WILD TROUT TRUST

wildtrout.org

Advisory Visit
River Camel and tribs, Cornwall

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Contents

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Summary

- Though each reach surveyed was relatively natural and performing well ecologically, all could benefit from specific targeted work or a change in management practice.
- Better riparian land practice, such as buffer strips and improved fencing, should be implemented or improved where possible.
- Floodplain connectivity could be improved on most reaches, though some present a far greater challenge to address.
- The benefits of a hands-off approach is evident on some reaches. This should be preserved and indeed emulated on other reaches if possible.
- De Lank quarry presents the biggest bottleneck to improvements downstream. Improvements for free passage are in progress with Westcountry Rivers Trust, but it may be worth investigating gravel augmentation as a separate, secondary measure.

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Introduction

This report is the output of two survey days undertaken by Bruno Vincent of the Wild Trout Trust to a number of small sections of the Camel catchment for the benefit of Bodmin Angling Association.

Normal convention is applied with respect to bank identification, i.e. left bank (LB) or right bank (RB) whilst looking downstream. Upstream and downstream references are often abbreviated to u/s and d/s, respectively, for convenience. Longitude, Latitude (decimal) Reference system is used for identifying locations.

The report has been separated into reaches, displayed in chronological order.

Catchment / Fishery Overview

The River Camel rises at an altitude of 280m on Hendraburnick Down, on the edge of Bodmin and drains a catchment of 413km^2. From its source, the Camel runs for approximately 48Km south-west along the northern edge of Bodmin Moor towards the town of Bodmin. From here, the river flows north-west to Padstow, where it joins the sea. Major tributaries, such as the Stannon Stream, the De Lank River and the River Allen join the Camel. The underlying geology of the catchment comprises granite, sandstone, slate, shale and clay, with Bodmin Moor itself being an extrusion of the underlying granite 'Cornubian batholith' of central Devon and Cornwall.

The upper and middle reaches of the Camel are essentially moorland, passing into woodland. The River Camel is recognized for historically being one of the most productive rivers in the south west for sea trout (*Salmo trutta)* and salmon (*Salmo salar)*. It is designated as a Special Area of Conservation (SAC).

The following report covers a selection of handpicked areas within the Camel catchment to provide habitat enhancement opportunities and recommendations to Bodmin Angling Association (BAA). Recommendations are indicative only; improvement works are dependent on individual landowners' consent as some are not directly connected to club waters. The aim is to provide habitat improvement opportunities, that will benefit salmon and trout populations of all age classes, across the Camel catchment. Sites were chosen in collaboration with Westcountry Rivers Trust (WRT) who are conducting a number of projects in the catchment. Efforts have been made to extend the benefits of these existing projects and not duplicate efforts.

Initial areas of focus were:

- The Camel head waters above Camelford
- Smaller tributaries

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    - permissions could not be obtained in time
- Below Kenningstock (where an existing Wild Trout Trust report was undertaken by Mike Blackmore)
- The Stannon Stream below Allensford
    - Permissions were also difficult to obtain
- BAA sanctuary water above the confluence of the De Lank
- The De Lank below the quarry

De Lank

The De Lank stream runs from its source between Roughtor and Brown Willy (Cornwall's highest point). Around 150 years ago, the De Lank quarry buried the river under mining spoil. The river now percolates through approximately 250 metres of granite gravels, blocking migration of salmon and sea trout as well as other resident species, though elvers and juvenile eels do appear to navigate the blockage as mature silver eels have been recorded above.

The obstruction not only prevents migration of large anadromous species, but also the movement of smaller resident species and drastically interrupts coarse sediment supply downstream. This appears to be the greatest bottleneck to improved salmonid habitat in the lower De Lank.

The river exhibits a good pool and riffle sequence throughout with its steep gradient arrested by boulder falls and chutes. The banks are predominantly tree-lined and pleasantly unmaintained, due in part because of its SSSI designation.

Windblown trees bridge and sit within the channel providing cover, scour and habitat corridors along with natural flood management.

Flood plain connectivity is slightly reduced as the aforementioned sediment supply issue has incised the stream, eroding the bed. This will only increase, as more bed erosion will increase the disconnection and create higher shear forces upon the bed. As a result, the sediment generally comprised smaller sands, <8mm and larger cobble/boulders >250mm in size. The vacuum of coarse sediment sizes within this range are required for large resident trout, sea trout and salmon spawning. As such, the river in its current state is unlikely to support self-sustaining populations of anadromous salmonids.

Gravels in the >10mm to <100mm, would ordinarily form the ‘bricks to the mortar’ (sand) in a good sediment matrix. With sand easily mobilised in moderate flows, and only sporadic boulders to arrest this flow, trout redds are likely to be washed out in

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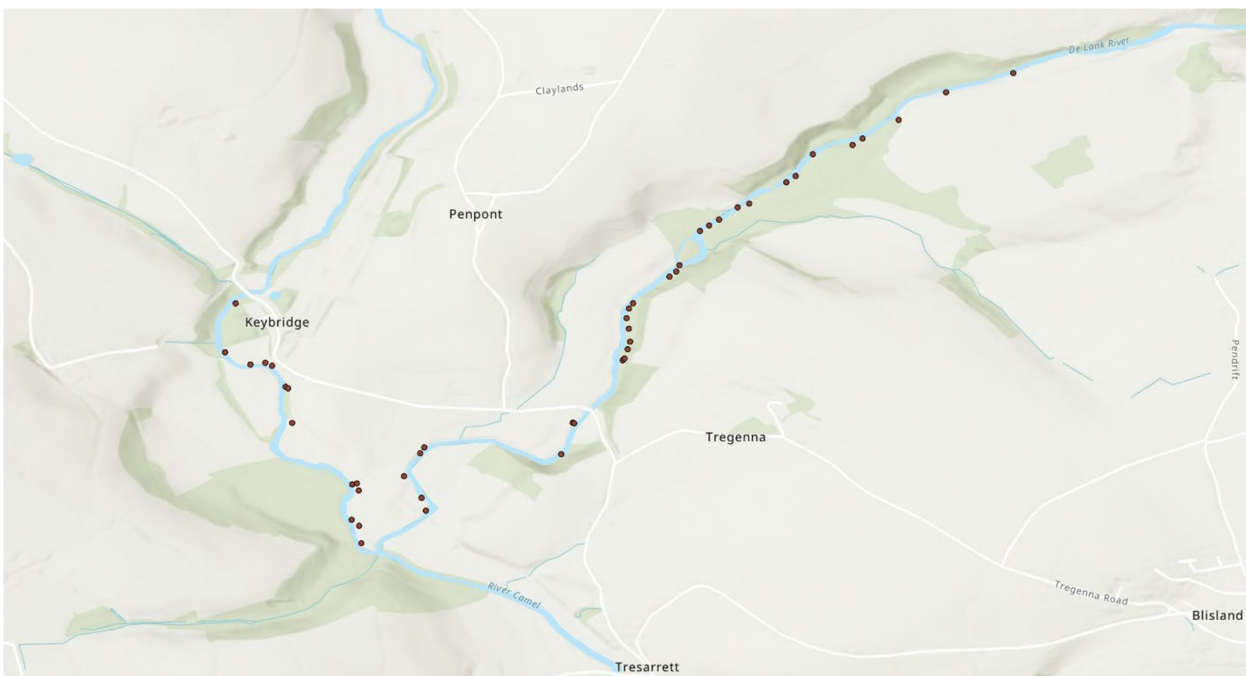
all but the most sheltered areas (where they may be more susceptible to smothering by finer sediment.

No specific issues such as diffuse or point source pollution were witnessed apart from a pair of stock fords nearer the confluence of the Camel that could be easily improved.

The greatest improvement to this reach would be increased coarse gravel augmentation, in the first instance, and free passage through the quarry with better natural river function as an ultimate aim. The latter is in the early stages of development with Westcountry Rivers Trust and the improvements this project could make to the Camel catchment should not be understated. However, it will be a costly and challenging project and is sited within two separate SSSI designations.

Augmenting gravels from the quarry itself is sadly impossible as the required grades are not available. A rough estimate of 5 to 10,000 cubic metres of imported gravels would be required, installed in an inaccessible area, so a challenging prospect in itself. The benefits would wash downstream into the Camel improving sediment supply and could even reduce bed erosion of a short reach upstream of the confluence.



Map 1 The lower De Lank and Camel sites of interest.

Survey

The following selection of photos and captions are recorded from the Camel confluence in an upstream direction along the De Lank.

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Figure 1 The first potential spawning area on the De Lank. Large trout potentially sea trout, could use this area for redds. -4.7025988 50.5307196

Figure 2 A little used stock ford. Fine sediment supply did not appear to be an issue at the time of visit, however this will increase with wetter weather and greater use. A better entry on either bank with cobble standing should be a minimum alteration though diverting stock over a clear span bridge would be preferable where possible. Examples of better stock fords are included in the Appendix. -4.7027093 50.53105

Figure 3 Stock fencing within 1m of the river bank is not providing a sufficient riparian strip to maintain bank stability. Fencing further back, allowing the buffer to establish with deep rooting plants is recommended to reduce erosion and land loss. -4.7031638 50.53161

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Figure 4 The site of a former boulder weir, removed by Westcountry Rivers Trust and landowner. Note roots exposed from lowered water levels. The RB should be encouraged to establish a denser fringe of trees; the discarded boulders are likely preventing this and should be moved elsewhere if at all feasible. Some larger boulders could be placed randomly in the channel to increase the flow diversity in what is a uniform bed. -4.699093 50.5321787

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Figure 5 Flailed riparian trees. It is understandable that this is the most efficient way to manage tree growth. However, the uniform and severe result does little for biodiversity and is likely stunting root growth, as evidenced by the pockets of erosion witnessed between trees. -4.698795 50.5329938

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Figure 6 Another little used stock ford. This was a better fenced example, though fine sediment pathways are visible and so diverting stock is the primary recommendation as before. -4.6987607 50.532981

Figure 7 A deep corner pool with large fish holding potential. Solar gain (the amount of solar energy that the body of water receives) could be reduced with better shading, riparian tree planting on the RB would eventually facilitate this and provide future material to hinge into the channel. -4.697455 50.534653

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Figure 8 Windblown hazel making a good addition to in-channel diversity. Such fallen material provides refuge and flow diversity for many age classes of salmonids. -4.69744595 50.53538274

Figure 9 A windblown, bridged tree creates a terrestrial habitat corridor and increased channel diversity where it touches the bed. In high flows, such natural structures reduce flow energies whilst leaving low-flows unfettered. -4.6973444 50.5354265

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Figure 10 Many bankside multi-stem trees provide good hinging potential. Hinging all but the largest stem into the channel margin will increase diversity and habitat, with the remaining stem growing upward into a standard-like tree. -4.6974022 50.5356991

Figure 11 Potential spawning area, the up-kick of gravels at the tail of the pool could support many redds; however, the depleted range of gravel sizes may limit spawning to resident trout and small sea trout only. -4.6973412 50.5359481

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Figure 12 Another big tree bridge and accumulated trunk. The habitat value of such structures should be retained.-4.6972314 50.536083

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Figure 13 Despite the generally steep LB valley side, this area had good storage capacity as evidenced by trapped flotsam. Felling and lodging trees from both banks as an NFM structure would have capacity to back up in high flows. -4.6962916 50.5367708#

Figure 14 The channel pushes hard against the LB of the floodplain. In combination with an incised stream, floodplain connectivity on the RB is limited, increasing stream energy. -4.6960314 50.5370663

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Figure 15 Good, clean trout spawning gravels but lacking larger sizes needed for migratory fish. -4.6954989 50.5379531

Figure 16 A tree fall many years ago, has pushed the channel to the LB. Lateral erosion caused by windfall is a natural process and the channel diversity downstream has increased as a result. This is to be encouraged. -4.6952639 50.5380944

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Figure 17 The tree from the previous photo has caught fallen woody debris, creating scour and refuge. A 20cm trout was seen within this structure. -4.6950081 50.538246

Figure 18 A tributary enters the main river from the LB. The variety of coarser gravel was evident, showing just how much of an impact the quarry is having. Though small, it is not unreasonable to expect sea trout to spawn within the lower reaches of this tributary. -4.6942253 50.5386637

Figure 19 An unnatural looking pair of boulder weirs (orange arrows). There was no obvious reason as to their function, but the regularity and perpendicular stance suggests they were man-made. Manipulation to naturalize their formation could provide better river function, but is not a high priority. -4.692676 50.539886

Figure 20 A lodged fallen tree diverts flows over part of a natural fall, creating greater depth and hence passability combined with an upstream resting pool. To remove this tree would average out the depth across the fall and so make them less easy to navigate. -4.6915509 50.540177

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Figure 21 Another tough, natural ascent for anything other than sea trout. Approximately 90cm head. -4.6891292 50.541537

Figure 22 The gradient begins to increase with stream energies moving all but the largest boulders. More fallen trees in channel provide good habitat. -4.6878209 50.5418454

Recommendations

- The use of stock fords on the lower river should be reconsidered and, if absolutely necessary, should be protected with hard-standing to lessen their impact on the river. Coarse, crushed concrete entries on both banks will reduce erosion from stock and limit fine sediment pathways (see appendix).
- Riparian fencing could be improved on the lower reaches, setting it further back from the bank to establish a wider buffer and denser mix of shrub and trees. This would ideally be undertaken now, but could be part of a future programme as the fencing is replaced.
- The boulders on the right bank of the former weir site are limiting regrowth and should be moved. Some could be reinstalled within the channel to build back some flow diversity.
- The flailing of the riparian trees is limiting their habitat potential and causing some bank erosion. The practice also encourages vertical growth, leaving the river without trailing branches, shade or cover for fish. Some hinging of limbs could remedy the erosion and habitat issues.
- Tree planting alongside deeper pools to limit future solar gain would be beneficial though this is only a concern in a few places.
- Continue to preserve the un-managed riparian trees and windfall.
- Some previously coppiced, bankside trees could be hinged into the channel to increase coarse woody material and add structural & habitat diversity.
- Support efforts by WRT to create free passage through the quarry.
- Investigate opportunities for gravel introduction below the quarry.

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Camel

The short section from Wenford Bridge downstream to the confluence of the De Lank is fished by the club from the LB. It is reasonably well shaded throughout, with the exception of areas where riparian trees are flailed.

Reasonably natural morphology is present with a good pool-riffle frequency, though a couple of key areas could do with green engineering to soften hard engineered revetments to reduce bank erosion.

Buffer strips and stock fencing were adequate throughout, but increased buffer width would benefit the river if the land could be spared. Schemes such as Environmental Land Management Scheme (ELMS) will likely be a source of future income for such habitat creation.

Survey

The following section was walked from Keybridge in a downstream direction to the confluence of the De Lank.

Figure 23 Old coppiced alders overhang the river. Though not the easiest species to hinge, the majority of this material could be felled and/or lodged to build better in-channel habitat. Where lodging is impossible, some could be cabled to stumps.
-4.7075246 50.5360806-4.7075246 50.5360806

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Figure 24 More old coppice that could be hinged into the channel margin.
-4.7077971 50.5348167

Figure 25 A point of erosion in a municipal area next to the Camel Trail. Dogs entering the river are a likely cause, exacerbated by the total lack of trees and cropped grass. Tree planting of thorny hedgerow species could be established with a view to being laid along the bank in the future. If stock are given access, fencing to exclude them from the riverbank would help planting efforts and reduce

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poaching. Formalized dog runs within a better structured riparian fringe will limit the damage. -4.70714, 50.5345

Figure 26 A stone revetment protects the Camel Trail (seen directly above, centre frame). Though important to protect this public asset, the engineered nature of this revetment is increasing erosive forces downstream (and to an extent directly upstream) and providing little habitat value. Green engineering, with strategically fallen trees, tied into the bank, would improve this and neighbouring sections. -4.7067545 50.5345447

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Figure 27 A good riffle, providing juvenile salmonid habitat. Light levels to promote primary production were good, but could accept some holes in the canopy to improve the habitat. -4.7065799 50.5344671

Figure 28 The RB had an approximately 4m wide buffer, complete with good riparian fringe of overhanging plants and trailing limbs. -4.7062301 50.5339232

Figure 29 A natural log-jam could establish here, but is currently clear and providing benefit in channel. There is room for the river to circumnavigate the obstruction, by eroding a new route if needed, but the landowner would need to accept the limited land loss. -4.70616 50.53388

Figure 30 Fallen trailing limbs in channel. This presents good habitat for salmonids and should be left; the process could be replicated by coppicing and trailing limbs in the water. -4.7045047 50.5314007

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Figure 31 A multi-stem ash is about to wash out. The upstream trees have been regularly flailed and may be the cause of the undermining of this mature coppice stool. The buffer fencing is 1m only in this area and will also contribute to reduced bank stability. -4.70439 50.53142

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Figure 32 A mixed thorn, riparian fringe has been flailed. This reduces the terrestrial habitat quality and prevents better marginal aquatic habitat from establishing. As small, slow growing species, the wind loading (mentioned by the owner as the reason for flailing) would be low and the habitat value of leaving it unmaintained would be great. On a northly aspect such as this, the increasing light levels will be minimal, but as a general practice it will introduce large amounts of solar gain to the stream, detrimentally increasing water temperatures. -4.70434 50.53124

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Figure 32 More overhanging and trailing trees on the RB. An opposing complement on the LB would be of benefit to the river. -4.7045195 50.5304834

Figure 33 Small trees lay in the channel providing scour, refuge and habitat diversity. They should be left and allowed to settle into position following spates. -4.704327 50.5303269

Figure 34 An overhanging, fallen tree on the RB. Around 2 years of vertical growth have sprouted, indicating good root connection, stability and vigour. -4.7042682 50.5298775

Recommendations

- Hinge some coppice stools into the channel to add small pockets of light to shallower riffle areas, whilst building back more in-channel structure and diversity.
- Improve riparian fringe in the area by the Camel Trail. Tree planting and fencing to allow the development of a scrubbier riparian buffer will secure the bank and prevent unfettered dog (or stock) access. A formalised dog access could be established to limit the extent of their access and it could be moved to allow areas to repair.
- The stone revetment next to the Camel Trail would benefit from some large wood to soften the bank and allow a more natural dissipation of flow energies.
- The practice of flailing the riparian trees should be reconsidered (as above).

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- Maintain the hands-off approach to river management, leaving in fallen trees, snared flotsam etc.

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Upper Camel

The small streams at Worthyvale Manor exhibited a reasonably natural planform and morphology. Some areas of the floodplain appeared to have disconnected, partially through engineering and also due to incision. The latter may have been caused by the increased stream energy that the floodplain disconnection has created, but other factors up and downstream cannot be discounted.

Interrupted bedload caused by weirs, and channel straightening can all disrupt the natural function of a river leading to excessive erosion and bed scour.

A few small weirs were observed within the reach, but it is likely that a compound of various human alterations is the cause of the incision. The right bank had a pleasantly unkempt and well-treed fringe in places, creating ideal trout habitat, in others showing potential for easy wins. The left bank however showed areas of poor fencing and browsed bank. The lack of bankside trees and shrubs exposes the banks to more erosion as there is limited root structure to bind the highly friable soils together.

Improved fencing and riparian buffer strips will allow natural recovery by limiting stock access. Tree planting within these strips would be beneficial and may even be a source of future funding.

The two pond features witnessed are due for maintenance and this would be an ideal opportunity to revisit their design and function. As a habitat feature the current scheme does add a little to the diversity of the reach but at an unfortunate cost to the river. The initial spoil created in their construction has been placed on the riverbank. This has effectively bunded the river and prevents high flows from spilling out onto the floodplain.

The small weir that provides the off-take for the ponds is not so significant as to prevent fish passage, but as part of a better designed wetland it should be redundant and removed. On a positive note, the fact that the ponds need dredging suggests that they are working as a sediment trap for the river, but this should be addressed by removing the weir and bunds, allowing high flows to overtop the bank and fill the ponds naturally. The outfall of the ponds could be restricted to maintain a higher water level and the resulting habitat should have a flow regime more suitable to our native wetland flora and fauna.

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Map 2 Worthyvale Manor sites of interest

Survey

The next series of photos and captions were recorded from the most upstream accessible limit of the upper Camel at Worthyvale Manor, moving in a downstream direction.

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Figure 35 The upper reaches were pleasantly unmaintained on both banks. The stream exhibited incision, with banks disproportionately high for the channel width. -4.6731315 50.6460435

Figure 36 In places, tree cover was reduced and the resulting increase of light was promoting the growth of hemlock in the stream. A stock fence on the LB was sited too close to the bank and so was not preventing livestock from browsing valuable new growth. -4.6731201 50.6460294

Figure 37 Large stands of hemlock were already established. Note the faster flow on the near side preventing the plant from succeeding. As an in-channel feature, hemlock can provide much needed flow diversity and habitat structure. Where it is deemed out of control, shading and increased flows can re-establish a better balance without the need for labour intensive removal and disposal. -4.673115 50.6459873

Figure 38 A slumped tree providing a pinch point in the channel. The deep pool downstream and the focused flow through the pinch provides an excellent lie for adult trout. -4.6731534 50.6458918

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Figure 39 Significant incision is evident. Disconnection from the floodplain only increases the bank-full energies and hence greater bed erosion. The planform of the stream is not particularly unnatural so coarse sediment supply is a likely cause, due either to an obstruction upstream such as a weir or channel dredging or straightening downstream that is drawing sediment from further up to replace what is lost. Nothing witnessed on this reach appears to be the direct cause so investigations on neighbouring properties may yield a likely cause. -4.6733382 50.6458542

Figure 40 Stockfencing on the LB is too close to the watercourse, however stock density appears to be light or occasional. Regardless, establishing a better riparian buffer will reduce run-off and create better bankside biodiversity and riparian habitat. -4.6734793 50.6457647

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Figure 41 A good range of gravels were seen, however they may be missing 5 - 10cm range. A Wolman Count analysis could confirm this, but investigations upstream to find any man-made obstructions may get to the point faster. -4.6734481 50.6458539

Figure 42 Good cover and trailing branches in the section are encouraging, but it could be improved with a more diverse and deeper rooting riparian fringe of mixed species. -4.6735369 50.6455351

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Figure 43 The LB had a number of young saplings and coppice growth that could be hinged into the margins to increase habitat and provide hydraulic roughness. The channel was a little uniform in depth and the addition of fine and coarse woody material will help to scour out a more variable depth and clean the gravels seen. -4.6735018 50.6454254

Figure 44 The stream has diverted around a tree, leaving a back channel. This extra channel capacity could be used in conjunction with a downstream NFM structure. In high flows the capacity could hold a reasonable volume of water to be released slowly as the river falls. The added capacity and lower bank height have accreted a better range of gravels, suggesting the incised sections are pushing through material too fast.-4.6732835 50.6452451

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Figure 45 As evidence of the natural, dynamic planform, a sharp meander is only a few seasons away from forming an oxbow. This freedom of movement for rivers is essential for good river function. -4.673634 50.6450141

Figure 46 More hingeable material on the LB with a good shaggy margin. -4.6738781 50.6442839

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Figure 47 As the shade level increases, the stands of hemlock are thin and sparse. Shading regimes are good for hemlock control and suppressing river temperatures, essential as the climate warms. -4.674251 50.6441681

Figure 48 The first weir seen within the reach, evidently created to provide the offtake for a wetland scrape immediately downstream on the RB. It is definitely an obstruction for small species and as a man-made structure it should be removed. -4.6743736 50.6437812

Figure 49 The wetland on the RB, apparently the sight of a historic trout farm, is providing some aquatic habitat; however, it is at the cost of the river Camel. The arisings of the scrape's construction have been formed into a bund (seen on the left of frame) that is preventing the stream from accessing what was once its floodplain. Removing the weir and bund will allow the river to periodically fill this scrape and create a better, more natural wetland feature whilst slowing the flow, without the current detriment to the river. -4.6743164 50.6437541

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Figure 50 The ~90cm bund seen looking upstream with the river on the right of frame. This artificially increases the already incised bank height and the bankfull flow energy as a result. -4.6743378 50.6436185

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Figure 51 The outfall from the wetland feature. Throttling this will hold more water within the scrape. Better still would be to allow natural drainage. -4.6745856 50.6434267

Figure 52 The second weir witnessed. This was a more designed arrangement but still a barrier to some fish. Again, this serves to feed an artificial wetland downstream and could be removed. -4.6746289 50.6431215

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Figure 53 A similar image to the wetland upstream (Figure 50). Robbing a river of sediment and habitat connectivity to provide an artificial wetland feature is not enhancing biodiversity. It is far better to restore habitats to as near natural a state as possible. -4.6745939 50.6432073

Figure 54 Fallen trees bridge the stream, something to leave and encourage. -4.6747463 50.642689

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Figure 55 Another unnecessary small weir. The featureless impounded reach above is entirely the result of this structure and would be greatly improved by its removal. -4.6752573 50.6423714

Recommendations

- Improved stock fencing on the LB will enable better riparian fringes to establish, reducing run-off and increasing bankside and in-channel habitat diversity.
- Some tree planting could be implemented to increase shade and bind the banks together with deeper roots.
- The three weirs witnessed would be redundant in a better designed river. Removal and reengineering of the scrapes would have all of the current benefits whist improving the stream.

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Kenningstock to Trecarne Bridge

The reach upstream of Trecarne runs from the tailrace of Kenningstock hydro power scheme. A separate WTT report by Mike Blackmore in 2018 covers the reach upstream and partially overlaps this report but viewed from the opposite bank. Most of the issues from 2018 still exist and this section serves as an update, from a different viewpoint.

A workshop to enact improvements highlighted in 2018 is also planned for the near future.

As a BAA beat, the reach is lacking in-channel woody material despite many large timbers lying on the banks. Though challenging to the angler, such structure is essential for river health, and salmonid and invertebrate habitat. Without such large and coarse woody material, gravels are less able to accrete causing bed erosion. Fine sediments are distributed more evenly across the bed and favourable pockets and pools for fish are reduced.

With careful and considered placement, large trees could be left within the channel, bringing back diversity to flows and hence diversity to the bed shape and composition.

The channel has also been engineered tight to the edge of the right bank floodplain. This was likely due to land creation on the left bank making a larger, drier field for agriculture. The resulting constraint and straightening only exacerbate issues with reduced sediment accretion. Full restoration of this reach would include accepted lateral erosion into the left bank and freedom for the river to carve a more natural path.

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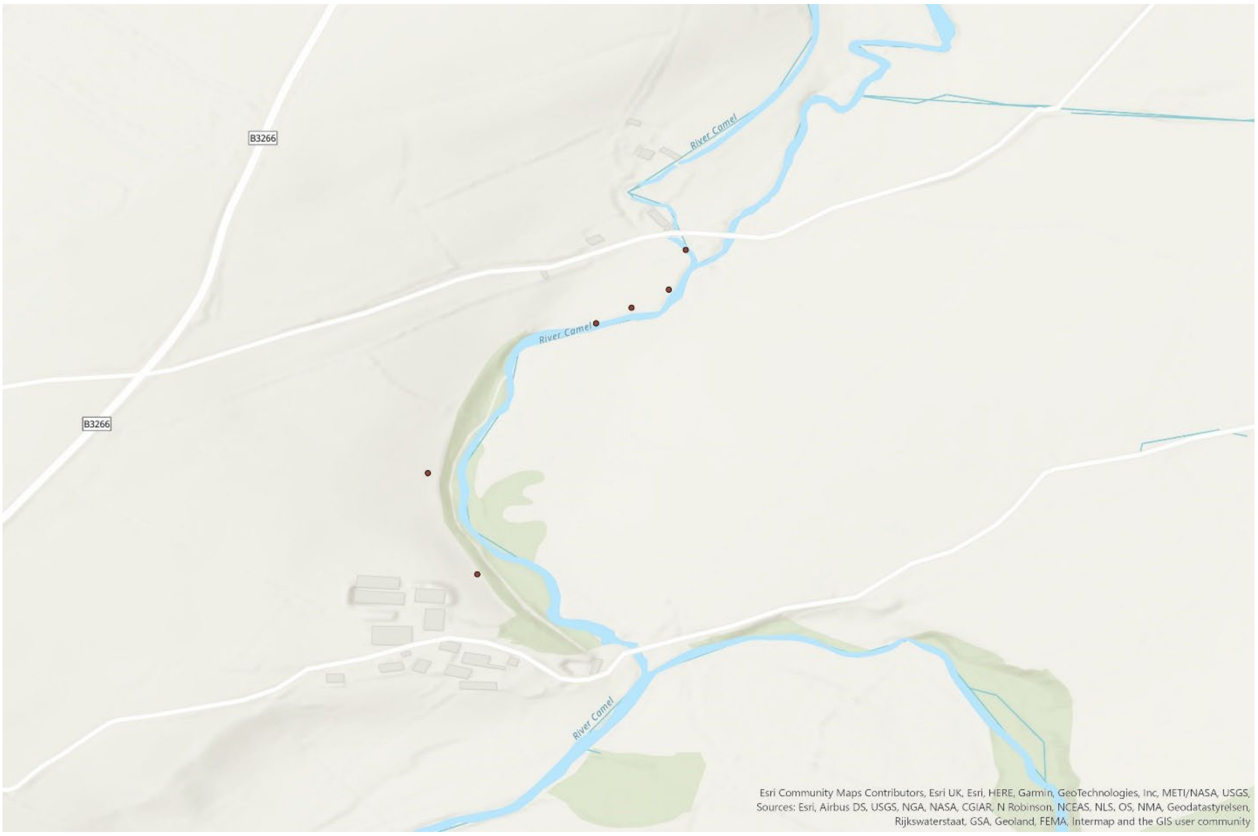

Map 3 Trecarne sites of interest

Survey

The following figures were collected from just downstream of the Kenningstock tailrace in a downstream direction to Trecarne Bridge.

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Figure 56 RB has good stock fencing, forming what could be an excellent buffer strip, but it is still grazed. Though occasional grazing within buffers is advised, the aim is to establish a rough and diverse fringe to the field. LB should also be excluded from livestock. There is some evidence of poaching on the LB and this could be the cause of the browsed buffer strip, with cattle fording the river. -4.6892498 50.5977827

Figure 57 A poorly designed ford. This will be increasing fine sediment inputs. Considering the road bridge is 50m upstream, and this ford appeared to be used by 4 wheeled vehicles, there should be a question of its need before thoughts of better design. -4.6894292 50.5973617

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Figure 58 Lack of fencing on the LB is causing faster erosion and land loss. Grass, especially short cropped, does not grow the deep roots of other native plants. This leaves the bank soils untied and easily erodible. Stock fencing, a wide buffer strip and a natural regeneration of shrubs, bramble and ground cover are required. Some tree planting could be employed as well. -4.6898251 50.5971698

Figure 59 A substantial drinking bay. However, stock entry to the river should be discouraged and other means of watering such as pasture or solar pumps are preferable. In this case, the recent investment is unlikely to be undone, so better cobble standing, running further into the field should be laid. Stock use has turned over the ground and is creating fine sediment pathways to the river. The river here is unnaturally straight and is pushed to the edge of the floodplain. -4.6902015 50.597004

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Figure 60 Though well-wooded, the river is straight, shallow and homogenous. No visible channel diversity or in-channel structure was seen. This stretch is not providing good adult habitat and as an angled stretch, could be improved greatly with the introduction of large woody material to provide structure and improve the bed morphology. -4.6919854 50.5954169

Figure 61 The river finally turns back into its floodplain. -4.6914617 50.5943445

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Recommendations

- Reconsider the need for the ford. If absolutely necessary, introduce coarse gravel and cobble standing to reduce fine sediment inputs.
- RB stock fencing is good, but the buffer strip hasn't been allowed to establish.
- LB should be fenced to provide a well-vegetated buffer stip.
- Woody material should be inserted into the channel to increase habitat diversity.
- Lateral erosion into the LB floodplain would be advantageous.

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The Stannon

Access to the Stannon was difficult to obtain, so only a small section was available to be walked.

Some fencing and tree planting would benefit the reach, however the benign neglect exhibited is working well in the river's favour. Overhanging and fallen trees are clearly providing habitat niches within the channel.

Hemlock is dense in areas, but this could be resolved by the increased shading from the aforementioned tree planting. Incidentally, electric fishing on this reach shows just how valuable hemlock is for juvenile habitat as good numbers of fry are often recorded within the stands.

Map 4 Stannon sites of interest

Survey

The last few figures were collected in a downstream direction from the Allensford weir, recently altered by WRT to improve fish passage as part of their Water For Growth project.

Figure 62 Looking upstream: the LB is occasionally holds cattle, the RB is solely a track. Fencing and a buffer strip on the LB would allow a better marginal fringe to develop, holding the banks together and making room for potential tree planting. The RB could be developed without fencing, but some tree planting would be beneficial. -4.6716676 50.5886926

Figure 63 The stream was nicely unmanaged, and this should continue as common practice. Fallen wood like this is beneficial for photophobic trout, giving them shade from the sun. It will have a positive effect on slowing peak flows and provide food for detritivores. -4.6715955 50.588029

Figure 64 Though the channel appears to be over wide, the bridging trees have displaced the channel and increased velocities, causing beneficial lateral erosion to accommodate the river. This process has created numerous different flow paths, complete with associated habitat niches. Clean gravel was also indicative of the healthy nature of this section. This is an excellent example of prime salmonid habitat. -4.672788 50.5871464

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Making it Happen

The WTT may be able to offer further assistance:

WTT Project Proposal - further to this report, the WTT can devise a more detailed project proposal report. This would usually detail the next steps to take and highlight specific areas for work, with the report potentially forming part of an Environmental Permitting Regulations application.

WTT Practical Visit - where recipients are in need of assistance to carry out the kind of 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 teaming up with interested parties to demonstrate the habitat enhancement methods described above. The recipient would be asked to contribute only to reasonable travel and subsistence costs of the WTT Officer. This service is in high demand and so may not always be possible.

WTT fundraising advice - help and advice on how to raise funds for habitat improvement work can be found on the WTT website - www.wildtrout.org/content/project-funding

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

- 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 stocks and managing invasive species.
- The DVD is available to buy for £10.00 from our website shop or by calling the WTT office on 02392 570985.

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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.

Legal permissions must be sought before commencing work on site. These are not limited to landowner permissions but will also involve regulatory authorities such as the Environment Agency – and any other relevant bodies or stakeholders. Alongside permissions, risk assessment and adhering to health and safety legislation and guidance is also an essential component of any interventions or activities in and around your fishery.

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Appendix

Figure 65 Hinged willow on the Cumbrian Derwent. Hazel, small willows and small alders can be hinged into a river, creating diversity of flow and in-stream cover for fish. The trees are hinged in a similar manor to hedge laying, where the tree is partially cut through at the base and laid into the margins. Chestnut stakes and fencing wire can be used to secure the trees in place. Willow will survive perfectly well even with 70% of the branches submerged; however, hazel and alder should be laid to retain much of the structure above water level.

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Figure 66 Another example of a tree successfully hinged into the margins of a river to improve habitat diversity.

Figure 67 Lodged woody material, the most natural of methods to mimic naturally fallen trees, wedged in another tree to secure it with no other materials required.

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Figure 68 An example of a well-constructed stock ford

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