degrades.

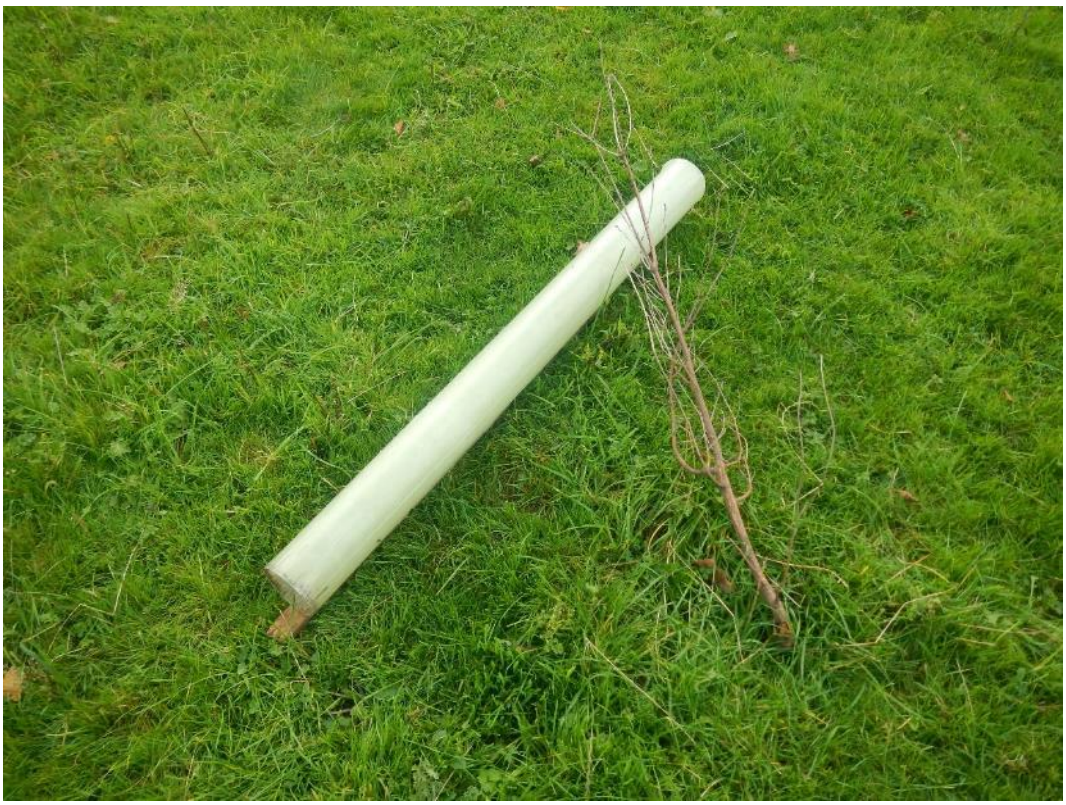


Figure 19. Evidence of the livestock issues: one of many dead saplings within the breast-wire buffer strip that have been killed by sheep browsing. Sheep will often preferentially browse trees and saplings over grass if they are allowed access.

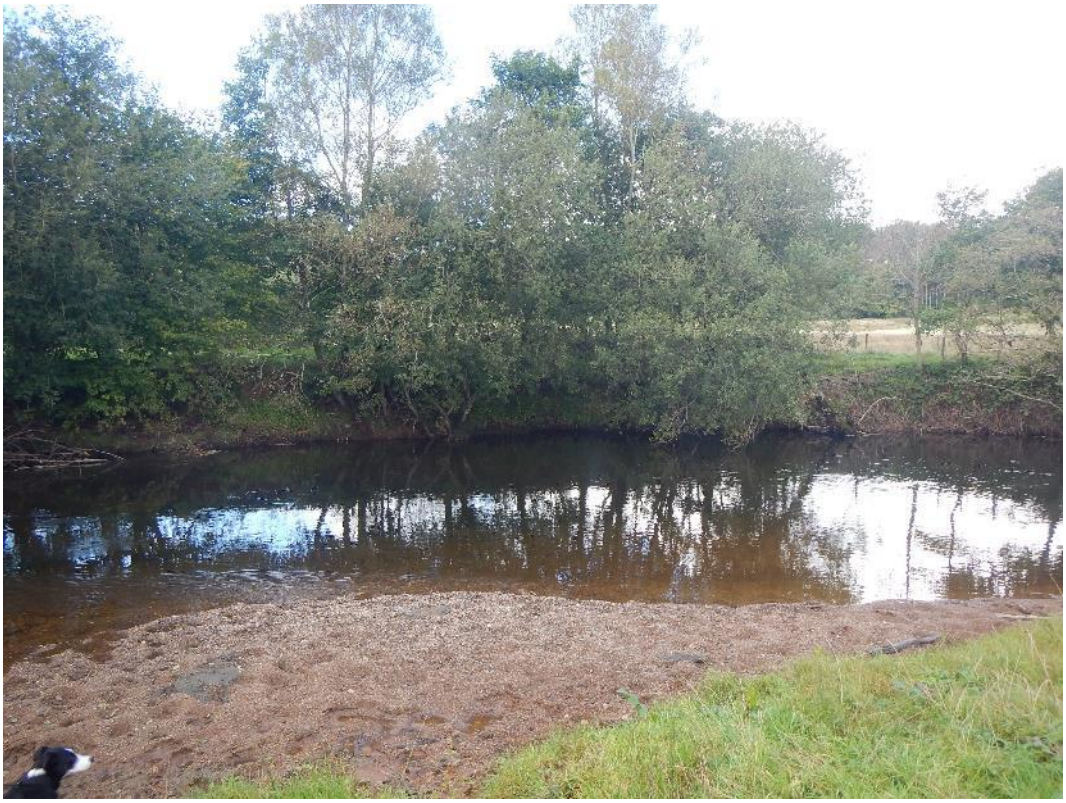


Figure 20. Signs of gravel having been extracted from the channel were also observed (NY 08227 00329 & NY 08380 00285), with farm machinery access tracks into the watercourse visible on Google Maps (Figure 21). Even aside from the immediate ecological issues of the dredging (particularly the likely impact upon protected freshwater pearl mussels), the interruption of sediment supply down the river has a the potential to destabilise the riverbanks and increase erosion rates up and downstream, which could be contributing to the issues observed.

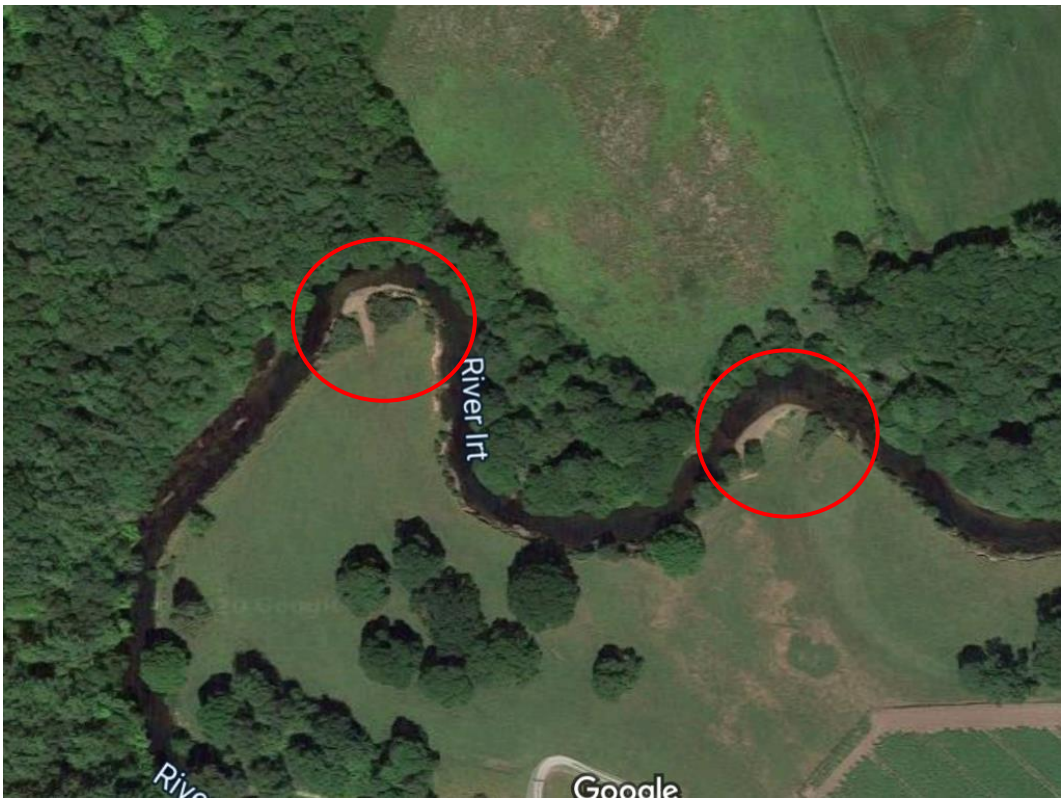


Figure 21. Aerial photography on Google maps clearly showing signs of farm machinery regularly accessing the watercourse (red circles).

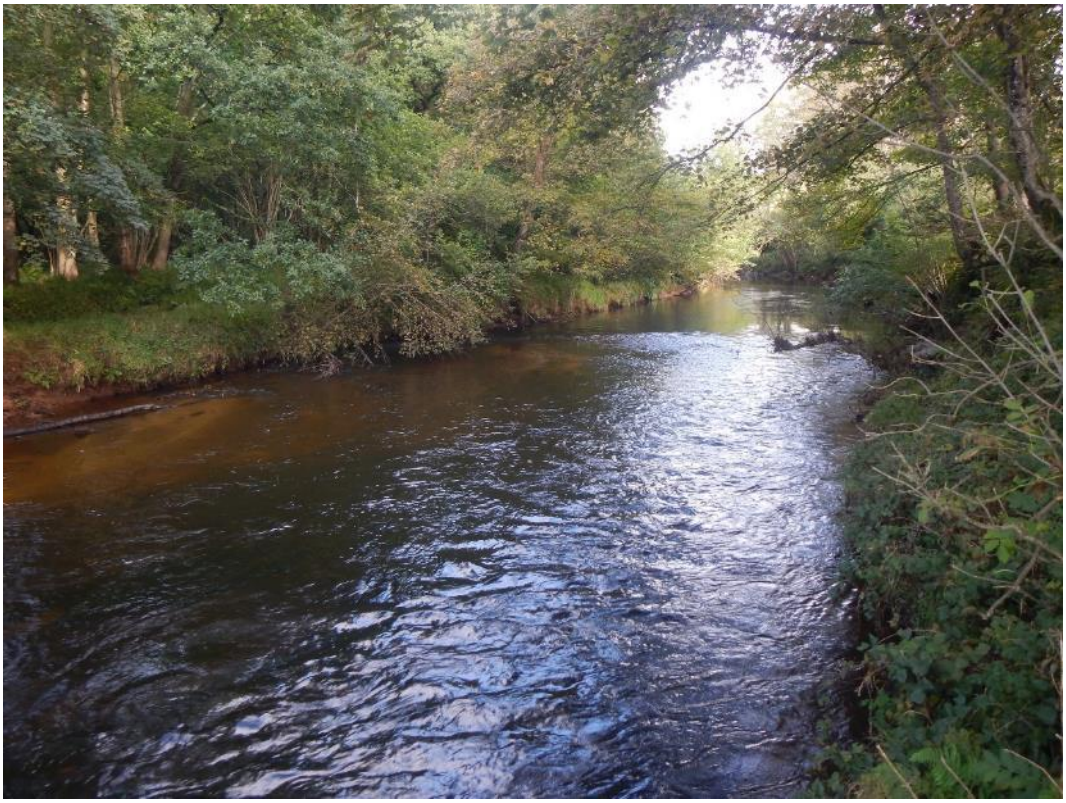


Figure 22. At the next wooded section on the LB, more potential high-quality spawning habitat was observed. Fish are likely to spawn in this area but would benefit from more trees/branches providing cover within the channel. It would be worth engaging with the landowners to gain agreement for habitat improvement work here.

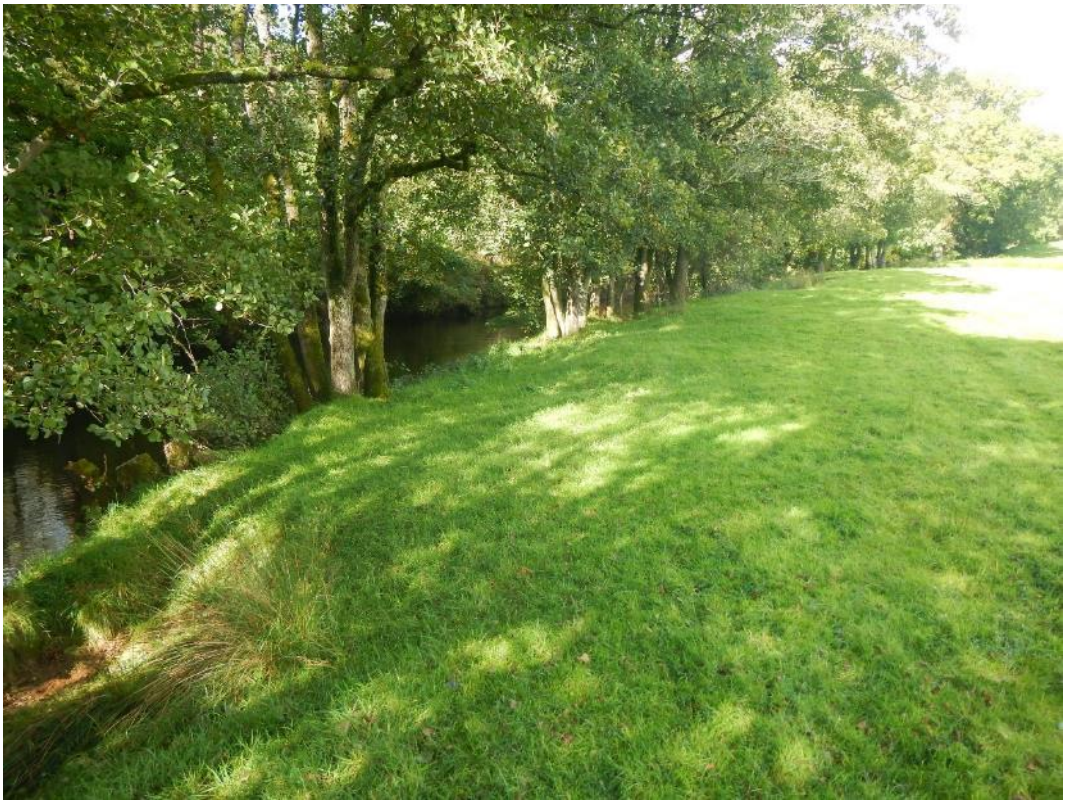


Figure 23. Upstream of the wood, grazing pressure appears to reduce, and an increased number of trees offer greater bank protection. However, note the lack of vegetation diversity, understory or tree regeneration that still occurs, even with lower intensity sheep grazing. This is why livestock exclusion for riverbanks is always preferable. The near monoculture of alders is also a potential concern as alder disease (Phytophthora alni) could have a severe impact. Maximising natural species diversity is always beneficial.

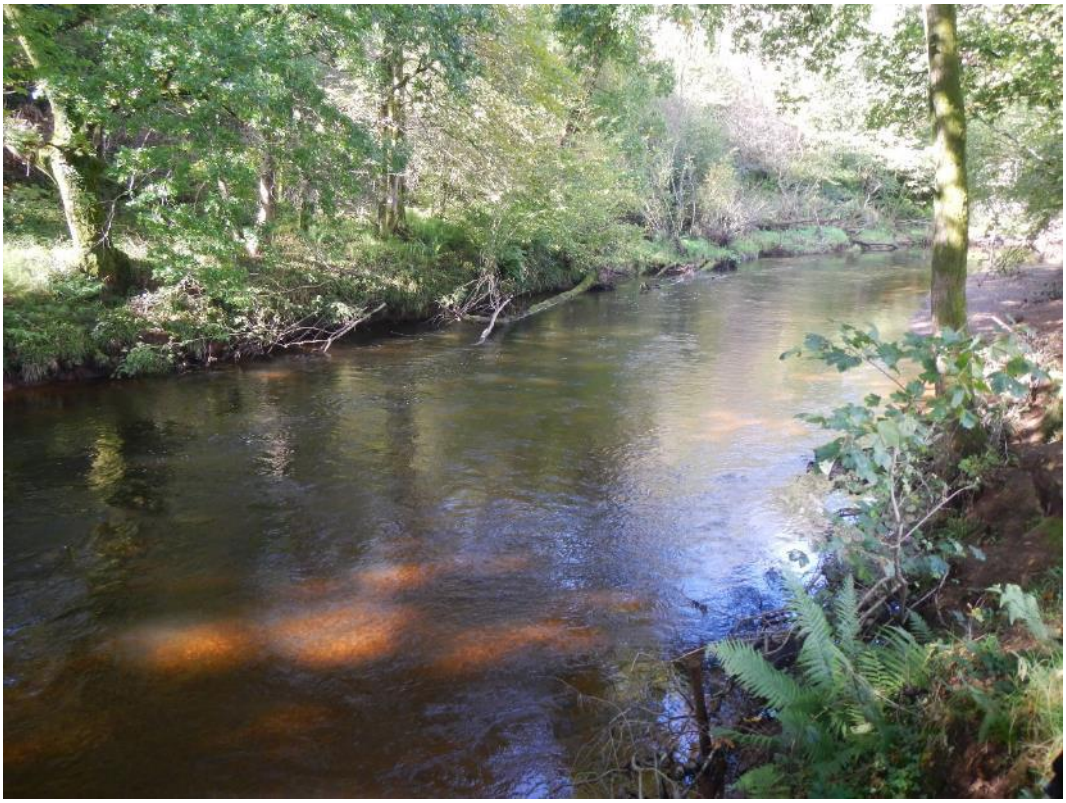


Figure 24. The line of trees along the bank create a somewhat over-shaded avenue; however, when considered over the broader reach this short section is not an issue. Some very limited coppicing could be beneficial to let the odd patch of light in, and may be worthwhile if the material could be used for in-channel structure, but short shaded sections do provide their own benefit in terms of water temperature regulation, so even no action here could be justified. Note the highly beneficial woody material along the far, right bank. The relatively stable channel section downstream could really benefit from the introduction of additional substantial pieces of woody material if agreement could be gained from the landowner. Even in this upstream section, excess fine sediment was observed within the substrate, signifying that the land use/erosion issues are not just localised, but also likely to be occurring further upstream.

4. Recommendations

This section of river is clearly cared for, with considerable efforts undertaken to mitigate the negative impacts of adjacent land use. This is to be commended; however, it really should not be necessary, certainly not to the extent it is currently. First and foremost, it would be beneficial to install buffer fencing in any areas that livestock currently have access to the watercourse. The EA (and possibly West Cumbria Rivers Trust) should be able to assist in gaining that agreement. This will allow the river to naturally stabilise and adjust to more natural dimensions, vastly reducing the requirement for costly bank protection. This is something that would be worth investigating throughout the catchment as the fine sediment issues do not appear limited to the section visited.

The next action should be to try and accommodate natural woody material input to the channel, resisting the temptation to alter leaning or toppled trees wherever feasible and allowing them to adjust within the channel naturally. Any urge to prune low or trailing branches should also be resisted,

although it was clear from the well healed pruning scars that much of this work was undertaken before the current management regime. To complement increased natural in-channel structure, several simple methods could be employed throughout the reach, to reinstate some of the features that are likely to have been lost over time. As such, it would be worth seeking agreement from the respective landowners to undertake some of the following habitat improvement techniques. The WTT and EA would be able to assist with the delivery of this as it is in one of the target areas for habitat work and river conservation workshops.

4.1. Low cover and in-channel structure

Where multiple trees are present, the occasional trunk can be cut and used to create a habitat enhancement feature, with no significant detriment to the overall habitat. This could entail partially cutting through the trunk, so that it remains attached and can be laid into or along the channel (Figure 25).

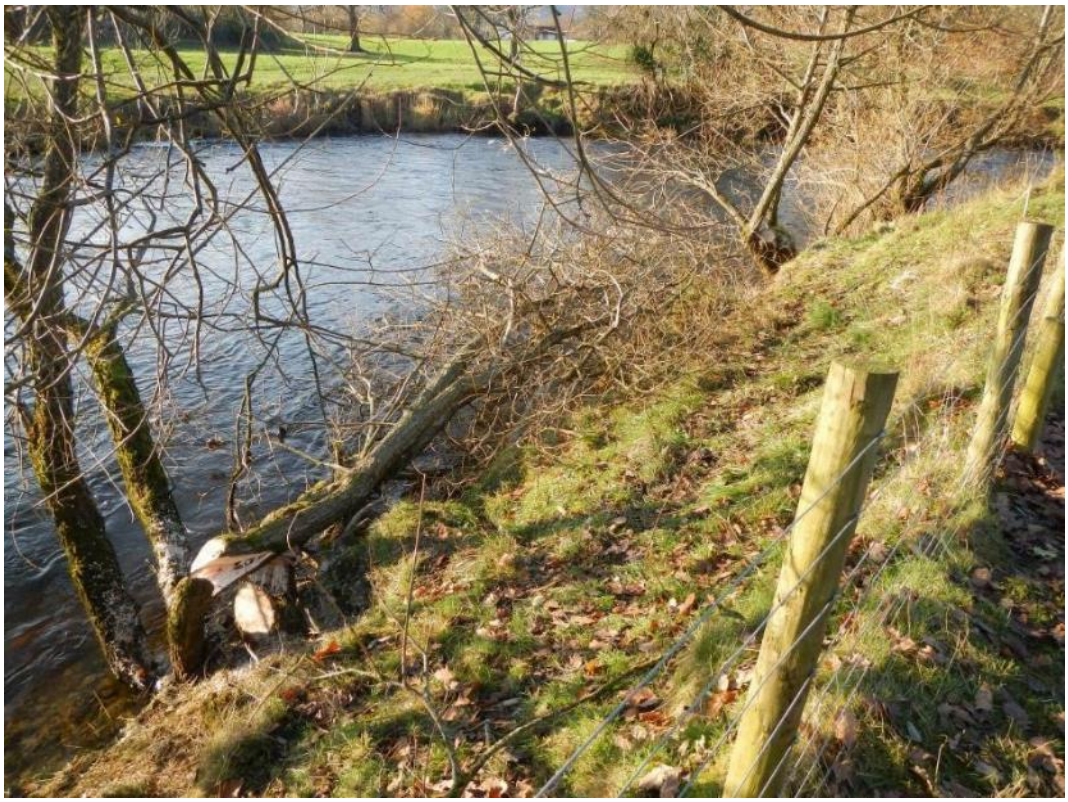


Figure 25. Willow hinged into the river margin to increase cover and structure. The method involves cutting part way through the stem, quickly through the first two thirds, then continuing until it collapses down over the river. The depth of the cut should be limited to only that which is required to bend the stem over, as this will maintain maximum size and strength of the hinge and the health of the tree/shrub.

Alternatively, a tree can be felled to create a coppice, encouraging low-level regrowth from the stool, providing material that can be lodged between two or more standing trunks (Figure 26), or hung over another tree if a 'V' branch is available (Figure 27).

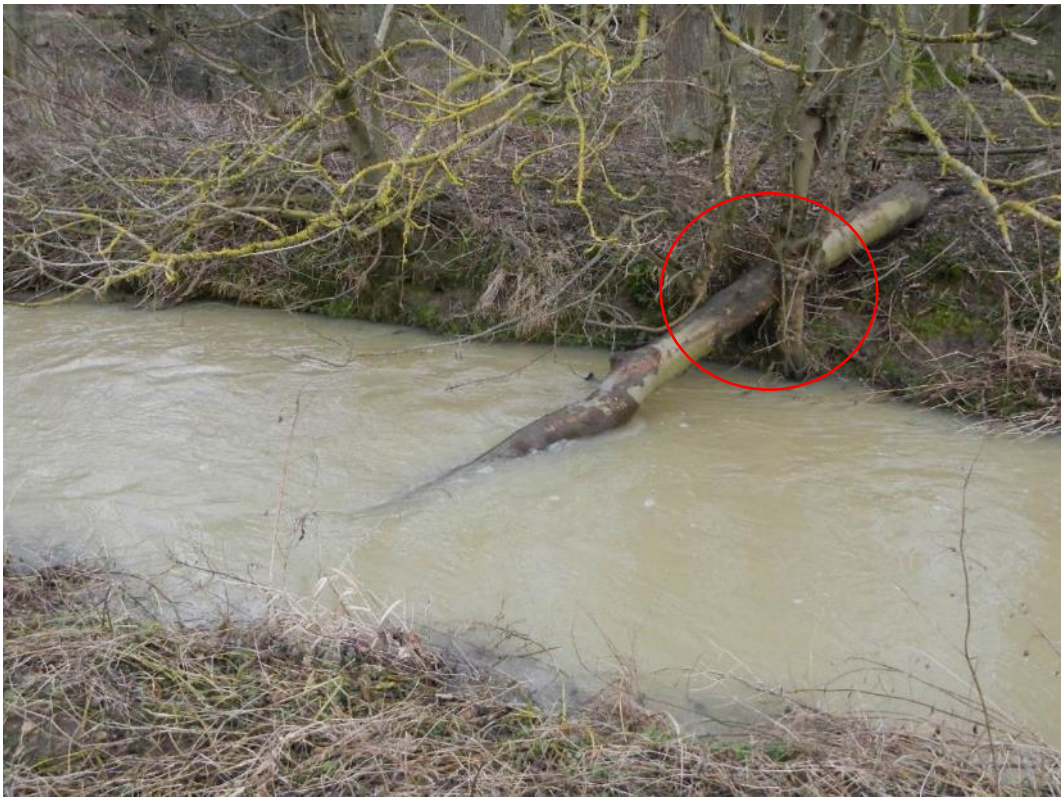


Figure 26. A lodged flow deflector securely but naturally lodged in place between two upright trees (red circle). The technique can utilise a single pole (primarily to increase scour) or a branched limb (to create greater flow dissipation). The elevated butt end (bank end) reduces the potential detrimental bank scour usually associated with downstream deflectors as a through-flow is maintained along the bank.

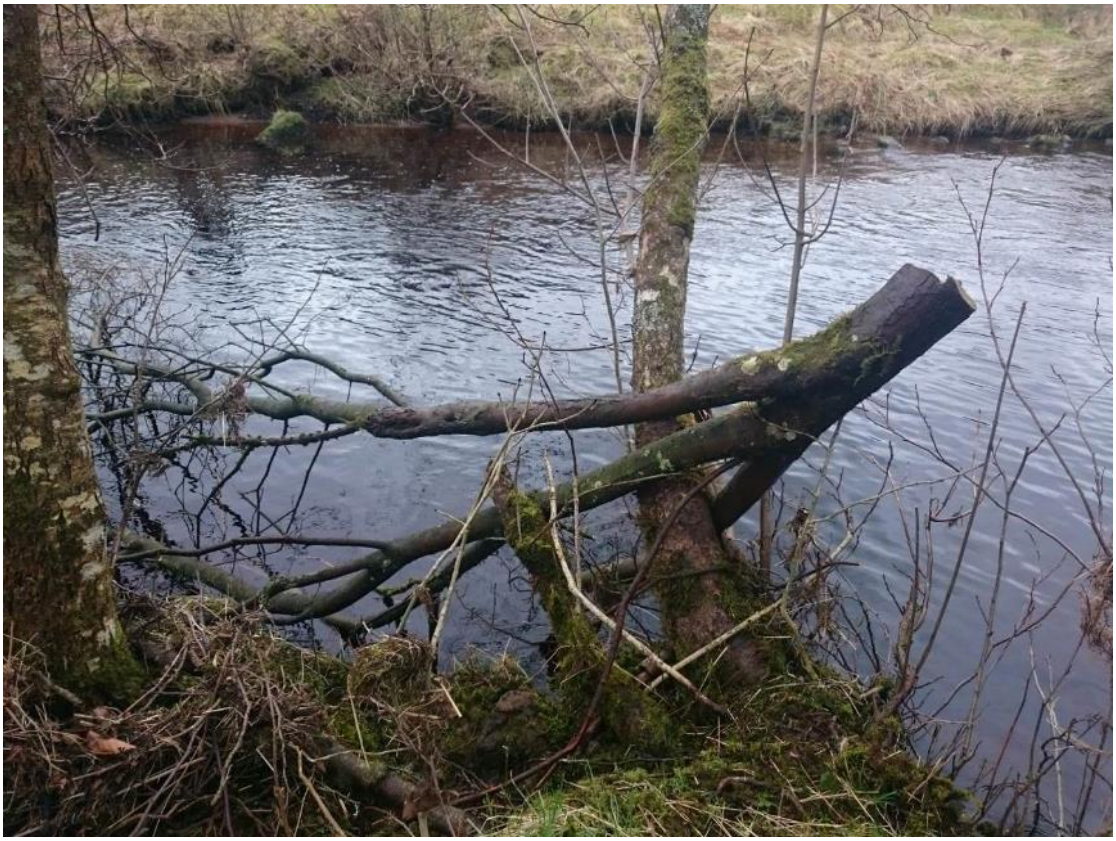


Figure 27. Medium-sized, lodged woody material, securely anchored by the 'V' of the branches against an upright tree.

Felled trees can also be tethered as downstream facing tree kickers (Figure 28 & Figure 29), where the butt of the tree is attached to its stump with strong cable. This is a highly effective method, but it is generally beneficial to avoid the use of man-made materials, so where possible, the lodged material options may be a better choice.

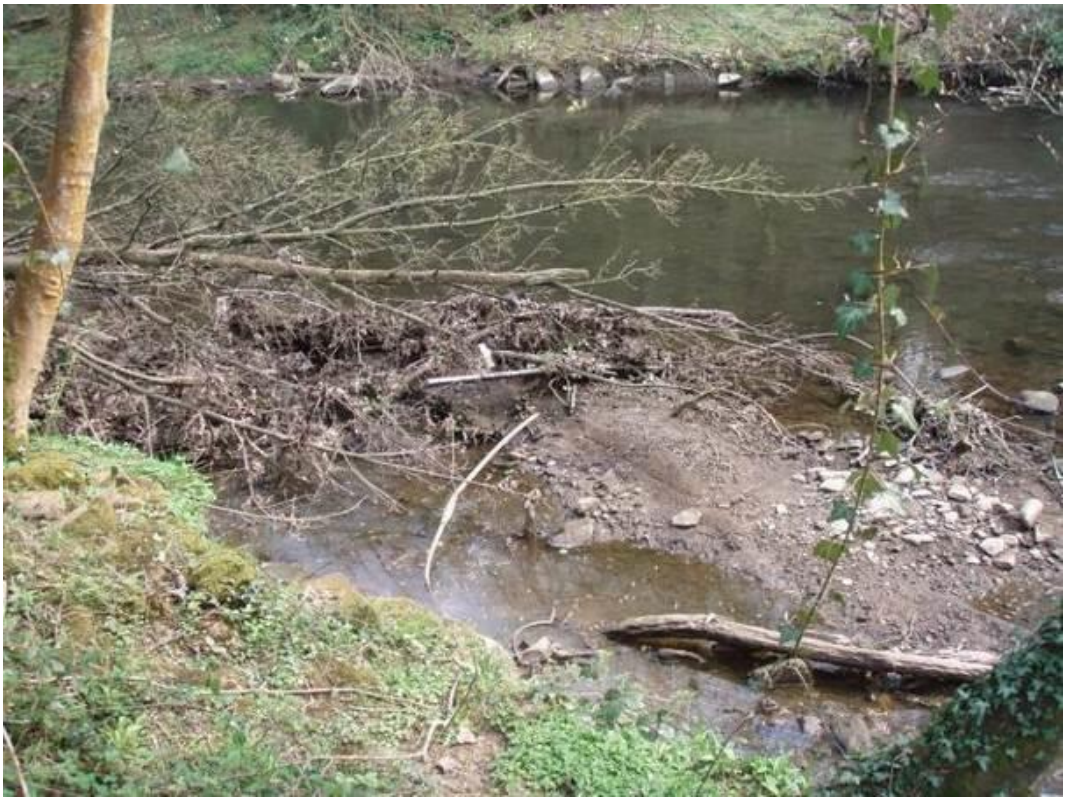


Figure 28. A perfect example of how the diffuse canopy of a tree kicker can be employed to diversify flow and increase deposition in the river margin. Here, that focusses flow down the far side of the channel, maintaining depth there with no negative impact upon the downstream transport of gravel. The structure itself creates valuable high flow refuge for fish. This kind of technique is designed to kick-start processes that will continue to develop long after the initial structure degrades.

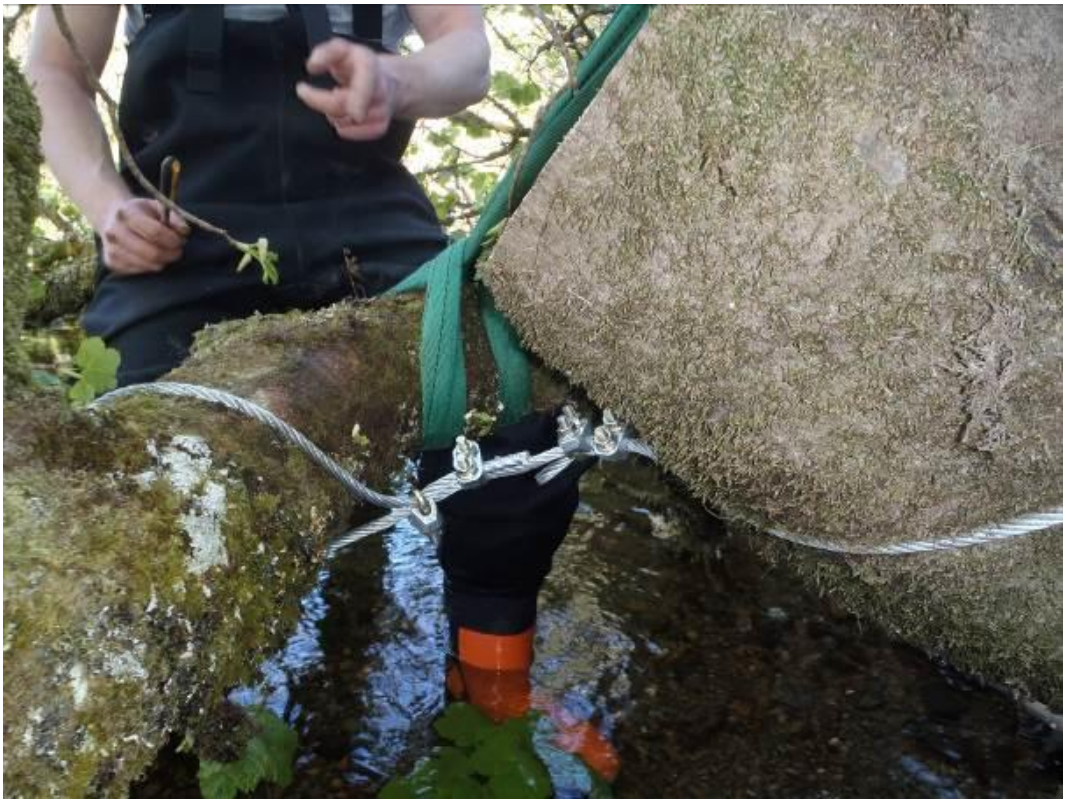


Figure 29. A basic tree kicker setup, using 4000 kg breaking strain cable and two pairs of cable clamps. The webbing strap in the background is used to pull the kicker close to the stump for fastening but is removed once the cable is fully fixed in place.

4.2. Tree planting

Tree planting with a range of native species would also be beneficial in any areas where livestock are excluded, to kick-start regeneration of greater diversity along the river. To complement the general planting, willows could be planted strategically to rapidly create cover and provide material for laying into the channel in years to come.

The easiest way of establishing willow is by pushing short sections of freshly cut willow whip into areas of wet ground, ideally close to the waterline where plenty of moisture is available to the initially rootless sapling. Whip planting can be undertaken at any time of the year but will have the greatest success during the dormant season, shortly before spring growth begins (ideally late Jan-March) but can prove successful throughout the year in damp ground. This kind of planting should be undertaken sparingly to avoid overpopulation by willows.

Whips should be planted so there is a greater length (~$^2/_3$) within the ground, to minimise the distance that water has to be transported up the stem. Planting them on a shallow d/s angle will also ease water transport within the developing shrub and reduce the potential for it catching flood debris and being ripped out. Leaving 300-400mm of whip protruding from the ground is sufficient, providing they protrude well past the surrounding vegetation (to allow access to light). Whips of 5mm-25mm diameter tend to take best, but even large branches can be used. If undertaken during the

growing season, care should be taken not to leave excessive amounts of foliage on the whips as these greatly increase the rate of transpiration and can lead to the whip dehydrating before the supporting root system can develop.

5. Further information

The WTT may be able to offer further assistance such as:

- WTT Practical Visit
    - Where recipients require assistance to carry out the improvements highlighted in an advisory 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.).

In these examples, the recipient would be asked to contribute to the reasonable travel and subsistence costs of the WTT Officer.

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 www.wildtrout.org/shop/products/rivers-working-for-wild-trout-dvd or by calling the WTT office on 02392 570985.

Acknowledgements

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.

Disclaimer