



River Otter, Tipton St John, Devon



An Advisory Visit by the Wild Trout Trust June 2015

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Introduction

This report is the output of a visit undertaken by Mike Blackmore of the Wild Trout Trust on approximately 2km of the River Otter near Alfington, Ottery St Mary and Tipton St John, Devon (National Grid Reference (NGR) SY 10964 97814 to SY 10658 97462, NGR SY 09566 96210 to SY 09352 96049 and NGR SY 09142 92634 to SY 09011 91775). A walk-over of the site was requested by Ian Hawkins of The Ottery Fly Fishing Club. The visit was primarily focussed on assessing habitat for wild trout (*Salmo trutta*) and biodiversity in general.

Comments in this report are based on observations on the day of the site visit. Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

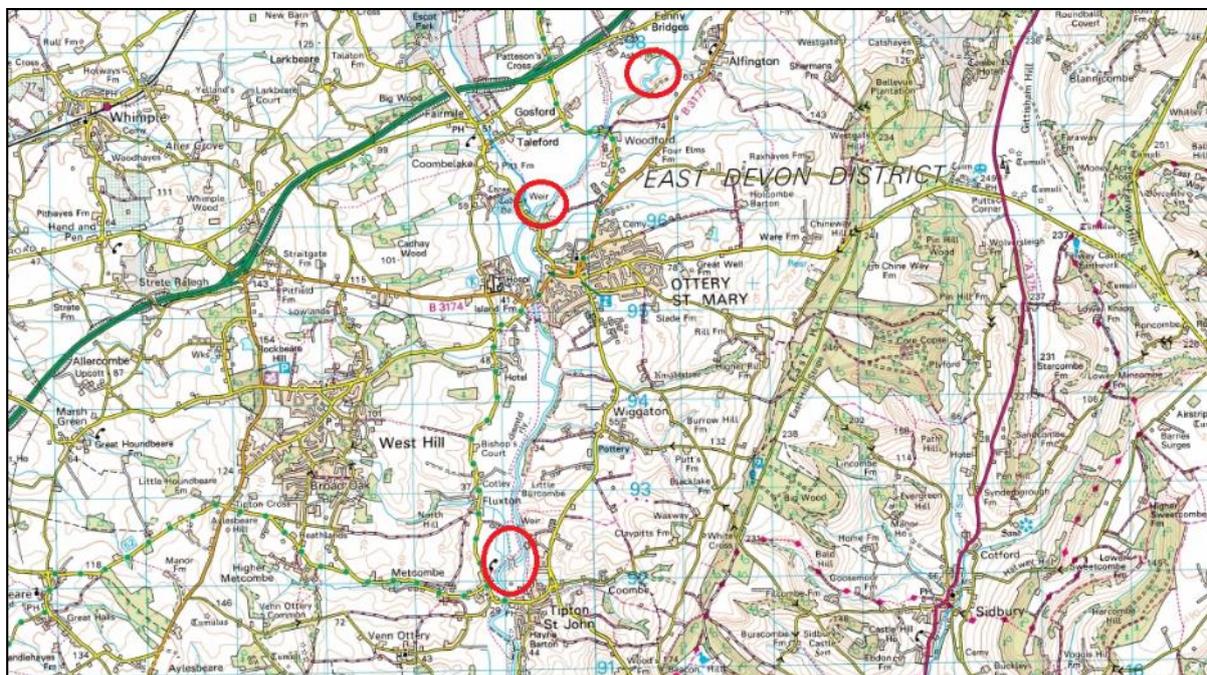


Figure 1: Map showing the locations of the water visited

Catchment and Fishery Overview

The River Otter rises in the Blackdown Hills, north of Otterford, where a stream feeds the Otterhead Lakes. From here the river flows south / south west through Upottery and Monkton, then roughly parallel to the A30 trunk road skirting around the northern limits of Honiton, flowing under the road near Alfington before turning south and flowing through Alfinton, Ottery St Mary, Tipton St John, Newton

Poppleford and Otterton. The Otter enters the English Channel at Budleigh Salterton where the tidal mudflats and salt marshes of the Otter Estuary Nature Reserve are designated as a Site of Special Scientific Interest (SSSI).

The geology of the catchment is primarily an undifferentiated mix of sandstone, siltstone and mudstones with some greensand in the headwaters. The river drops approximately 200m over its 32km length, 150m of which occurs before the river reaches Ottery St Mary. The steep gradient of the upper catchment makes the river prone to powerful spate flows during periods of prolonged rainfall.

The Otter flows through a predominantly rural area, with the main land uses being intensive arable agriculture and sheep and dairy farming.

As with most rivers in Devon and Cornwall, the fish communities of the Otter are predominantly resident brown trout and seasonal runs of sea trout and Atlantic salmon (*Salmo salar*). Historically, salmon and sea trout have struggled to migrate upstream of Tipton St John but the recent replacement of a poorly functioning 'pool and traverse' fish pass with a 'Larinier' technical fish pass has significantly improved fish passage. Other significant obstacles to migration still remain which limit the numbers of salmon and trout reaching the upper Otter, but overall fish populations are improving. Other fish recorded in the Otter include bullhead (*Cottus gobio*), gudgeon (*Gobio gobio*), and European eel (*Anguilla anguilla*). Under the European Water Framework Directive (WFD), the river has previously been failing its targets for fish. However, the most recent cycle of survey data (2014) shows that fish populations are now classified as 'Good'. Any classification below 'Good' is considered a failure under WFD and, unfortunately, the phytobenthos (microscopic plants/algae that live attached to riverbed substrates) community in the river is still not as healthy or diverse as it could be. This indicates potential water quality problems, probably related to excess nutrients or sedimentation. For this reason, the Otter's biological quality is classified as 'Moderate' but with a target of achieving 'Good' in the next cycle of testing. The pollutants driving this failure are most-likely phosphate and / or fine sediment and are probably linked to agricultural run-off and treated sewage effluent within the catchment. This is the only physico-chemical quality element of the Otter that is also classified as Moderate. Levels of other specific pollutants, such as heavy metals and pesticides are at 'Good' levels.

Habitat Assessment

For the purposes of this report, the river will be assessed from the upstream to the downstream extent of the reach visited.

Alfington Reach SY 10964 97814 to SY 10658 97462

At the upstream extent of the visit the river flows freely through a wide floodplain. The naturally high level of gravel sediment in the River Otter, combined with the sandy, friable soil of the catchment and the steep gradient of the upper reaches cause the river to undergo significant morphological changes during spate flows. The morphological change is driven by erosion of the friable banks and deposition of gravel within the channel. This is a natural process that increases the diversity of depth and flow conditions, providing a good range of habitat niches below the water. The active morphology also helps to keep the gravel relatively clean of fine sediment, enabling trout to easily cut their redds (spawning nests) and providing adequate water flow through the gravel to oxygenate eggs and alevins (hatchlings in the gravel still living on their own yolk supply).

Erosion can be either beneficial or detrimental to the health of a fishery depending on the rate and extent at which it occurs and this is in large part a function of the management of adjacent land. Bank erosion is a natural process by which the channel adapts to annual flows, often introducing additional gravel into the river (such as shown in Figure 2) which can benefit gravel-spawning fish as well as providing habitat for a range of invertebrate species. Material eroded from one bank is often deposited a short distance downstream on the inside of the next meander (Figure 3). This can introduce low-gradient saturated habitat where a succession of marginal plants can establish, boosting local biodiversity.



Figure 2: Bank erosion exposes a rich seam of river gravel



Figure 3: Areas of deposition create low-gradient, saturated margins to the riverbank

Where the adjacent land is managed for intensive agriculture, banks are often weakened by reduced vegetation coverage. Fence lines close to the bank result in too narrow a buffer between heavily grazed or cultivated land and the reduced root structure associated with such land uses places riverbanks at a greater risk of erosion. When riverbanks experience an unnaturally high rate of erosion, the resultant input of soil into the river can lead to an excess in fine sediment which can degrade the quality of potential salmonid spawning and invertebrate habitat.

Another important factor affecting the rate of bank erosion is the density of bankside tree cover. Roots from bankside trees reinforce riverbanks and can resist erosion by locally slowing flow speed, taking some of the energy out of the erosive forces acting against the bank. In addition to reducing the abundance and diversity of riverbank plants, livestock grazing can also inhibit the growth of tree saplings, resulting in a net loss of bankside trees as the older trees die or fall into the river.

Throughout most of the Alfington reach, there was a general paucity of bankside trees. Some isolated sections of bank did have dense tree cover, but even these locations were lacking young saplings. The intensity of grazing through the reach varies significantly, with some sections very intensively grazed and fenced too close to the riverbank (Figure 4), and some sections appearing not have been grazed for some time, allowing a diverse range of plants to grow in abundance (Figure 5).

The land owner/tenant farmer of the land shown in Figure 4 appears to have attempted to protect his bank by constructing a bar of gravel to push flow across the channel away from his field. The land owner/farmer may respond well to being informed of more appropriate and effective means of bank protection. Simply engaging with land owners and discussing effective and low cost alternatives to illegal or harmful channel modifications is often the most productive means of improving their bank and river management practices.

The gravel bar is very unlikely to remain in place for long as the next spates will almost certainly re-distribute the gravel downstream and the main force of the flow will return to acting against the bank on the outside of the meander. Alternative solutions for protecting the bank at this location are outlined in the *Recommendations* section of this report.



Figure 4: An artificially repositioned gravel bar appears to be an attempt to reduce erosion against an over-grazed and poorly vegetated bank



Figure 5: Where grazing pressure is reduced, a diverse range of plants occupy the bank and reduce the rate of erosion.

The alien invasive species Himalayan balsam (*Impatiens glandulifera*) was observed in various locations throughout this reach (Figure 6). Alien invasive plants such as Himalayan balsam or Japanese knotweed (*Fallopia japonica*) also weaken bank stability as they quickly out-compete and over-shade native species during summer months but die back to leave bare, exposed soil during the winter. This is often a significant factor in the rate of bank erosion and controlling these

species at the earliest opportunity is recommended. Himalyan balsam is very shallow rooted and can be pulled by hand or strimmed below the first (lowest) node early in the growing season before the plant flowers. Once balsam is in flower it can quickly go to seed and it is not recommended to attempt to remove balsam once the seed pods are ripe as they can burst on touch, propelling their seeds for several meters in any direction.



Figure 6: An infestation of Himalayan balsam. Eradicating this alien invasive species requires a source-to-sea approach. However, ongoing control of balsam at a local scale will at least help to limit the damage caused.

Whilst channel morphology through the Alfington reach is relatively active, the river is lacking submerged structure. Along with deep pools and overhead cover, in-channel structure (such as fallen trees and trailing branches) are vital for adult trout. Trout are naturally territorial and rarely tolerate other fish occupying their favoured lie. As a general rule of thumb, the greater the abundance and diversity of trailing and submerged cover, the greater the number of micro-territories available and, therefore, the greater the number of adult trout a reach can accommodate.

Woody debris in the river is also valuable for trout at the fry and parr life stages. Where salmon parr often favour shallow, stoney riffles, trout parr prefer 'shaggy' marginal cover. In highly erodible sections of spate-rivers this habitat is often in short supply. However, submerged branches, roots and other brushwood within the shallow marginal areas can provide very similar refuge habitat for juvenile

trout. This type of structure is also valuable in deeper areas for adult trout as somewhere to hold up out of the main current during heavy spates.

The river is relatively well-connected with its floodplain throughout the Alfington reach and flooding is relatively frequent. Fortunately, this flooding does not appear to effect any nearby properties or infrastructure and the saturation of the land supports some areas of wetland meadow habitat. As the river readily breaches its low banks, the reach does not experience the high-energy bank-full flows of some of the higher-banked sections of the River Otter. The relatively low-risk of the reach in terms of both spate flow conditions and potential flood damage creates an ideal opportunity for introducing woody habitat features into the channel.

Examples of habitat features that could be incorporated into the river at Alfington are outlined in the *Recommendations* sections.

Cadhey SY 09566 96210 to SY 09352 96049

At Cadhey, the river is impounded by a weir at SY 09566 96211 (Figure 7). This weir holds up a head of water to feed a leat that flows alongside Fairmile Lane towards Otter St Mary where it falls through the Tumbling Weir; a rare circular weir constructed in the 1700s to power a textile factory and corn mill.

https://en.wikipedia.org/wiki/Tumbling_Weir

The Cadhey weir is made passable for fish by a technical fish pass on the RB (Figure 8) and an eel pass on the LB. Even if weirs are made passable for 90% of fish, the physical exertion required for a fish to traverse a fish pass has a cumulative effect for each pass ascended. The greater the number of obstacles to overcome, the lower the number of fish that will successfully reach habitat upstream. For rivers such as the Otter that support fish populations heavily reliant on anadromous behaviour (fish that run up from the sea to spawn), even apparently passable obstacles to fish passage can actually have a significant impact (Figure 9).

Even disregarding the impact of the weir on fish passage, the weir has other negative impacts on the ecology and morphology of the river. The impounding effect on flow upstream causes the river to be overly uniform, providing habitat for a reduced number of species compared to sections of un-impounded river.

Weirs also interrupt the natural transport of river sediments. River gravels and cobbles are trapped upstream of weirs, reducing the supply of sediment downstream, this often leads to a net increase in bed and bank erosion downstream. Figures 10 and 11 illustrate these impacts, as does a video prepared by the Wild Trout Trust making use of the Severn Rivers Trust's EmRiver geomodel; a scale model used by scientists and researchers to demonstrate river processes.

www.youtube.com/watch?v=ILofBcLiDts



Figure 7: The head weir at Cadhey



Figure 8: The fish pas on the right hand bank of the weir

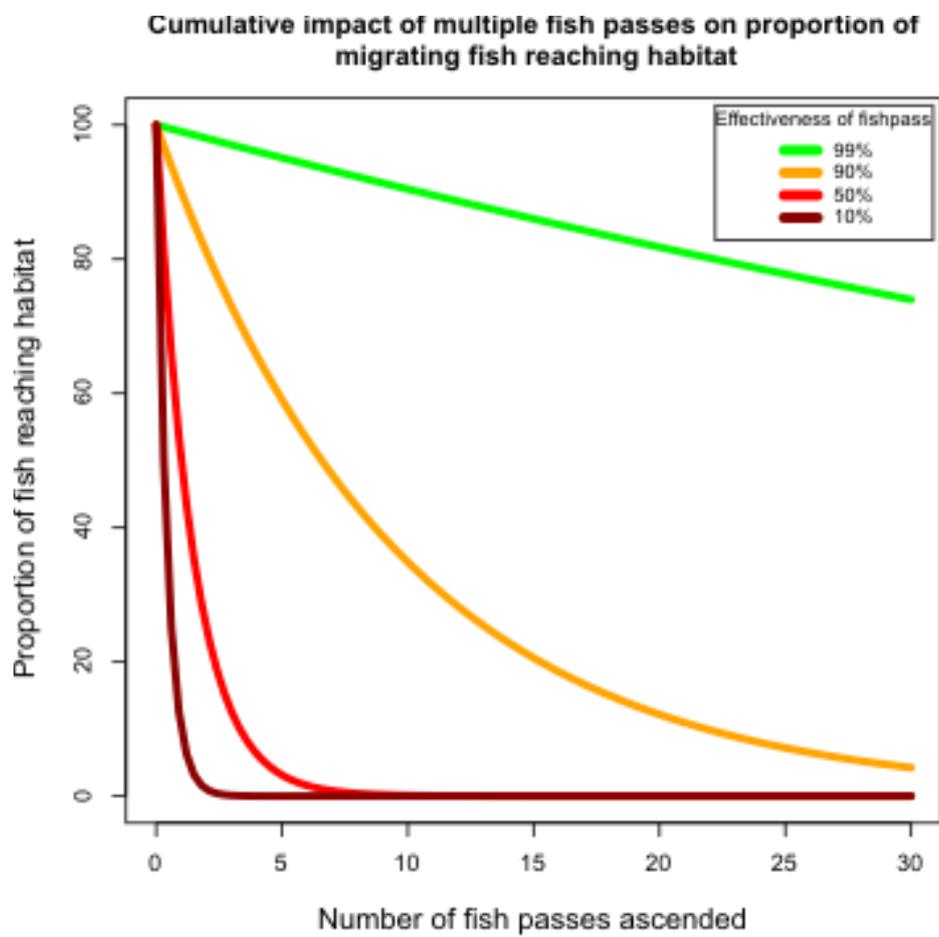


Figure 9: Graph showing the cumulative effect of multiple obstacles to fish passage on upstream migration (courtesy of Dr E Shaw, Catchment Science Centre, University of Sheffield).

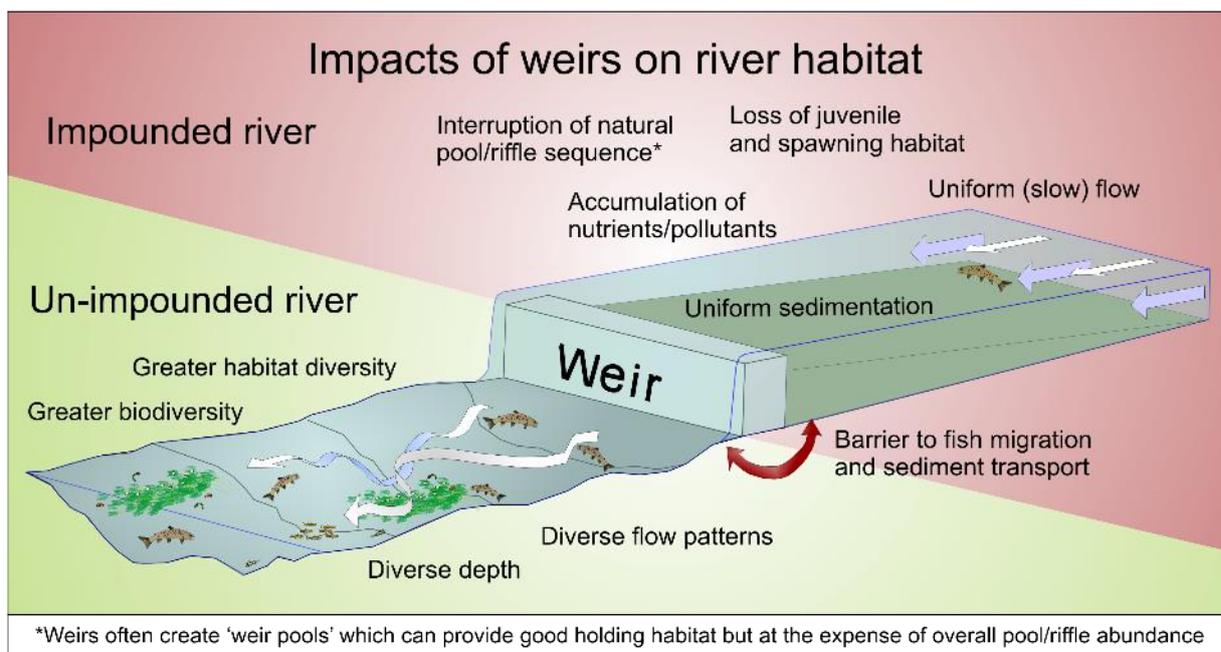


Figure 10: An illustration showing the impact of weirs on river habitat

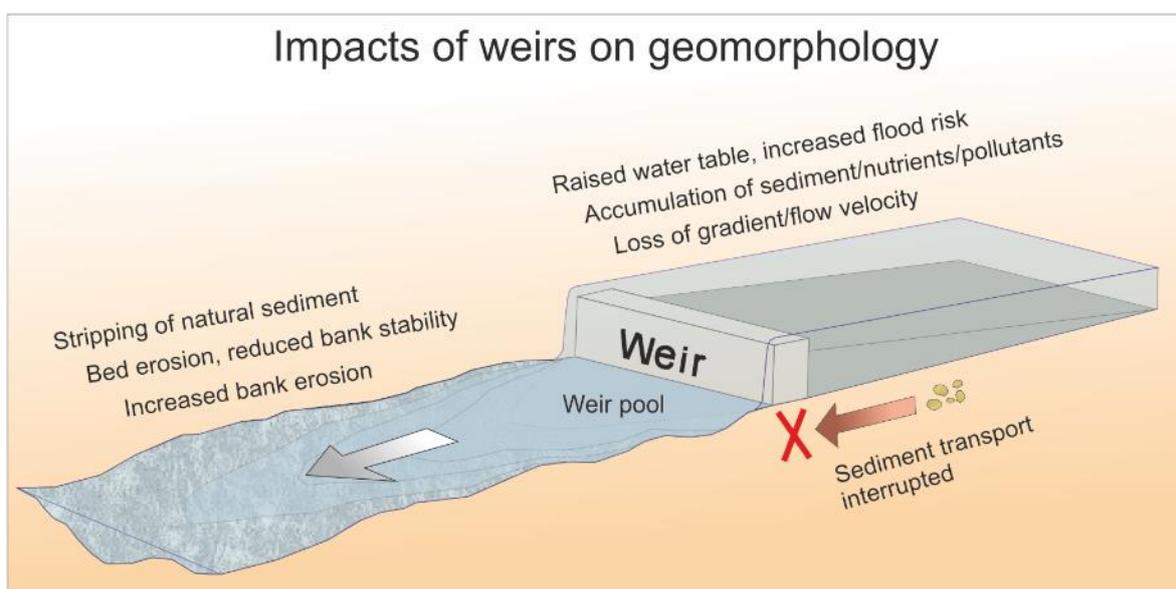


Figure 11: An illustration showing the impact of weirs on river morphology

Although the Tumbling Weir in Ottery St Mary may have a perceived heritage value to local people, the ideal action in terms of fish passage and river ecology is to remove the head weir at Cadhey.

Downstream of the weir, towards the Fairmile Lane bridge, bank erosion is excessive and the impact of the weir on natural sediment transport is likely to be a significant contributing factor. Possibly of even greater significance is the

management of the riparian land through this reach. On the day of the visit, a herd of cattle were grazing the upper bank (Figure 12).



Figure 12: Cattle grazing the unprotected banks near Fairmile Lane Bridge

When riparian land is intensively grazed, grass is forced to divert energy to continuously growing new blades (leaves). This results in a shrinking of the roots and limits new growth of rhizomes and stolons (roots which creep outwards to produce new plants). The reduced length and abundance of roots results in a reduction in bank stability. In addition, intensive grazing also prevents other plant species from establishing, reducing bankside biodiversity which, in turn, reduces the diversity of food and habitat available for terrestrial invertebrates that often supplement the diet of salmonids.

Along with reducing bank stability and biodiversity, bankside grazing also inhibits the growth of new sapling trees and, as a consequence, when bankside trees mature, fall into the river, or die, the next generation of trees is not present to replace them. This leads to a loss of trees over time and a lack of shade over the channel, potentially putting the river at risk from temperature spikes. Elevated water temperature during periods of hot weather can reduce the concentration of dissolved oxygen and put temperature sensitive species such as trout and mayfly (Order Ephemeroptera) at risk.

A reduction in the number of trees can also contribute to the rate of bank erosion. As with the grass (detailed above) tree root structure is very important in holding the bank together. As the abundance of trees reduce, livestock often congregate around the remaining trees to keep cool in the summer resulting in localised acute bank erosion (bank poaching) and point-source inputs of fine sediment.

Once the rate of bank erosion is high enough to cause block failure of the bank, the bank will begin to form a steep or near-vertical cliffing face. Constrained to short sections of bank, this is not necessarily a problem and can provide habitat for bank nesting birds such as kingfishers (*Alcedo atthis*) and sand martins (*Riparia riparia*); however, an over-abundance of cliffing banks results in a loss of marginal plant habitat and an increased fine sediment input.

Attempts at bank protection using rip rap (large boulders) has failed to abate the rate of erosion; in fact, it is more likely that these attempts have actually exacerbated the problem. Hard-engineered revetments often protect the bank behind them at the expense of the bank at the edges of the revetment, or sometimes a section of bank downstream. At the interface between the hard surface of the rip rap and the soft, friable bank, erosive forces are concentrated, often causing erosion around the back of the revetment. A good alternative to hard revetments is to plant live willow into the bank. If undertaken during the winter or early spring when the willow is dormant, and driven down into the bank so that around two-thirds of the willow is underground and the very bottom is at or below summer water level, each stem should sprout in the spring and put out roots and leaves. Willow roots form a dense mat that gets denser and stronger with time. These also act to absorb energy and slow flows as opposed to simply diverting the energy as hard-engineered revetments do. Live willow revetments also have the advantage of being very cost-effective, often free to install. Whips (long sticks) can simply be cut from other bankside willows and driven into the bank by hand. Ideally, low-growing species such as goat willow (*Salix caprea*) should be used as these will require less frequent maintenance and provide good low cover for trout. It is worth emphasising that whilst living willow revetments can provide good protection for eroding banks, the requirement of annual maintenance as the revetment grows should factor into decision making.



Figure 13: Hard-engineered 'rip-rap' bank protections have failed to reduce the rate of bank erosion

Another WTT video illustrates the difference between hard and soft bank revetments and the way they interact with river processes.

www.wildtrout.org/blog/bank-erosion-matter-balance

Downstream of the bridge, the land is not grazed and the banks are densely vegetated, providing much higher quality habitat for both aquatic and terrestrial wildlife. The rate of bank erosion is also substantially lower than upstream of the bridge, highlighting the important role of marginal and bankside vegetation in naturally protecting river banks.



Figure 14: The view upstream from Fairmile Lane Bridge



Figure 15: The view downstream from the same bridge.

Tipton St John SY 09142 92634 to SY 09011 91775

At Tiptop St John another weir was visited at SY 09142 92634 (Figure 16). Here the weir was also originally installed to divert water to a nearby mill.



Figure 16: The new technical fish pass at Tipton St John has significantly improved fish passage. More recently, a hydro power turbine has been installed downstream between the leat and the main river (Figure 17).



Figure 17: The 'Archimedes Screw' turbine a short distance downstream of the weir discharges flow from the old leat back into the main channel.

The previous fish passage easement on the weir consisted of a pool and traverse pass which, unfortunately, was not efficient. The newer pass, although less aesthetically pleasing to some people, is a much more effective solution that provides a better attraction flow to encourage fish up through the pass. Attraction flow is an important factor in fish passage as fish seeking to run upstream along the main stem of the river will follow the strongest flow. In a completely natural

stream, this would provide the most likely path through or over a natural blockage (such as a debris dam) or cascade. The outfall of the hydropower generator will produce its own attraction flow which is likely to delay fish moving upstream; therefore, the greater the momentum (discharge x velocity) of flow emanating from the pass outfall, the less energy fish will waste attempting to traverse impassable routes before successfully finding and using the fish pass.

Hydro-power schemes are generally problematic for river ecology, even low-head schemes. The term 'low-head' can actually apply to any hydro scheme with a head drop (drop in water level from above to below the turbine) of up to 20 metres. Even the smallest of hydropower generators requires a relatively substantial head drop to operate and are usually affixed to weirs which, as shown in Figures 9-11, have a negative impact on river ecology. Once a hydropower turbine is installed, the chances of removing the weir in the short-medium term will be very low since the weir effectively acquires a new reason-to-be.

Some turbine designs, such as Kaplan turbines, can be extremely hazardous to fish. The Archimedes screw turbine at Tipton St John is one of the less harmful designs as the screw turns relatively slowly and is less likely to kill or seriously injure any fish that might come into contact with it.

It is unlikely that the ideal scenario of removing the weir will be feasible for the operating lifetime of the turbine. As it currently stands, there is little that can be done to reduce the impact of the impoundment on habitat and morphology. Fortunately, the weir is at least now relatively passable for fish.

Downstream of the old mill, the Otter flows through open pasture land. As with the river at Cadhey, erosion is exacerbated by grazing on unprotected banks and attempts to protect the banks with riprap are unlikely to work long-term (Figure 18).

At SY 09038 92191 treated effluent from a nearby sewage treatment works discharges into the river. There were two outfalls at this location but only one was flowing on the day of the visit. No immediate signs of nutrient enrichment (such as algal blooms or sewage fungus) were observed around the flowing outlet but there was what appeared to be a small bloom of sewage fungus in the slack water around the non-flowing outfall (Figure 19). These outfalls should be closely

monitored and a location a short distance downstream could be a good site to conduct regular invertebrate monitoring via the Riverfly Partnership in order to quickly identify and address any potential water quality issues related to the outfall.

www.riverflies.org/get-involved



Figure 18: More erosion exacerbated by a complete lack of livestock exclusion from the bank



Figure 19: The outfalls at SY 09038 92191 should be monitored to assess water quality

Around the next meander downstream, two small tributary streams draining from Broad Oak and Venn Ottery Common (Figure 20) join the river. These streams were not inspected on the day of the visit but could be important spawning and nursery habitats for wild trout.



Figure 20: The confluence of one of the small tributaries draining from the West

Whilst salmon often prefer to spawn on gravels in the main river where flow velocities are greater, trout have a tendency to run up into smaller streams to spawn. These streams often have lower flows, shallower water and a greater abundance of cover and refuge habitat which can improve the chances of fry surviving to the parr life-stage when they will begin to drop back down into the main river. Small tributaries have an equally important role as spate refuge habitat where fish can hold up and rest during periods of high flow.

In intensively-farmed catchments, smaller streams are often at high risk from the effects of excessive soil run-off, and valuable spawning habitat can become infiltrated and compacted by fine sediment. This can have a significant impact on the rate of survival for trout eggs and alevins, potentially leading to a life-stage 'bottleneck' in the local trout population (Figure 21). Further investigation into the quality of the tributary streams, and the identification of any potential fine sediment input pathways and/or barriers to fish passage is recommended.

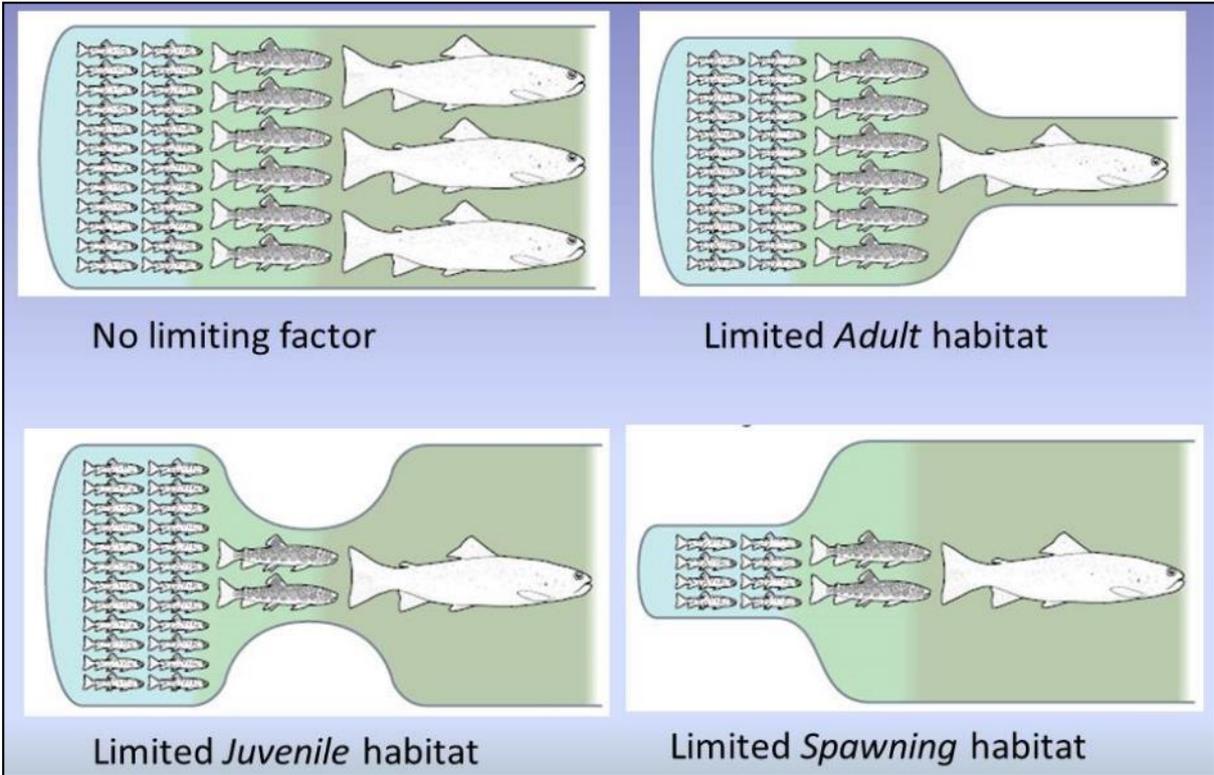


Figure 21: An illustration showing how ‘bottlenecks’ at a particular life-stage can impact on fish populations

The remainder of the reach downstream is confined between extensive rip-rap revetments. The protection of nearby houses and infrastructure is probably the driver behind such aggressive engineering works but the result is that the river has become relatively barren of habitat features and there is a general lack of overhead cover and shade (Figure 22).



Figure 22: An upstream view of the large-scale rip rap bank revetments deprive the river of natural habitat features

The river here would benefit from tree planting along the relatively bare bank above the rip-rap to introduce a greater diversity of light conditions. Unfortunately, the height of the bank means that new trees (planted or naturally established) will not provide the low-lying and trailing cover that fish need to comfortably lie up and evade predators.

Fortunately, the inside of the meander (LB) has a much gentler gradient and some good 'shaggy' marginal vegetation providing areas of cover habitat. A few metres back from the bank edge there is an abundance of willows and these may provide an opportunity to win some live willow whips and stakes that could be planted along the bank-edge to boost the abundance and diversity of cover. Once established, occasional bankside willows, could be 'hinged' (partially cut through and folded down in a similar fashion to hedge laying) into the margins and secured with wooden stakes. This would provide further low and submerged cover and also introduce some diversity into the overly-uniform reach. Undertaking this work in the inside of the meander, where flows are slacker, will reduce the risk of trees or limbs being torn away by spate flows.

At the next meander downstream, the river bends to the right and then becomes straightened as it flows alongside a public park towards the A3052 road bridge. Here, yet another rip-rap bank revetment limits the abundance of marginal cover habitat (Figure 23). Fortunately, there are at least some trees on the opposite bank (RB) with low trailing branches (Figure 24). Being so close to the road bridge, it is unlikely that permission would be granted to introduce new habitat structure into the river at this location. It will therefore be important that as many of the naturally occurring low-lying branches be retained as possible.



Figure 23: More rip-rap limits the availability of marginal cover habitat



Figure 24: The few trailing branches present should be retained

Conclusions

As with many Devonshire spate rivers, riparian land management is one of the key factors affecting habitat quality within the River Otter. Un-restricted grazing of upper banks increases the rate of erosion and compacts soil, decreasing the permeability of the land and increasing the rate of surface water run-off. Along with other point-sources such as household septic tanks and plumbing misconnections, diffuse run-off from agricultural land contributes significantly to the phosphate levels in UK rivers.

A lack of bankside trees, as a direct result of bankside grazing, further reduces bank stability, contributing to fine sediment inputs as banks experience block failure and collapse. It also creates a paucity of shade, low cover habitat and in-channel structure.

The widespread, inappropriate and often ineffective use of rip-rap bank revetments reduce the abundance and diversity of marginal habitat, with knock-on effects for plants, invertebrates, and ultimately fish, mammals and birds.

Throughout the waters visited, several infestations of Himalayan balsam were observed. This alien invasive species can quickly out-compete other bankside plants during summer months, dying back in the winter to expose bare soil banks that are vulnerable to erosion. Balsam is prolific and its elimination requires catchment-scale co-ordination and a source-to-sea approach. However, infestations can be controlled at a reach scale and tackling the problem early will reduce the rate at which it spreads.

The impoundments observed on the visit are unfortunately unlikely candidates for removal in the short-medium term owing to the perceived value of the portion of flow they divert for hydropower. The weirs have now at least been made passable for salmonids and eels but their complete removal should remain a long-term goal.

Conflicts of land use (such as nearby housing or infrastructure) may limit practicable options for habitat enhancement at Tiptop St John. The river at Cadhey would receive the most benefit from livestock exclusion and tree planting. The Alfington reach is the lowest-risk candidate for habitat enhancement and should be prioritised as such.

Recommendations:

In order for the River Otter near Ottery St Mary to achieve its full potential for biodiversity and good quality habitat, capable of supporting healthy, self-sustaining populations of wild brown trout, the following actions are recommended:

1. Engage with land owners/tenant farmers throughout the club's waters and discuss the benefits of installing stock-exclusion fencing at least 3-5 metres back from the top of the bank. Alternative means of watering livestock are available which can eliminate the need for cattle to access the stream entirely. Pasture pumps (Figure 25), for example, do not require electricity as they are simply powered by the cattle themselves.

Where only cattle are present, two strand barbed wire fencing should be sufficient to exclude them from the river bank. This is a cheap, quick and easy method to exclude cattle from a river bank and, owing to its minimal structure, has a relatively low risk of wash-out through flooding.



Figure 25: Pasture pumps are operated by cattle and do not require power

Westcountry Rivers Trust (WRT) may be able to assist with landowner engagement and possibly even help to find funding to pay for fencing.

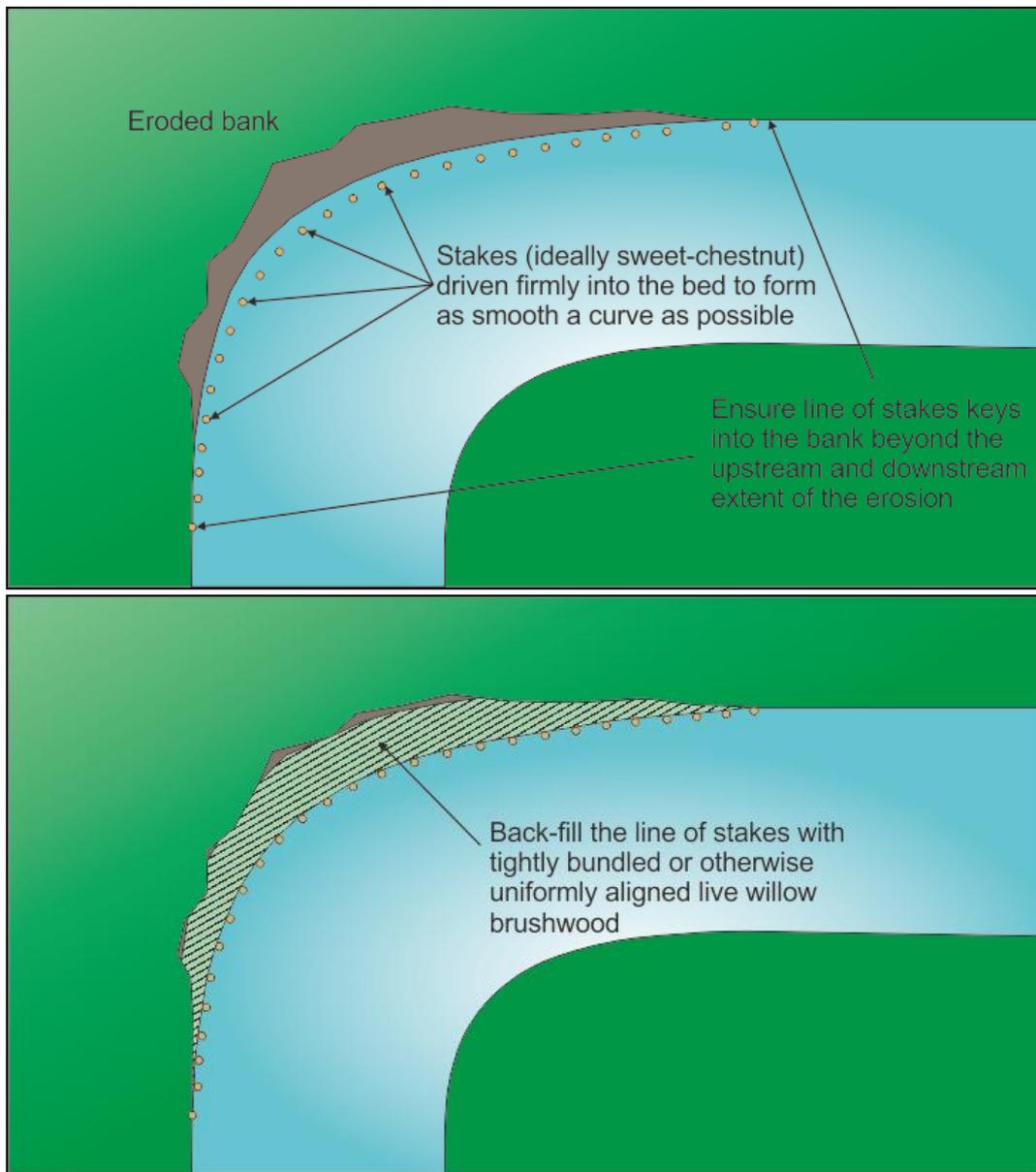
David Chapman david@wrt.org.uk might be a good primary contact at WRT. More information on the benefits of fencing riverbanks can be found by following these links to videos on the Wild Trout Trust website:
www.wildtrout.org/content/land-use-impacts-rivers
www.wildtrout.org/content/case-study-videos#wufbuffer

Areas inside fence lines do require management, through controlled livestock grazing and/or mechanical cutting, especially to avoid infestation by invasive, non-native plant species such as Himalayan balsam and Japanese Knotweed, both sadly present in the Otter catchment; see 3 below.

2. Once livestock have been excluded, consider a programme of tree planting along some of the more barren banks of the clubs waters. The Woodland Trust are able to provide trees free of charge for planting along riverbanks. Contact Hamish Thomson (SW Woodland Creation Advisor) hamishthomson@woodlandtrust.org.uk to discuss this option.
3. Take steps to control infestation of Himalayan balsam at the earliest possibility. Some angling clubs organise balsam pulling days, sometimes followed by a barbecue or other social activity in late spring/early summer to try and tackle infestations before the plants go to seed. It would be worthwhile contacting Devon Wildlife Trust and enquiring what balsam eradication programmes they may have already running and how the club could work within such a programme.
4. Encourage land owners to protect excessively eroding banks with soft-engineered techniques such as live willow revetments. On sharp bends these structures should be installed to form as smooth a curve as possible so as to limit the occurrences of eddying flows and uneven friction. Live willow brushwood should be aligned in the same direction, ideally with the branched ends pointing downstream to reduce the risk of trapping debris that could pull the structure apart. Finally, the willow should be firmly secured and the upper bank fenced to protect new growth from browsing livestock.

The upstream and downstream ends of the revetment should be keyed into the bank beyond the start and finish of the bend if possible. This will help ensure that the river cannot erode behind the revetment.

Once the structure is established, it will require annual maintenance (trimming) in order to ensure that it remains relatively even and does not encroach into the channel.



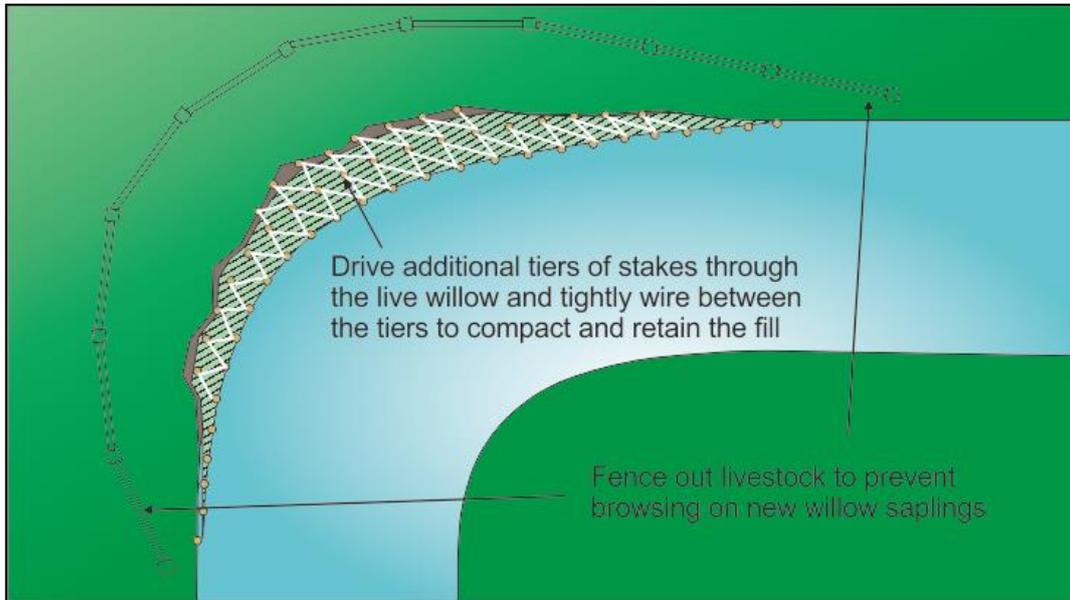


Figure 26:

5. Plan a series of woody habitat enhancements through the Alfington reach. Where possible, adapt existing habitat features to maximise their effectiveness. (Figures 27 – 29). Where woody habitat features are absent, introduce new features sourced from existing trees within the floodplain (Figures 30 and 31).



Figure 27: Suggested actions to enhance an existing woody habitat feature in the Alfington reach



Figure 28: A work party hinged bankside willow limbs into the River Wylfe in Wiltshire



Figure 29: A hinged bankside willow provides good fish and invertebrate habitat and diversifies flow in a straightened reach of the River Monnow in Herefordshire.



Figure 30: Additional woody habitat could be sourced from willows within the floodplain



Figure 31: A suggested example of locations to introduce large tree limbs into the river to enhance habitat and diversify flow conditions. The blue illustrates how the trees might deflect flow and thus introduce habitat diversity in the river.

6. Plant live willow close to the bank edge on the lower, natural banks at Tiptop St John. Also explore the option of planting native deciduous trees along the top of the rip rap reinforced banks.

Making It Happen

The creation of any structures within most 'Main Rivers' or within 8m of the channel boundary (which may be the top of the flood-plain in some cases) normally require formal Flood Defence Consent (FDC) from the Environment Agency in England. This enables the EA to assess possible flood risk, and also any possible ecological impacts. The headwaters of many rivers are designated as 'Ordinary Watercourses', in which case the body responsible for issuing consent will be the Local Authority. In any case, contacting the EA early and informally discussing any proposed works is recommended as a means of efficiently processing an application.

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

<http://www.wildtrout.org/content/index>

The Wild Trout Trust has 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 <http://www.wildtrout.org/product/rivers-working-wild-trout-dvd-0> or by calling the WTT office on 02392 570985.

There is also the possibility that the WTT could help via a more specific Project Proposal (PP). This service is designed to help land owners, fishing clubs and community groups put together the necessary plans and documentation to obtain the relevant permissions to undertake a project.

The WTT could also help with a Practical Visit (PV). PV's typically comprise a 1-3 day visit where WTT Conservation Officers will complete a demonstration plot on the site to be restored. This enables recipients to obtain on the ground training regarding the appropriate use of conservation techniques and materials, including

Health & Safety, equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

Recipients will be expected to cover travel and accommodation (if required) expenses of the WTT attendees.

There is currently a big demand for advice and assistance and the WTT has to prioritise exactly where it can deploy its limited resources. The Trust is always available to provide free advice and help to organisations and landowners through guidance and linking them up with others that have had experience in improving river habitat.

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.

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.