

WILD TROUT TRUST
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River Brue: Gants Mill (Bruton) to Cole, Somerset



Advisory Visit April 2025

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1. Introduction

This report is the output of a visit undertaken by Theo Pike of the Wild Trout Trust on approximately 2 km (1.2 miles) of the River Brue (and its associated milling leat at Gants Mill) downstream of Bruton in Somerset, on 14 April 2025.

A walkover of this stretch was requested by the local Brue CREW community group (www.bruecrew.org) on behalf of relevant landowners. The visit focused on assessing habitat for wild brown trout (*Salmo trutta*), other fish species, and biodiversity in general. It is hoped that this will inform local plans for improving the health of the river throughout the River Brue between Bruton and Cole.

Comments in this report are based on observations on the day of the visit, as well as discussion with local landowners, their representatives and members of the Brue CREW. 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.

At the time of the walkover, river flows were judged to be at low spring or summer levels after several weeks without significant rainfall: water clarity was very good.



Figure 1: A map showing the River Brue from Gants Mill, Bruton, to the confluence with the River Pitt at Cole

2. Catchment overview

The upper River Brue is a small limestone river which rises from springs on the western side of the Stourhead escarpment, from which it flows west through South Brewham towards Bruton.

Approximately 2km (1.2 miles) downstream of the town, the river meets the smaller River Pitt at Cole, and continues to flow west towards the Somerset Levels, gathering other tributaries such as the Alham. Its original course across the Levels has been much altered by centuries of cumulative human modification, and it eventually reaches the Bristol Channel at Burnham-on-Sea.

River	River Brue
Waterbody Name	Brue – Upper Water Body
Waterbody ID	GB108052021140
Management Catchment	Somerset South and West / Brue and Axe
River Basin District	South West
Current Ecological Quality	Good (as at 2022)
U/S Grid Ref inspected	ST 67815 34389 (approx.)
D/S Grid Ref inspected	ST 66666 33668 (approx.)
Length of river inspected	2 km approx.

Table 1: WFD summary information for the upper River Brue. The overall physical, biological and chemical health of all rivers in the UK is periodically assessed by the Environment Agency for the purposes of the Water Framework Directive (WFD). The most recent assessment (from 2022) can be found via this link:

<https://environment.data.gov.uk/catchment-planning/WaterBody/GB108052021140>

In its upper reaches, the Brue flows over a mixed geology of mudstone and limestone, overlain with impermeable clay soils. The sharp gradient of the main river, and numerous small tributaries arising from steep-sided combes, mean that flows can rise and fall very rapidly. This reactivity tends to produce low flows in periods of minimal rainfall, which contrast with particularly high flows as a result of prolonged wet weather or sudden storms.

Despite such natural variabilities, the steep gradient of the upper Brue has historically led to exploitation for water power. A fulling mill is known to have been established on the Gants Mill site in 1290, with subsequent development for products such as silk and animal feed. The mill was converted to steam power in 1883, and a micro-hydropower turbine was installed in 2003: it is understood that this is now due for decommissioning within the next year or so.

Most of these industrial activities have had an impact on the water and habitat quality of the Brue – whether by the construction of in-river barriers (weirs) to impound and dewater stretches of the main river for various milling purposes, or

by pollution in the case of cloth production. Through the Gants Mill site in particular, the river still shows dramatic evidence of the environmental problems created by centuries of harnessing for water power.

Today, despite these past and present pressures, the upper Brue is known to hold a self-sustaining population of native wild brown trout, and it would be reasonable to suggest that a wide range of fish species (including also eel and bullhead) could thrive in this part of the catchment if water quality, quantity, fish passage and habitat issues were successfully addressed.

2.1. River Brue trout genetics

The UK's wild trout are noted for their genetic variability and potential to produce (over the course of generations) locally-adapted strains which can cope with specific challenges posed by their particular environment. However, when populations have been fragmented for long periods of time – for example, by impassable physical or other environmental barriers, and thus cut off from beneficial genetic mixing with other trout from the area's wider 'meta-population' via natural migratory dispersion – these isolated populations can suffer from problematic 'genetic drift'. This means loss of genetic diversity, and thus potential loss of potential resilience to future pressures (such as climate change and disease) as well as reduced growth and reproduction rates.

A recent study by the Wild Trout Trust, the Westcountry Rivers Trust and Exeter University, as part of the Sheppey FISH project, has discovered that this is exactly what has happened in the upper Brue, where access by migrating sea trout (by channel modifications across the Somerset Levels, as well as fragmentation by milling infrastructure in the upper catchment) has probably been cut off for centuries.

Despite the appearance of a reasonably healthy population, the upper Brue's trout show much lower genetic diversity than might be expected, and are typical of what has been observed in other small, isolated populations inhabiting highly fragmented rivers. (Indeed, only six other populations previously screened in this way have demonstrated lower levels of genetic diversity than those discovered in the Brue - all representing extremes of isolation from gene flow as a result of physical or chemical barriers).

In collaboration with the Environment Agency (EA), a 'genetic rescue' programme for the upper Brue's trout is currently being proposed, by carefully-targeted reciprocal translocation of a number of individual trout from other isolated headwater streams within the Brue catchment rivers (such as the Alham) which exhibit different but complementary 'genetic drift'. These trout will be expected to spawn with trout in the rivers where they have been introduced; genetic changes may be evident within two or three years.

However, such genetic rescue alone will not solve the problems faced by the upper Brue's wild trout. Identifying their perilous genetic isolation, as a result of historic in-river barriers of different kinds, has given added urgency to improving fish passage, habitat quality and habitat connectivity in the upper Brue.

3. Habitat assessment

Thanks to their need for clean, well-oxygenated water, structurally-varied habitat, and free movement between different types of habitat at different life stages – as shown in Appendix A - the UK's native wild brown trout makes an ideal indicator species for healthy rivers.

As such, a simple and effective assessment for overall river health can be based around the lifecycle requirements of wild brown trout: these are described in detail in Appendix B, and applied throughout this habitat assessment.

For the purposes of this report, the stretches of river assessed are ordered from the upstream to the downstream extent visited.

3.1. Gants Mill estate

3.1.1. River Brue assessment



Figure 2: The Island weir: impassable to fish at all flows, and allowing almost no water into the main channel of the River Brue through the Gants Mill estate at the time of this visit

At the upstream end of the Gants Mill estate, the River Brue has historically been split around an area of land known as 'the Island', by the construction of a vertical-faced weir, approximately 2m high, at National Grid Reference ST 67815 34389 (hereinafter referred to as the 'Island weir' for the purposes of this commentary).

This creates an impoundment which may extend all the way upstream to ST 67987 34540 in the centre of Bruton; currently it is understood to be used for recreational boating and other purposes by the Mill on the Brue activity centre.

At the time of this visit, the Island weir was directing the majority of the river's flow towards Gants Mill via a leat, and allowing only a very minimal flow to the main river.

In general terms, whatever the purpose of any individual weir or dam, these structures cause problems for rivers because they impound long stretches of very slowly-moving water, where sediment carried in suspension drops out of the water

column uniformly across the stream bed; habitat quality and diversity are severely degraded. Such conditions can sometimes provide sufficient deep-water habitat for small numbers of adult trout and other species (until the deep water inevitably fills with sediment) but are generally unsuitable for gravel spawning fish, fry and juveniles. Long stretches of unshaded water, with dark sediments on the river bed, can also act as heat sinks, causing water temperatures to rise dangerously high, and oxygen levels to fall: this will affect both the immediate area and the river downstream of any such impoundment.

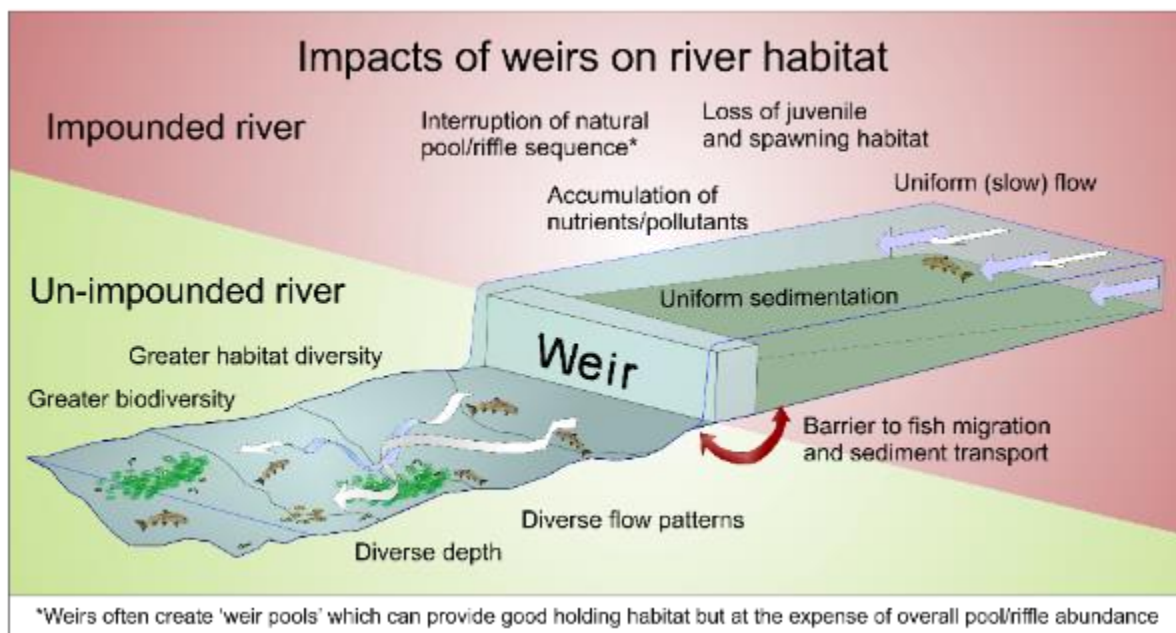


Figure 3: An illustration showing the impacts of weirs on habitat quality

Weirs like this one are also problematic because they form significant obstacles to fish passage, preventing many species from moving up and down rivers freely to fulfil the different stages of their life cycles. Due to its sheer, vertical face, the Island weir is considered to be a complete barrier to fish passage – preventing trout and other species from swimming upstream at any height of flow.

It is understood that the process of decommissioning the Gants Mill micro-hydropower plant will involve rebalancing the flows between the mill leat and the main River Brue – to be achieved by installing an automated sluice which will restrict the leat to a sweetening flow of 1 litre/second, and allow the rest of the flow (approx. minimum c 7 litres/second) to reach the main River Brue downstream of the Island weir.

This will provide a very welcome opportunity to restore the ecology of a significant stretch of river which has previously been severely degraded by management for hydropower – with the potential to be a leading exemplar of restoring natural river function and reversing the damaging effects of hydropower installations when these have proved financially, environmentally or otherwise unsustainable.

During this walkover, it was noted that the structure of the Island weir probably represented several stages of construction and repair, with some of these

measures visibly deteriorating - particularly in the case of the wing wall on the RB. Due to the sluice gates at Gants Mill having been temporarily lifted out for repair, proportional flows into the river were so low that no water at all was passing over the sill of the weir, but a very minimal flow still appeared to be making its way through or around the structure at a lower level. This suggests that the Island weir may already be vulnerable to failure when further stressed by high flows. Further investigation is recommended as a matter of some urgency; any plans for repairs, in addition to balancing flows between the mill leat and the main river, should also include discussion of opportunities for improving fish passage through this whole area – including options for removing the deteriorating weir altogether (which may also be cheaper than repair).

For the reasons described above and below, seeking to remove this weir and renaturalise the channel from Bruton downstream to Gants Mill would certainly be the best solution for this stretch of the River Brue and its ecology. All possible options should be discussed with the EA. Other solutions such as partial removal and / or replacing the weir with a rock ramp should only be considered if full removal is completely infeasible.

In the meantime, a deteriorating wooden stop board was observed on the sill of the weir, which may be directing available flows towards the leat and / or into vulnerable areas of the weir itself. It is recommended that this should be removed as soon as possible.



Figure 4: The River Brue downstream of Island weir: severely depleted flows, and river sediments dominated by unsorted cobbles

As well as blocking fish passage, structures like weirs also interrupt the natural transport of river sediment. This can cause the river downstream to become

starved of coarse sediment, and increase rates of bed and bank erosion in an attempt to compensate for the interrupted supply of suitable gravel and cobbles.

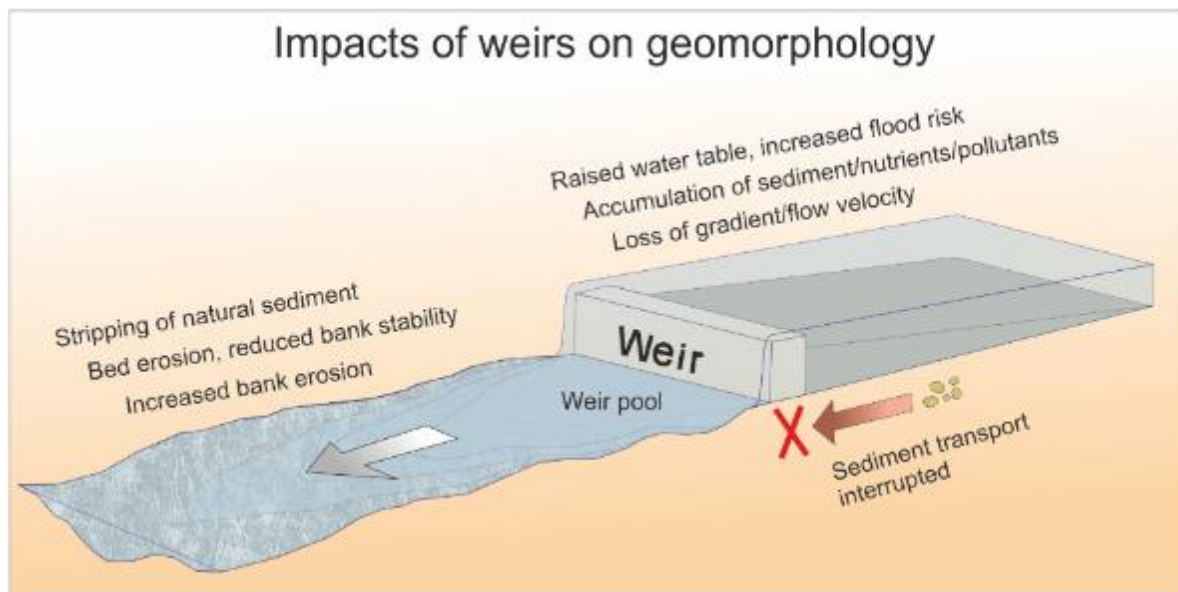


Figure 5: An illustration showing the impacts of weirs on river geomorphology

Many of these impacts can be seen in the main channel of the River Brue downstream of the Island weir. Very low flows reveal how the river's substrate is dominated by unsorted cobbles whilst being depleted of finer gravels, which have either become trapped behind the Island weir or moved straight into the mill leat (which appears to be comparatively well supplied with pea-sized and slightly larger gravels, suitable for spawning by trout and other fish). Brown trout require clean and well-sorted gravel, generally in the size range of 10-40mm.



Figure 6: Block failure of over-steep banks (left); livestock grazing on the Island (right)

Additionally, periodic rapid variations in flow - from regular dewatering caused by diversion of flow for milling and micro-hydro activities, to very high scouring spates at times when higher rainfall has led to significant overtopping of the Island weir - appear to have caused excessive bank erosion and even 'block failure' of the banks in some areas downstream of the Island weir. Erosion is a natural

process which helps to resupply a river with all sizes of substrate, and allows the channel to move naturally around its floodplain: however, excessive erosion can result in large volumes of silt being deposited in the river where it will clog any remaining gravels, and smother fish eggs and invertebrates.

In this area, high levels of erosion are likely to have been exacerbated by livestock grazing right up to the bank top – preventing grass and herbs from creating deep root structures, and restricting natural regeneration of trees whose roots would also reinforce the banks against excessive erosion. (See Appendix C for details of deep-rooted native plants.)

The presence of Himalayan balsam (HB) was also noted: a damaging shallow-rooted invasive non-native species (INNS) which shades out native plants before dying back in winter, leaving banks even more vulnerable to erosion (for more information, see the Cole Manor part of this report). No other INNS were noted in the course of this Advisory Visit. However, any future management plans for the upper Brue should include remaining alert for HB, Japanese knotweed, giant hogweed, floating pennywort, American signal crayfish, American mink and other damaging INNS.

To tackle this suite of issues, consideration should be given to gravel augmentation (introducing large volumes of geologically appropriate gravel to the river channel just downstream of the Island weir, and allowing the river to redistribute it further downstream); fencing livestock off the top of the river bank (creating a buffer strip of at least 5m - ideally 10m or more - between fence and the present bank top, and providing alternative water sources so that animals have no need to cause additional erosion by trying to reach the water); and working with community groups like the Brue CREW to tackle HB across the Gants Mill site as part of their strategy to eradicate it throughout the upper catchment.

Regrading and stabilising the river banks in this area could also be investigated as part of other works on the Island weir site: for example, by incorporating reprofiled banks into a general programme of fish passage improvements and channel renaturalisation.



Figure 7: Benefits of large woody material: A fallen ash tree in the river is delivering habitat benefits such as trapping silt and 'sorting' gravels (left) as well as helping to maintain a deep scour pool, with the kind of overhead cover that trout love (right)

Proceeding downstream alongside the Island, at least one large ash tree (possibly affected by ash dieback disease) was observed to have fallen into the river from the LB.

'Large woody material' (LWM) like this, together with the natural processes of localised scour and deposition which it facilitates, and the complex habitat structure which its tangle of branches provides, is a vital feature of healthy rivers. As shown in the photo above, the fallen tree and its overgrowth of ivy is already trapping fine sediment (perhaps deriving from the block failure of the bank a short distance upstream) and is beginning to 'sort' the available gravels into graded sizes, thus driving diversity in the shape of the river bed, and creating a suitable spawning area for trout as well as habitat niches for many other species.

These natural benefits mean that trees which fall into rivers should always be left in place and kept under observation, unless they are causing an immediate and obvious flood risk. If the channel is genuinely at risk of becoming blocked, with important infrastructure threatened, a good compromise may be to leave the wood in the river, but winch the tree parallel to the bank so that the risk is reduced and the hydromorphological benefits are retained.



Figure 8: Subsurface tree roots provide cover for fish as well as 'forcing' scour and deposition; note the tree root structures still helping to reinforce the RB, although this also seems to be grazed and would benefit from fencing and revegetating (including targeted tree planting for future hinging down into eroded areas of bank)

Downstream of the Island, and approaching the Gants Mill buildings, very low flows at the time of this visit continued to provide an opportunity to study the form of the river bed, and see how alder roots can provide valuable underwater structure (including refuge for fish) in higher flows: indeed a trout was seen in one of the deeper pools created by flows scouring round one of these root structures. Improved diversity of sediment sizes was observed in this area, including one or two shallow riffles which might be suitable for trout to spawn in minimal gravels eroded from seams within the banks.

Throughout this part of the walkover, a lack of aquatic plants such as *Ranunculus* was noted; this situation is likely to result from trees shading the river, particularly from the south bank as shown in the photos above, in conjunction with periodic dewatering. However, shallow water can heat up very rapidly under summer sun, creating conditions that are uncomfortable and even dangerous for trout at temperatures of c 20 degrees C or more, so 'keeping rivers cool' by planting suitable bankside trees will become increasingly vital as climate change continues (including extended periods of extreme weather). In the meantime, rotational re-pollarding of previously-managed riverside trees (especially if this saves mature pollards from becoming top-heavy and splitting) may still be beneficial if the shade:light ratio is kept around 70:30 in areas like these.



Figure 9: Views of Farm weir from downstream (left) and upstream (right)

As the main channel of the river approaches the Gants Mill access bridge at ST 67454 34211, it becomes impounded by another weir (hereinafter dubbed Farm weir) which is located further downstream at ST 67382 34229. The mill leat also rejoins the main river at ST 67432 34217, and appears to be similarly impounded by this weir, possibly all the way upstream into the mill tail pool shown on the front cover of this report.

It is understood that Farm weir was constructed comparatively recently, to provide a clear exit point for the tail pipe of the mill's hydropower turbine (although as seen in the photo, above left, the pipe arch looks considerably older than c 2003). With the hydropower infrastructure now being decommissioned, this weir has become redundant, and opportunities should be sought to remove it and renaturalise the river through this reach. Lowering the 'head' of water permanently retained by the weir may also contribute to reducing flood risk around the Gants Mill buildings.

Ironically, under the present flow regime, this artificial impoundment (and the connected mill tail pool) appears to be providing some deep-water refuge for trout and other fish species. Although restoring the natural flow of the main river will undoubtedly provide much more viable habitat throughout the presently dewatered reach alongside the Island, consideration should also be given to helping the river to re-establish a healthy sequence of deeper pools throughout the Gants Mill stretch of the river. This may be achievable by increasing the volume of LWM in the channel, both by retaining naturally fallen timber and by strategically felling trees into areas where deep scour holes, subsequently created by the action of high flows, might be most beneficial.



Figure 10: Gants Mill buildings being used for agricultural purposes; the cast iron drain grate could carry contaminated water directly into the river

At Gants Mill, some of the former fabric mill buildings have been informally repurposed for farming, including shelter for sheep. When the mill's original rainwater drainage system was installed, this would have been designed to convey water straight to the river. With livestock now in residence, runoff from this makeshift farmyard could constitute a point source of pollution for the river, including fine sediment, faeces and pharmaceuticals.

At the time of this visit, dry weather meant that it was difficult to confirm flow pathways in and around buildings being used for stock shelter. Further investigation via a 'wet weather walk' is recommended, followed by efforts to separate clean and dirty rain water, in the event that the former mill buildings continue to be used for agricultural purposes. In the meantime, measures should also be taken to ensure that no slurry and dirty bedding is accumulated near the river, where additional runoff could cause pollution.



Figure 11: At the downstream end of the Gants Mill reach, the river has a healthy pool and riffle sequence (left); an example of a small alder tree which could be hinged over into the margins to augment valuable cover for many species (right)

Downstream of the farmyard and the Farm weir at ST 67382 34229, and having regained the flow from the Gants Mill leat, the channel of the River Brue becomes increasingly naturalised, with the river's characteristically incised clay banks, but

now featuring much more defined deep pool and riffle sequences which could provide appropriate habitat for trout throughout their life stages.

Low, shaggy, trailing vegetation was abundant, and a number of opportunities were noted for hinging small trees into the margins to provide additional complex bankside cover (it was noted that some of these may be on neighbouring riparian owners' land, so some collaboration may be necessary to get the best results for the river). The RB had a healthily vegetated buffer between the river and the bank top, while the field on the LB is regularly used for grazing: fencing off the LB bank top and providing drinkers would be beneficial, in order to allow a diverse riparian fringe to re-establish, including succession of naturally seeded trees.

At ST 67308 34091, and at several further points just downstream of the Gants Mill railway viaduct, several cast iron pipes were observed to be discharging trickles of clear water from the LB into the river. No evidence of pollution was apparent, and the sources of these pipes are not currently known, but further investigation is suggested.

3.1.2. Gants Mill leat assessment

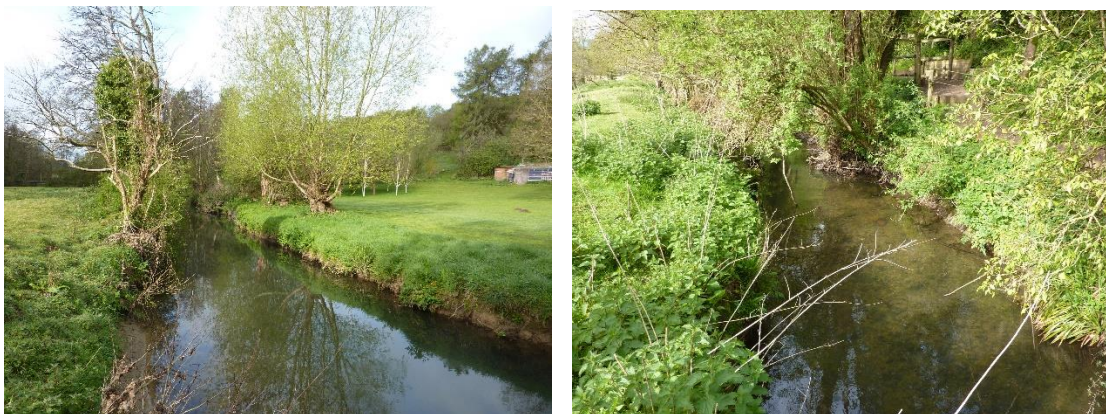


Figure 12: Views of Gants Mill leat

The leat which has historically carried water from the upstream end of the Island to Gants Mill is an engineered channel which continues the artificial straight line of the main river upstream of Island weir, and is perched high above the natural valley floor. Over time, despite probable flow variations linked to milling and hydropower, this has become naturalised, and may even offer some very limited areas of trout spawning and juvenile habitat. However, this should not be regarded as a reason to continue to deprive the main river of ecologically important perennial flows.

Alongside the Island, the leat was observed to be deep and possibly dredged in the past. At ST 67702 34354, an overflow channel appears to be designed to convey excess water to the main river; from this point downstream to Gants Mill, the leat becomes increasingly perched yet also heavily incised, creating a linear mill pond for the mill.

As noted above, some areas of the leat appear to be reasonably well supplied with smaller gravels than are widely present in the main river: it is possible that these could be used as a guide to the type and sizes required to augment the main channel. In future, when the new flow regime is implemented, the leat is unlikely to offer good trout habitat, but it could still provide ecological benefits as a valuable low-flow wetland for aquatic invertebrates and amphibians.

3.1.3. Recommendations

Opportunities	Locations	Recommended actions
Flow regime rebalancing	Gants Mill leat and main channel of River Brue	Expedite rebalancing of flows between mill leat and main river, to restore as much main river flow as possible; remove stop board on Island weir
Fish passage barriers	Island weir, Farm weir	Investigate stability of Island weir, and engage with EA regarding options for removal and / or other fish passage enhancements on both structures
Gravel augmentation	Main channel of River Brue: upstream end of the Island	Introduce locally sourced and geologically appropriate gravels (esp 10-40mm size) to offset long-term interruption of sediment transport by Island weir
'Shaggy', well vegetated river margins and bankside buffer strip	All riverside land used for grazing	Fence off 5m (minimum) buffer strip at bank tops of all water courses; include gates and/or stiles for easy maintenance access; install alternative water source; consider supplementary planting of deep-rooted herbs
LWM augmentation and tree hinging	Main channel of River Brue	Retain naturally fallen LWM in river channel when opportunities arise; identify suitable locations for tree hinging and adding further LWM
Trout habitat: deep water refugia	Main channel of River Brue	Selectively fell and secure (or retain already fallen) trees in channel for habitat and hydromorphological benefits, including scouring 'bomb hole'

		pools as deep water refugia for trout and other species
INNS clearance including Himalayan balsam (HB)	Survey area generally	Collaborate with Brue CREW local community group to clear HB; remain alert for appearance of other INNS
Citizen science: water quality monitoring	Survey area generally	Collaborate with Brue CREW local community group to monitor water quality via riverfly monitoring and other citizen science initiatives
Water quality monitoring	ST 67308 34091 and downstream of Gants Mill viaduct	Investigate source of pipes discharging into river
Wild trout fishing	Main channel of River Brue	Long term, investigate opportunities to develop a limited angling pressure, catch & release wild trout fishery: small syndicate or for holiday property guests

3.2. Gants Mill viaduct to Wyke Lane bridge

3.2.1. River Brue assessment



Figure 13: A mid-channel island forming ecologically valuable islands opposite the concrete STW wall (left) and crack willows offering bankside erosion protection and habitat (right)

After flowing under the Gants Mill railway viaduct at ST 67269 34042, the River Brue curves to the right and runs alongside the Bruton sewage treatment works (STW).

Historically, this stretch of the river has almost certainly been straightened to accommodate the STW, whose infrastructure is protected with a concrete wall on the LB: consequently this bank offers very little riparian habitat. However, the RB is understood to be managed as a 'rewilding area' of rough grassland, and an abundance of trailing cover is provided by a thick intermittent fringe of bramble bushes.

In the channel, it was interesting to see that a small number of low-level mid-channel islands had formed, perhaps initiated by sediment collecting around emergent vegetation such as water parsnip, and then becoming colonised by reed canary grass and other species. Similar features can also be observed on other human-modified stretches of the Brue, such as in the middle of Bruton: they provide valuable complex habitat for many species, and any attempt to remove these islands (thus 'simplifying' the channel and reducing its structural diversity and habitat value) should be resisted.

Crack willows were also growing on the RB at several points, and at least one of these had fallen, re-rooted, and continued to grow – providing robust habitat and natural bank reinforcement against excessive erosion. Crack willows grow quickly and tend to grow unmanageably large before splitting and falling, and it may be preferable to coppice or pollard some of these on a rotational basis if there is a likelihood that they will fall across the river onto the STW site. Future replacement planting with smaller, more manageable goat willows could also be considered.



Figure 14: An area of excessive erosion (left) and Himalayan balsam seedlings (right)

Apart from providing very little habitat, hard infrastructure such as the concrete revetment alongside Bruton STW is unable to dissipate the energy of flood flows in the way that 'shaggier' natural river banks would – instead transferring the energy downstream where its erosive force is all the greater. This appears to be happening around ST 67041 33857, where a section of RB (also apparently lacking deep vegetative root structures to hold it in place) is progressively failing and collapsing into the channel, which is now becoming silty and overwide.

From one perspective, this area of erosion may represent a natural process in action – perhaps with the river creating a new meander as the RB erodes, while a corresponding depositional zone on the LB accumulates sediment and becomes vegetated. In this case, however, the river's migration across its floodplain may foreseeably be threatening the footpath on the RB (with the railway embankment not too far beyond). As such, it may be preferable to arrest further rapid erosion and consolidate this stretch of the RB by installing brash bundles along the eroding toe, and planting goat willow whips into the bank behind, where their roots will provide reinforcement against further structural failure and channel migration.

At the same time, 'large woody material' (LWM) or a more formal shaggy brushwood berm could be constructed in the natural depositional area on the LB, thus accelerating this process whilst also pinching flows in mid-channel to scour away silt, and clean and sort gravel for trout and other fish to spawn. (However, this may need to be a follow-on project, as any narrowing of the channel in this area may also put more pressure on the currently-eroding and unprotected RB).

To help prevent further bank collapses, and facilitate successful re-establishment of native riparian plants in this area, Himalayan balsam (HB) on the LB (and indeed throughout this rewilding area) should also be controlled – in this case as a temporary 'localised harm reduction' tactic, but still contributing to the Brue CREW's wider INNS strategy for the upper Brue. The LB is likely to be owned by Wessex Water (as operators of the STW) so their partnership in this project should be sought: they may also be able to provide additional funding.

At approximately ST 67082 33896, the discharge pipe from Bruton STW was noted. According to local people, upgrade works have recently taken place at the

Bruton STW, and riverfly monitoring counts, a short distance downstream at the Cole monitoring site, have noticeably improved. Although not yet fully evident from the site's data on the Riverfly Partnership website, this is encouraging news, and a situation which should continue to be monitored:

<https://riverflydata.org/?where=s-c6773729-cf74-3fa5-9574-ae5c2678ed83>



Figure 15: Beneficial large woody material in the channel

Further downstream, between the STW and the Colestile Farm Lane bridge, at least one very beneficial accumulation of LWM was noted in the channel. Due to over-zealous past flood risk management and over-tidying, many UK rivers are still 'functionally starved' of LWM, which would naturally be deposited by processes such as wind-blow or beaver activity. As noted above in this report, LWM 'drives' many essential processes like localised scour and deposition of sediment, as well as providing complex cover for fish and birds, and surface area for aquatic insects. Whenever possible, such LWM should be left in place as a valuable 'gift from nature'.

As seen in the photo above (left), LWM can sometimes trap plastic and other human litter: while this may create an aesthetic eyesore, it also makes collection easier for landowners and volunteers, thus preventing these materials from being swept out to sea as marine plastic and other pollution.



Figure 16: The shallow, exposed river channel through the old railway bridge footings would benefit from bankside cover (such as goat willows) on the RB

At ST 66929 33771, the footings of an old railway bridge (now partly demolished) were noted. Although the remaining footings have created a small upstream impoundment, the gradient drop downstream was not considered to be an obstacle to fish passage, apart from being rather exposed and lacking in marginal cover. To overcome this, the gravel bar on the RB could be further renaturalised by planting whips of goat willow, for future hinging into the margins for beneficial shade and cover.



Figure 17: Looking upstream from Wyke Lane bridge, with a view of the 'beach' formed by deposition (and possibly access-related erosion) on the LB

As the River Brue curves between the bridges at Colestile Farm Lane and Wyke Lane, the channel becomes wider and shallower, with more obvious public access from the LB. A sloping 'beach' has formed in the margins of the river just upstream of Wyke Lane – possibly as a result of natural sediment deposition on the inside of bend, combined with footfall from people and dogs. (This is also understood to be the local riverfly monitoring site).

At present, footfall does not appear to be a very significant source of sediment input to the river in this area, but it should be monitored over time. 'Dog slides' where pets enter and leave the river via steep banks can cause very rapid, localised erosion: the best solution is usually to 'nudge' this activity towards areas of the bank which have been optimised for frequent footfall with access steps and gravel beaches retained by suitable logs, so as to resist erosion while offering safe access for all.

3.2.2. Recommendations

Opportunities	Locations	Recommended actions
'Shaggy', well-vegetated river margins and mid-channel islands	Survey area generally	Continue light-touch management approach; consider supplementary planting with deep-rooted native herbs
Excessive bank erosion and collapse	ST 67041 33857	Reinforce RB toe with staked brush bundles and goat willow whips behind; install brushwood berm on LB to pinch overwide channel and initiate mid-channel scour
Exposed, shallow channel through old bridge footings	ST 66929 33771	Plant goat willow whips on RB gravel bar to add bankside cover (with a view to future hinging down into margins as additional complex habitat)
Bank erosion potentially associated with 'dog slides'	Wyke Lane bridge and other access points for people and dogs	Monitor for further erosion and consider formalising access points as gravel-reinforced 'dog dip' areas, protected against damaging erosion with naturalistic log steps and augmented gravel beaches
Water quality monitoring	ST 67308 34091 and downstream of Gants Mill viaduct	Investigate sources of pipes discharging into river
LWM augmentation and tree hinging	Survey area generally	Retain naturally fallen LWM in river channel when opportunities arise; identify suitable locations for tree hinging and adding further LWM
INNS clearance including Himalayan balsam (HB)	Survey area generally	Collaborate with Brue CREW local community group to clear HB; remain alert for appearance of other INNS
Citizen science: water quality monitoring	Wyke Lane bridge	Continue monitoring by Brue CREW local community group via riverfly monitoring scheme and other citizen science initiatives

3.3. Cole Manor

3.3.1. River Brue assessment

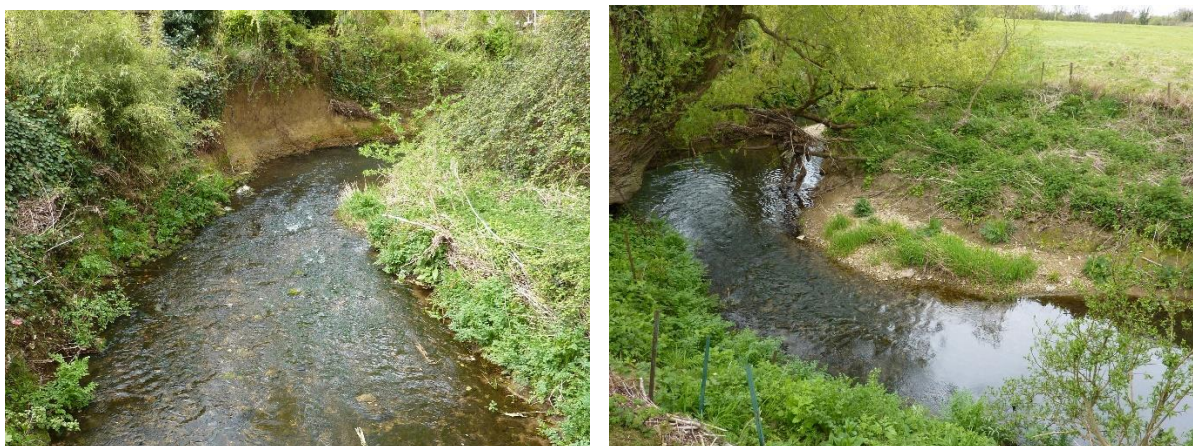


Figure 18: Varied pool and riffle habitat, with well-vegetated banks, alongside Cole Manor

Downstream of the Wyke Lane bridge at ST 66803 33741, the River Brue flows around the northern boundary of Cole Manor in a healthy natural sequence of pools and riffles.

This stretch of the river is heavily incised, with generally steep but well-vegetated banks, and the channel appears to be stable (as suggested by a tall vertical 'cliff' on its outside bend at ST 66787 33729, shown in the image above left, which does not seem to have undergone further erosion in a number of years – possibly thanks to well-established vegetation on the bank top).

As noted previously in this report, richly-vegetated river banks with deep perennial root structures are more likely to resist excessive erosion – so leaving a generous 'shaggy' riparian fringe between the river and traditionally 'tidy' areas of the garden will be important for maintaining this status quo.

It is understood that Himalayan balsam (HB) is present, and that the landowner has already started to clear it – another important facet of maintaining river bank stability, since the HB lifecycle includes dying back in winter, leaving bare soil without root structures to counteract erosion. Riverbank erosion due to HB can contribute significantly to riverbed sedimentation (one recent study suggests a rate of 10 tonnes per km per year) smothering gravels, aquatic vegetation, invertebrates and fish eggs. More generally, HB also reduces biodiversity by suppressing native plants with allelopathic compounds in the soil and attracting insects to pollinate its flowers preferentially with its strong scent and prolific nectar.

Extensive areas of HB monoculture can be brought under control by repeated strimming or mowing, with hand-pulling as a follow-up measure. For smaller areas, or greater selectivity when HB is growing among other more desirable

plants, hand-pulling is a tried and tested means of control and eventual eradication, as well as an excellent form of community engagement.

For sustainable long-term results, a catchment-scale approach is required: the furthest upstream extent of the infestation should be located, with a systematic programme of eradication designed to progressively push HB further and further downstream, and eventually out of the catchment completely.

In general, HB seeds appear to survive in the soil for around 3 years, so it may be necessary to revisit previously infested areas for at least this length of time – or longer when an upstream source of seeds is still known to exist (as in the case of this stretch of the Brue). For best results, areas of infestation should also be revisited repeatedly through the growing season, up to the time of the first frosts in autumn, to prevent late-germinating plants from flowering and setting a seed bank for the next year.

Once pulled or strimmed, HB plants should be piled up to compost well away from any watercourses, with the stems snapped between the root and the first node of the stem to prevent resprouting: the fleshy plants will desiccate quickly, and experience shows that few seeds will survive this process to germinate in future years.

In recent years, efforts have been made to introduce suitably co-evolved varieties of rust fungus as a biocontrol for HB:

<https://www.cabi.org/projects/biological-control-of-himalayan-balsam/>

However, these have not yet achieved widespread levels of success, and hand clearance is still considered to be the most effective approach.



Figure 19: Disposal of grass clippings (left) and builder's waste in a counterproductive attempt to protect the bank (right) on the river banks should be avoided

Whilst walking along this stretch of river, at least one dumping area for grass clippings was found on the bank. As a general principle, disposal of grass clippings and other garden waste should always take place as far from a waterway as possible, since this plant material is likely to leach high levels of nutrients into the stream as it decomposes, potentially raising Biological Oxygen Demand (BOD) in

the water which can result in the death of fish and invertebrates. Areas of unvegetated ground associated with compost piles can also create potential areas for increased erosion. Additionally, discarded garden waste can help damaging INNS to escape into the wider environment. It is understood that the landowner has already asked his gardener to make better arrangements including well-sited compost bins.

Although the RB of the river is not formally included in this survey, it was also noted that a quantity of builder's waste appeared to have been thrown down this bank, opposite the Cole Manor garden, at approximately ST 66750 33754. Apart from the negative aesthetic aspects of such rubbish disposal, builders' waste may contain contaminants which can damage the ecology of the watercourse. Even if this was designed to protect the bank where some light erosion and past 'slumping' was observed, it is most likely to prove ineffectual; a better approach would be 'green engineering' including HB control and planting goat willow whips and other deep-rooted native plants to help to stabilise the area. WTT would gladly engage with the landowner to explore appropriate options.



Figure 20: LWM producing undershot scour and upwelling currents (left, indicated by red circle); natural accumulation of organic surface scum (right)

As the river's course curves alongside the garden, several accumulations of LWM were noted in the channel. The general lack of LWM in many rivers (as explained previously) makes this 'large wood' a very valuable habitat resource; wild trout have been seen in this stretch, and it is likely that they will be using these tangles of wood as cover.

In such a deeply incised channel, even comparatively large trees are unlikely to cause flood risk: as such, every effort should be made to retain them in the river, rather than remove them for any reason. In the case of one large tree limb, noticeable 'upwelling' of water was seen on the downstream side – showing how, even in low flow conditions, LWM can initiate localised scour to clean gravels, create habitat pockets, and perpetuate the river's healthy sequence of pools and riffles.

In the course of conversation with the landowner, it was noted that some 'scum' had collected on the water's surface at the upstream sides of these 'log jams'. Although the location is downstream of Bruton STW, this scum was assessed to be a natural accumulation of organic material, including decomposing algae which

had floated up from the river bed in low water / warm weather conditions, and will be swept away in higher flows. However, any more significant signs of pollution such as odours, unusually coloured water (particularly at times of low flow), or distressed fish or wildlife, should always be reported to the Environment Agency's incident hotline as soon as possible: 0800 80 70 60.

At ST 66666 33668, the River Brue is joined by its smaller tributary, the River Pitt: comments about this separate water body will be addressed in a further report.

3.3.2. Recommendations

Opportunities	Locations	Recommended actions
'Shaggy' river margins and bankside buffer strip	Survey area generally	Maintain 'shaggy' river margins with plenty of trailing cover over the river's edge, and a well-vegetated, naturalistic buffer strip between river and more formal garden areas
LWM retention	Survey area generally	Retain naturally fallen LWM in river channel when opportunities arise
Garden waste disposal	Survey area generally	Dispose of garden waste carefully, with composting areas located well away from the river
INNS clearance including Himalayan balsam (HB)	Survey area generally	Continue beneficial clearance of HB; collaborate with Brue CREW local community group for wider upper catchment perspective; remain alert for appearance of other INNS
Engagement with other riparian owners	Neighbours generally	Engage with neighbouring riparian neighbours to enhance environmentally-friendly river management, and reduce dumping and other negative activities
Pollution	Survey area generally	Watch for unusually smelly or coloured water, or fish / wildlife in distress; inform the EA's pollution hotline 0800 80 70 60 in the event of any concern

4. Making it happen

The creation of any structures within 'Main Rivers' or within 8m of the channel boundary (which may be the top of the floodplain in some cases) may require a formal Environmental Permit from the Environment Agency (EA). This enables the EA to assess possible flood risk, and also any possible ecological impacts. The headwaters of many rivers are not designated as 'Main River', in which case the body responsible for issuing consent will be the Local Authority (often the County Council as the Lead Local Flood 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>

A focused Trout in the Town Urban River Toolkit (which also contains many valuable insights for general community engagement) is available at:

<https://www.wildtrout.org/content/trout-town>

There is also the possibility that the WTT could help via 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 high demand for practical 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.

An important source of income which helps to fund the WTT's work is our Annual Spring Auction. The auction is our biggest fundraising event and includes fishing days, tackle, books, art and more. Many of our AV and PV recipients subsequently help us with auction lots each year, and we're very grateful for this extra support. To donate a lot, please contact WTT via Christina Bryant @ office@wildtrout.org

5. Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency for their continued support of the Advisory and Practical Visit programme in England, through a partnership funded using rod licence income.

6. 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 may be required before commencing work on site. These are not limited to landowner permissions but may also involve regulatory authorities such as the EA, lead local flood authority and any other relevant bodies (e.g. Natural England and Forestry Commission) 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 river.

7. Appendix A : Trout life cycle

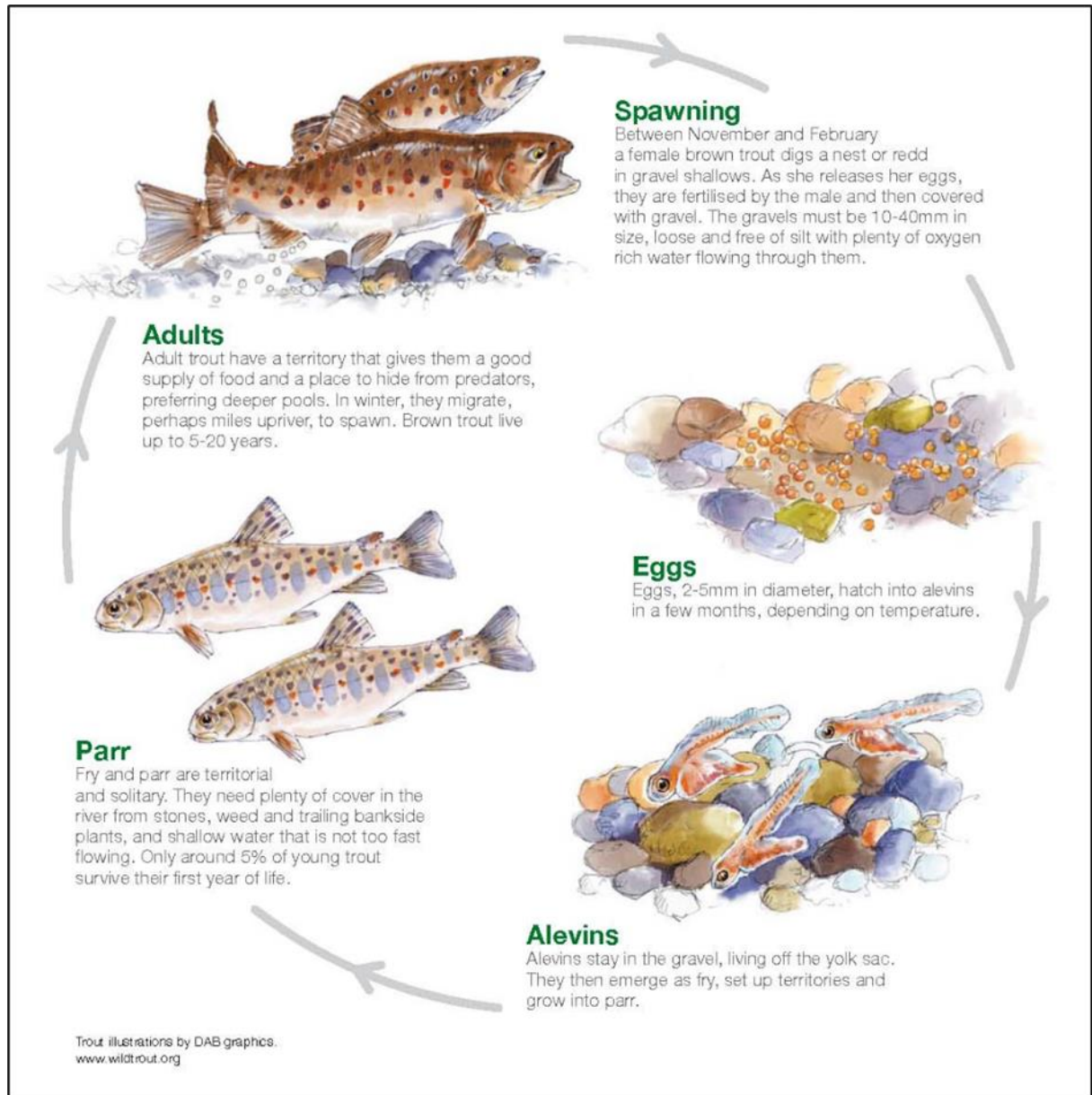


Figure 21: A diagram showing the life cycle of the UK's native wild brown trout, *Salmo trutta*

8. Appendix B : Trout habitat

Due to their need for clean, well-oxygenated water, structurally-varied habitat, and free movement between different types of habitat at different life stages, the UK's native wild brown trout makes an ideal indicator species for healthy rivers. These characteristics mean that a simple and effective assessment for overall river health can be based around the life cycle requirements of brown trout.

As a result, identifying and noting the presence or absence of habitat features that allow trout to complete their full life cycle is a very practical way to assess overall habitat quality. By identifying the gaps (i.e. where crucial habitat is lacking), it is often possible to design actions to solve those habitat bottlenecks.

To put all this into context, there are three main habitat types required for wild trout to complete each of their three key life cycle stages. This creates a demand for varied habitat, which is vital for supporting a wide diversity of other species too.

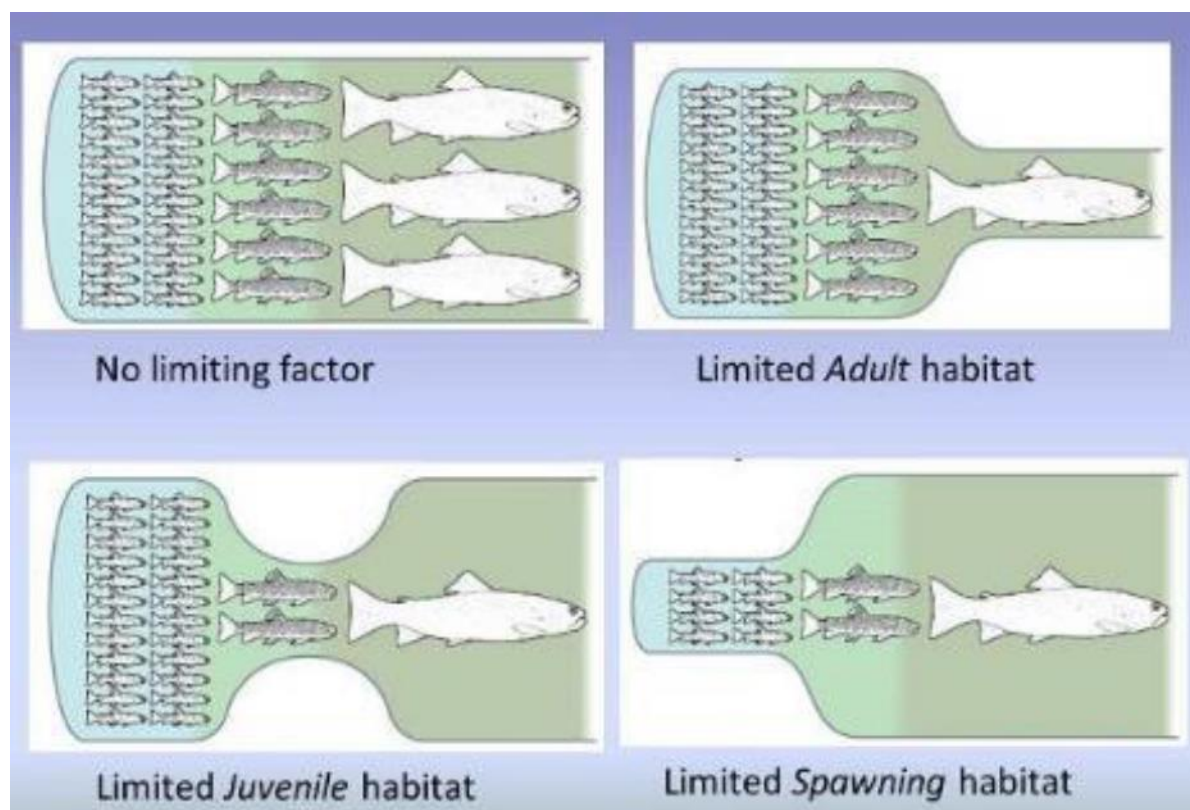


Figure 22: The impacts on trout populations lacking adequate habitat for key life cycle stages. Spawning trout require loose gravel with a good flow-through of oxygenated water. Juvenile trout need shallow water with plenty of diverse structure for protection against predators and wash-out during spates. Adult trout need deeper pools (usually > 30cm depth) with nearby structural cover such as undercut boulders, sunken trees/tree limbs and/or low overhanging cover (ideally trailing on, or at least within 30cm of, the water's surface). Excellent quality in one or two out of the three crucial habitats may not mitigate a 'weak link' in the remaining critical habitat.

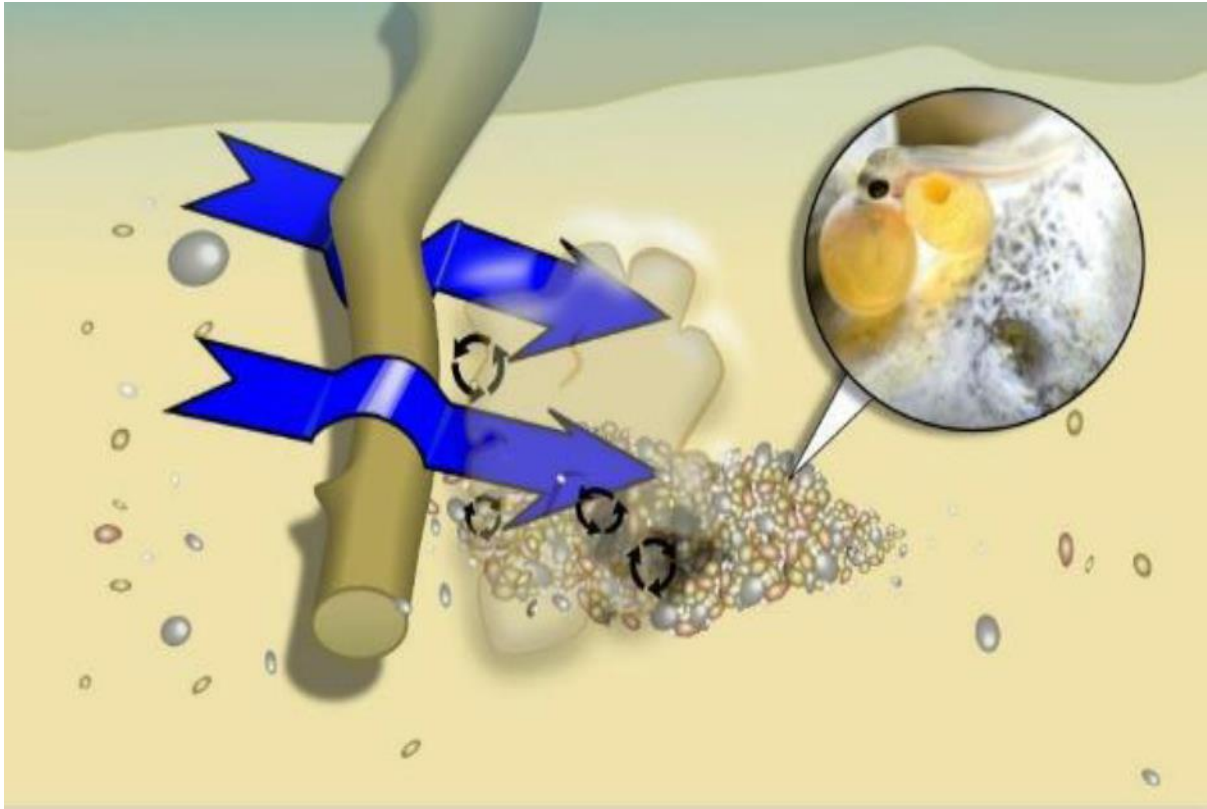


Figure 23: Successful trout spawning habitat requires relatively silt-free gravels. Here, the action of a fallen tree limb is focusing the flows (both under and over the limb as indicated by the blue arrows) on a small area of riverbed that results in silt being washed out from between gravel grains. A small mound of gravel is deposited just below the hollow scoured out by focused flows: this mound will be selected by trout to dig a 'redd' for spawning. In the silt-free gaps between the grains of gravel it is possible for sufficient oxygen-rich water to flow over the developing eggs and newly-hatched 'alevins' to keep them alive as they hide within the gravel mound (inset) until emerging in spring.

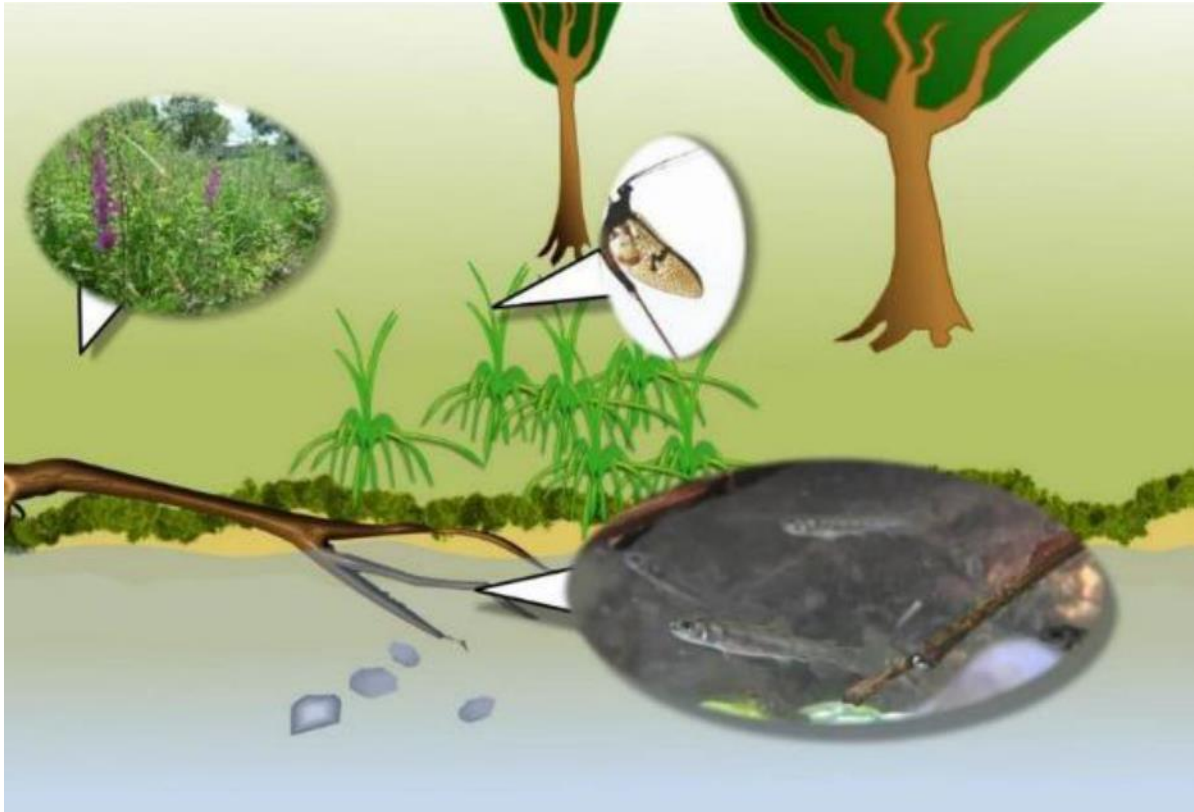


Figure 24: Larger cobbles and submerged 'brashy' cover and/or exposed fronds of tree roots provide vital cover from predation and spate flows for tiny juvenile fish in shallower water (<30cm deep). Trailing, overhanging vegetation also provides a similar function, and has many benefits for invertebrate populations (some of which will provide a ready food supply for the juvenile fish).



Figure 25: The availability of deeper water bolt holes (>30cm), low overhanging cover and/or larger submerged structures such as boulders, fallen trees, large root-wads etc. close to a good food supply (e.g. below a riffle in this case) are all strong components of adult trout habitat requirements.

9. Appendix C : Deep-rooted plants

In addition to small willows and emergent plants such as yellow flag iris and canary reed grass, which can help to stabilise eroding river banks at water level, many of the deep-rooted native UK plants shown in the diagram below may be considered for supplementary planting in dryer bankside areas as a means of counteracting excessive erosion.

From Shoots to Roots: revealing the above and below ground structure of meadow plants

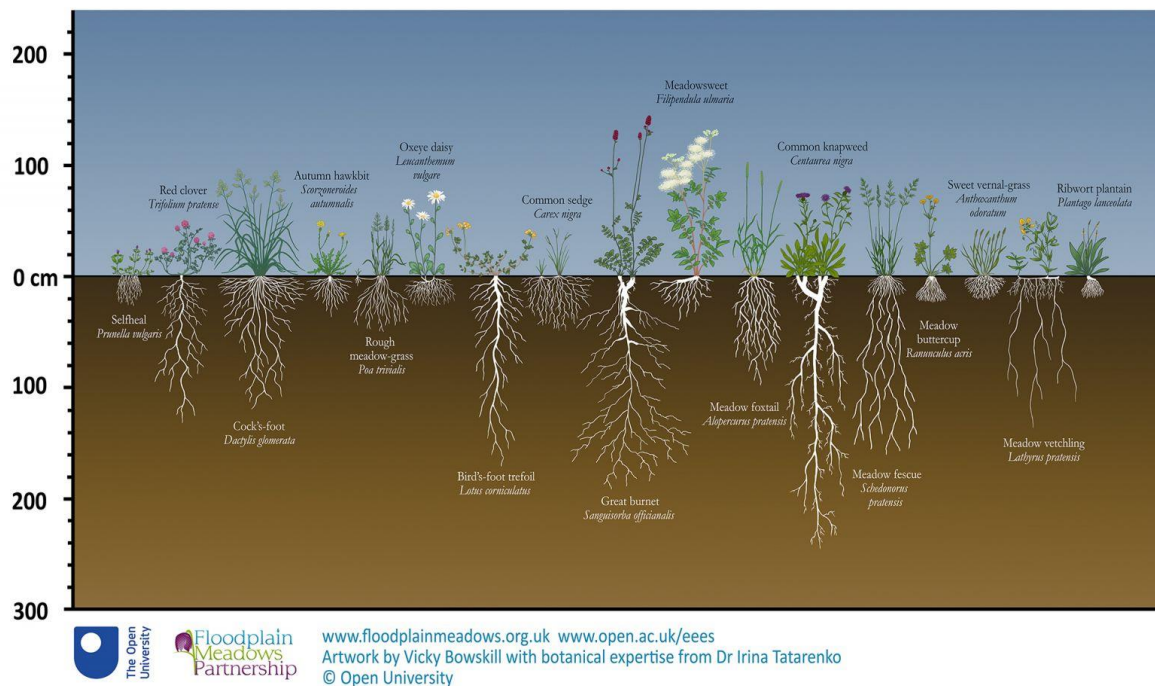


Figure 26: A diagram showing the root structures of native UK plants