



Pillhill Brook – Little Ann



Advisory Visit October 2018

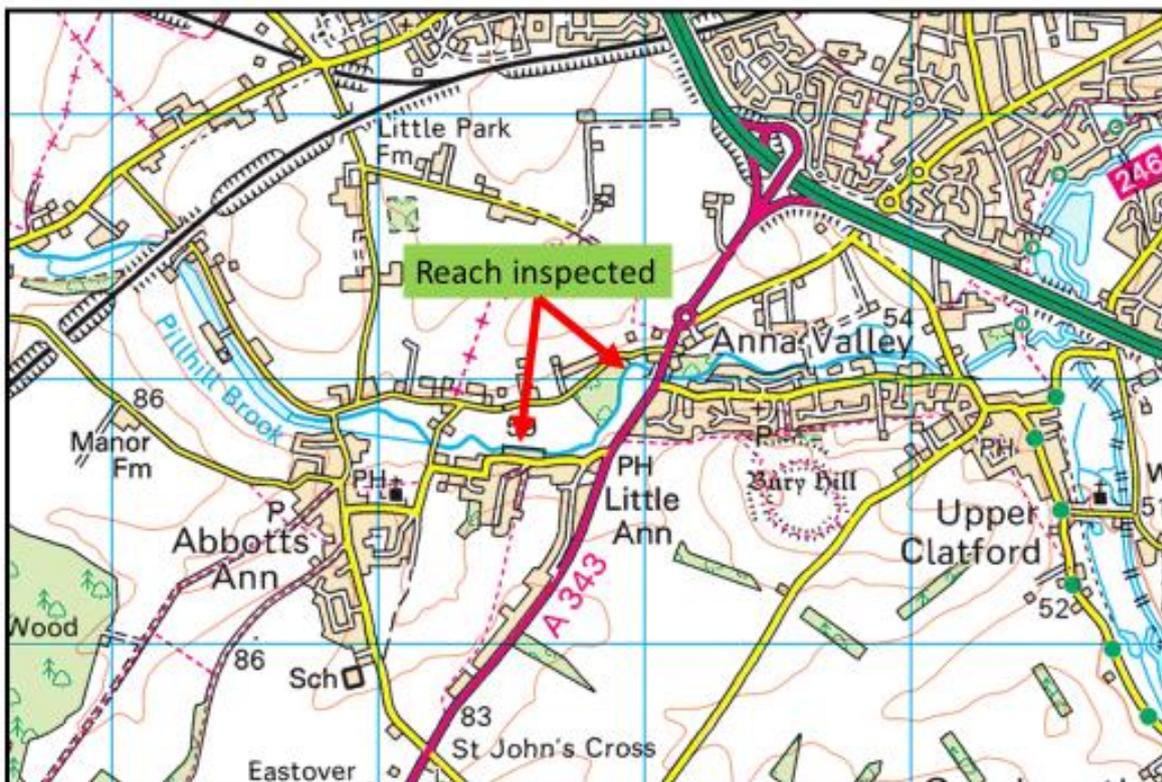
Key Findings

- **The Pillhill Brook here supports high quality habitat for juvenile trout but holding habitat for adult fish is limited, especially during periods of prolonged low flow.**
- **Tree work is required at the bottom end and in the reach above the access bridge.**
- **More woody material pegged into the channel would be beneficial, especially to promote bed scour and provide additional winter cover.**
- **The hatch pool does provide holding and resting habitat for pre- and post-spawning adult brood fish in the middle of the beat. The hatch gate should not be re-installed.**

1.0 Introduction

This report is the output of a site visit to a 600m stretch of the Pillhill Brook in Little Ann, Hampshire. The request for the visit came from Mr. Bernard Griffiths, the landowner. Mr. Griffiths is concerned that the density of wild brown trout, *Salmo trutta*, in his river appears to be in decline. Increased predation pressures are thought to be one factor; however, Mr. Griffiths is keen to explore options for restoring favourable habitat for his trout population in an attempt to increase its resilience to increasing mammal and avian predation pressures. Improved habitat quality will also help to buffer the adverse effects of extreme weather patterns.

Comments in this report are based on observations made during the site visit and discussions on the day with Mr. Griffiths. Normal convention is applied with respect to bank identification, i.e. left bank (LB) or right bank (RB) whilst looking downstream. Upstream and downstream references are often abbreviated to u/s and d/s, respectively, for convenience. The Ordnance Survey National Grid Reference system is used for identifying specific locations.



Map1. Pillhill Brook. © streetmap

River	Pillhill Brook (Anton tributary)
Waterbody Name	Pillhill Brook
Waterbody ID	GB 1070422022790
Management Catchment	Test & Itchen
River Basin District	South East
Current Ecological Quality	Good Status
U/S Grid Ref inspected	SU33910444037
D/S Grid Ref inspected	SU3355243729
Length of river inspected	0.6km

Table 1. Overview of the waterbody. Information sourced from

<http://environment.data.gov.uk/catchment-planning/WaterBody/GB107042022790>

2.0 Catchment Overview

The Pillhill Brook (Waterbody ID 107042022790) has been assessed by the Environment Agency as being in 'good status' under the Water Framework Directive (WFD). Early WFD assessments suggested the stream was only meeting "moderate" quality but was revaluated in 2016 and now apparently meets "good" status. The author does not know the reasons for the improved status.

The Pillhill Brook is the principle tributary of the River Anton, which in turn is a major headwater tributary of the River Test. The Brook rises upstream of Fyfield, flowing in a roughly south easterly direction before entering the River Anton to the south of Andover.

Total length of the Brook is approximately 9km. As with most of the wider River Test catchment, the Pillhill Brook rises from and drains a catchment consisting of various forms of chalk bedrock. This provides relatively stable flows which are generally gin-clear when not affected by surface run-off. From the source, the stream supports flourishing chalk stream plant and invertebrate communities, which are, in turn, home to good populations of fish, principally brown trout and

grayling *Thymallus thymallus*, as well as mammals and birds. Unlike the River Test, neither the Pillhill Brook, nor the River Anton are designated as Sites of Special Scientific Interest (SSSI). The brown trout is a UK Priority Biodiversity Action Plan (BAP) Species and local initiatives designed to improve the ecology of the river should include actions that specifically target improvements for salmonid fish species.

The catchment for the Brook is relatively small, draining the land between Grateley to the southeast, Weyhill to the north, a small part of Andover to the northwest and upper Clatford to the west.

3.0 Fishery Overview

This stretch of the Pillhill Brook has been managed sensitively for many years as a wild fishery. The river is occasionally fished by the owner and his friends but has never been run as a commercial chalkstream beat and retains a truly wild feel, despite its relative proximity to the southern urban fringes of Andover.

Good catches of wild brown trout and grayling are occasionally recorded by Mr. Griffiths and the few rods who occasionally fish the river. In recent years, the river has had very little management work or angling pressure.

Mr. Griffiths has received support from a friend who has written a management plan for the fishery, which sets out a programme of work to manage the extensive riparian tree cover lining the river bank, particularly along the lower half of the stretch.

4.0 Habitat Assessment.

The lower section of the river is heavily shaded mainly by willow trees (photo 1). There is a plantation of mature poplar trees in the meadow adjacent to the LB, which casts additional shade from mid-afternoon onwards, but the bulk of the shading comes from trees in the immediate riparian zone. Mr. Griffiths is in the process of thinning the plantation using a local contractor.

The extensive shade cast by the willow at the bottom end of the fishery has restricted both in-channel submerged weed beds and also marginal emergent plants. As a direct result, the channel width through this section is comparatively wide (photo 2) for the given average flow discharge, resulting in considerable deposition of soft sediments in marginal zones.

At the time of the inspection in late September, following a long dry summer, the flows were low and the bulk of the river comparatively shallow. Several small trout were observed in this section, utilising mainly fallen woody material (photo 3) as cover; however, holding opportunities for large adult trout were at a premium due to the very shallow nature of the reach.

In one location there is a small impounding structure (photo 4). It wasn't entirely clear as to whether the impoundment had been constructed from stones, or has been naturally formed by fallen woody material, which has

completely blocked the channel. Water usually manages to scour beneath naturally fallen woody material, often providing valuable adult trout holding lies. In situations where the river becomes completely blocked and a full channel-width impoundment is formed, bed sediments will deposit in the reach immediately above the structure, sometimes leading to a substantial difference in river bed height below and above the dam. In these circumstances, it is advisable to either move or cut the trunk to create a gap for water to pass through at bed level. This will allow sediment transport to be maintained and avoid excessive deposition in the reach above the debris dam.

In a few other areas, there are the beginnings of what could potentially become further debris dams (photo 5). In such circumstances, it is better to intervene at an early stage, utilising the fallen trunks and branches to create cover and promote bed scour and sediment sorting, rather than wait until a blockage completely occludes the river.

Overall, the river is uniformly shallow and therefore limiting for adult trout, although there was plenty of cover, especially for trout fry and parr. It is likely that the lack of depth will result in adult trout being displaced from the reach during long periods of low flow. Larger adult fish will undoubtedly migrate back into the reach when conditions for safe holding are more favourable.

Impounding the channel in an attempt to create depth rarely works because optimum holding lies for adult trout require a combination of depth, cover and proximity to energetic flows, where food items can be easily intercepted by fish that feel secure from predation pressures. To create these ideal lies requires the bed level to be driven down (scour pools), rather than the water levels to be held up (impoundments). Further information on how to create improved holding opportunities for adult trout is discussed in the recommendations section of this report.

An overhead river pipeline was noted (photo 6). These overhead pipelines always ring slight alarm bells in such locations and could potentially pose a hazard for the fishery, depending on what they carry. If these pipes are used for pumping raw sewage, the local water company should be reminded to inspect them regularly, as well as local trees that could fall and perhaps result in a pipeline failure, potentially resulting in a serious pollution incident. Having some reassurance that these pipes are regularly monitored and maintained should provide some peace of mind.



Photo 1. Typical section of lower channel, shallow and wide with a heavily silt laden bed below a thick canopy of riparian trees.



Photo 2. This shaded reach has restricted the success of aquatic plants and enabled an exceptionally wide channel to form, resulting in low flow velocities and fine sediment deposition.



Photo 3. Fallen trees can provide valuable “low-level” cover for trout and when in contact with the water also promote bed scour.



Photo 4. A full channel-width impoundment has formed from what appears to be a fallen trunk. This should be “notched” to bed level to reduce deposition pressure upstream and promote bed scour below.



Photo 5. A fallen tree facing upstream is likely to trap lots of debris, especially when it completely falls, leading to what could be a serious debris dam. Lowering selected trunks into the water, securing and snedding off excess limbs can result in the creation of valuable habitat, as well as reducing the risks of blockage.



Photo 6. Pipelines that carry waste water need to be regularly inspected and vulnerable trees that might cause failure regularly managed.

A short distance upstream, in the central section of the beat, the tree canopy opens up on the true RB (photo 7), which has enabled sufficient light penetration to promote a well-established fringe of emergent aquatic plants. The combination of a slightly squeezed channel width has enabled fine sediments to be swept from the underlying gravel bed and in turn provided an ideal environment for valuable submerged plants such as water crowfoot *Ranunculus* sp. (photo 8) and starwort *Callitriche* sp. This section, right up to the hatch pool, supports classic small chalkstream habitats of soft, luxuriant margins and bright, energetic flows over a mainly clean gravel river bed. Again, the odd small trout was seen here, this time utilizing the submerged weed beds as cover.

It was noticeable in this reach that the reduced channel width, sometimes coupled with a piece of fallen woody material, was helping to sort bed sediments (photo 9) and thus create a variety of habitat favoured by a range of invertebrate species. The weed itself is favoured by certain olive species, particularly the blue winged olive *Serratella ignita* and the larvae of black gnats *Simulium* sp. The layer of woody detritus will be favoured by shredding invertebrates such as shrimp *Gammarus* sp., whilst the inside line of finest settled material will be favoured by burrowing mayfly nymphs. A cursory inspection of a few large stones in the main body of flow also identified good numbers of caddis larvae (photo 10).

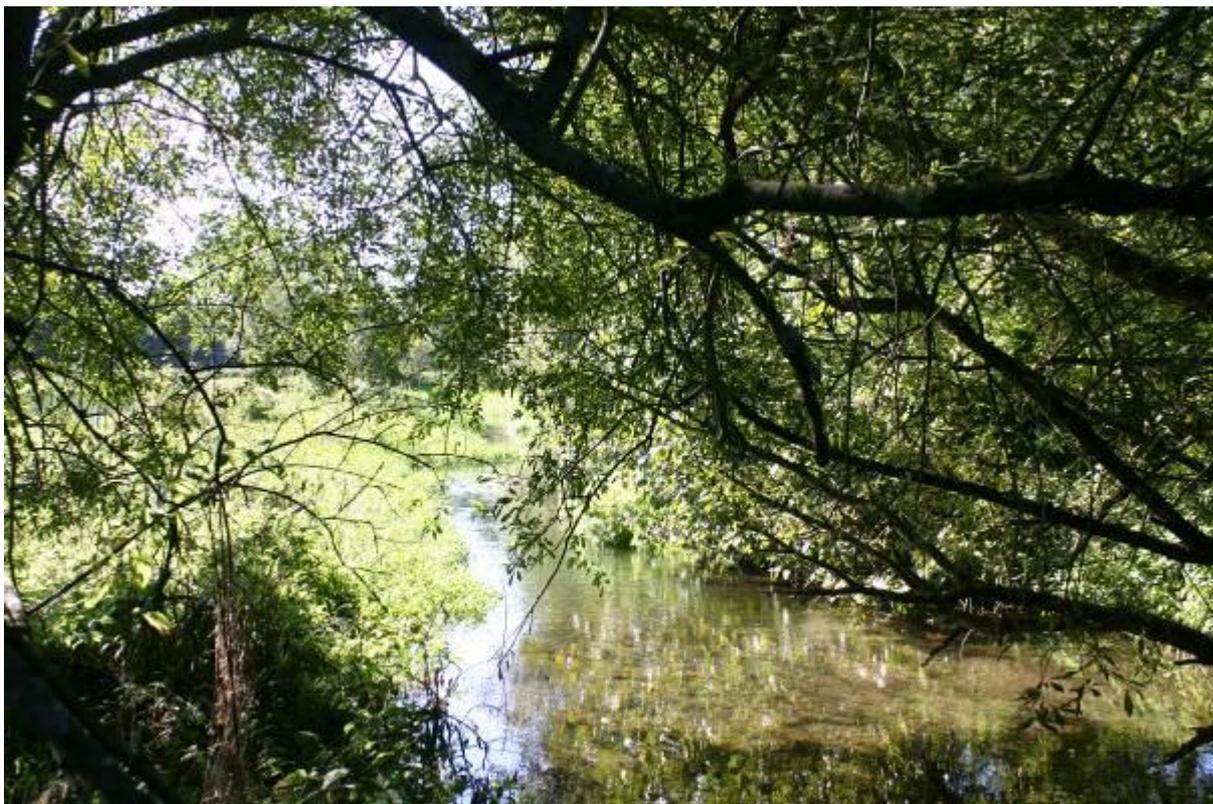


Photo 7. The shaded canopy gives way to an open meadow reach where the river width has been naturally narrowed by the encroachment of emergent plants.



Photo 8. Classic chalkstream habitat: soft luxuriant fringe and thick beds of water crowfoot funnelling clear water over bright strips of gravels.

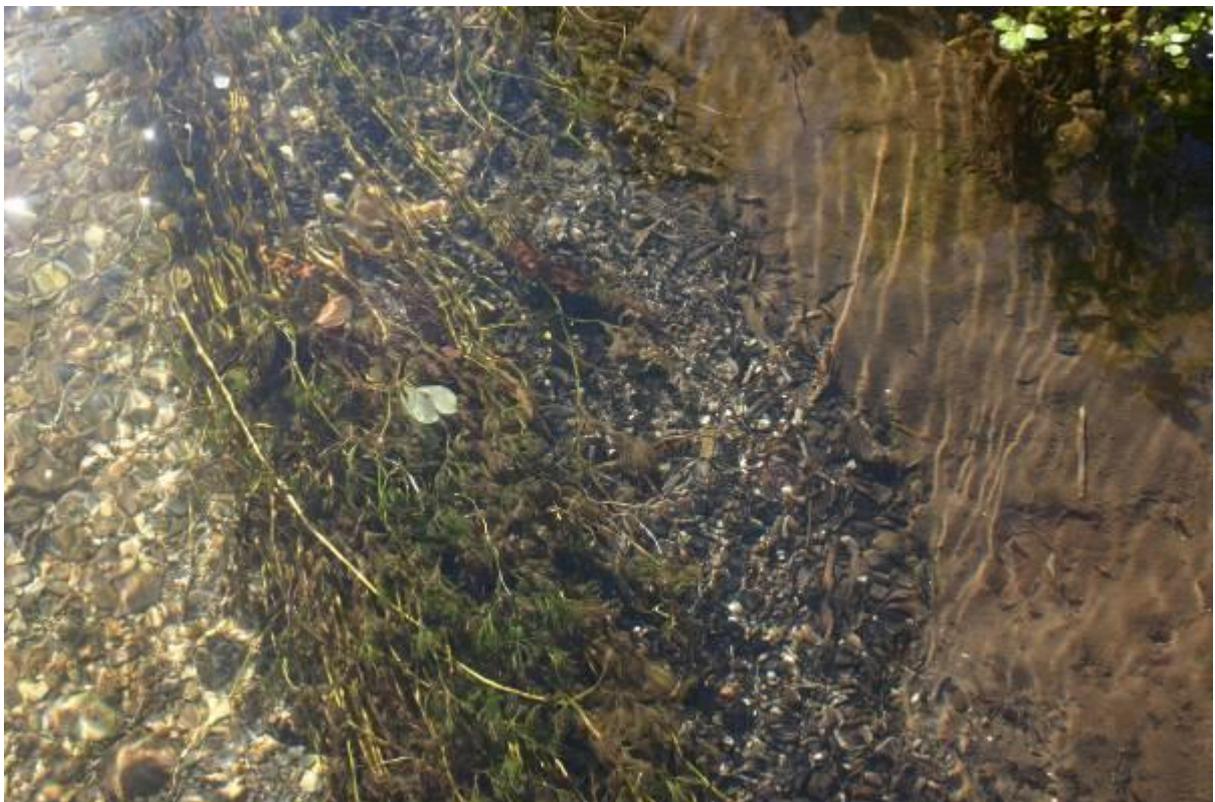


Photo 9. A few square foot of river bed supporting four distinct habitats which are all maintained by a gradient in flow velocities.

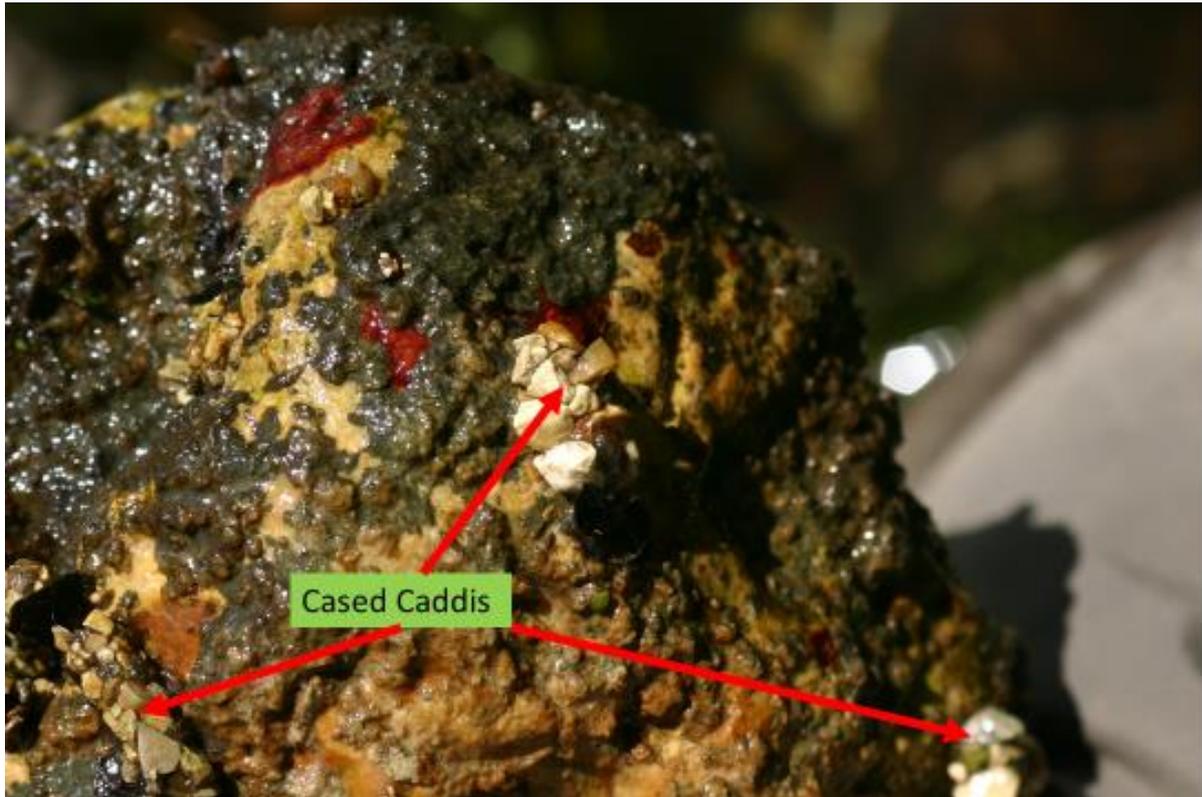


Photo 10. Large stones supporting lots of potential trout food.

There were some good examples of high-quality habitats being maintained by the odd piece of woody material (photo 11). In this example, a modest sized tree branch has squeezed the channel width and promoted a sinuous flow pattern in what would otherwise be a straight, uniform section of river. In doing so, it has enabled the marginal fringe of emergent plants to safely encroach, as well as promote elevated flow velocities through the narrowed section, sweeping away fine sediments and providing an ideal environment where water crowfoot can flourish and small trout can feel comfortable with suitable cover.

The only deeper "pool" habitat was found immediately downstream of the old water meadow hatch (photo 12). The structure would have originally been used for drowning the adjacent ridge and furrow water meadow but is now derelict. The fact that the hatch gate is no longer in place is good for the ecology of the river, especially for the reach above. The flume of pacey water squeezing through the supporting walls of the structure have created a very attractive pool, which is bound to be good for both large adult trout and grayling. The low-level overhanging cover in each margin immediately below the hatch makes this an even more valuable holding pool.

The structure itself is a very important piece of agricultural heritage and the narrow flume creates wonderful downstream adult trout habitat, but it is recommended that any moves to reinstate a working hatch gate are resisted.



Photo 11. Woody material encroaching from the RB promoting a valuable sinuous flow pattern.



Photo 12. The old water meadow hatch has promoted years of bed scour to form a high quality pool below. Replacing the gate would not be in the best interests of in-river habitat quality.

Where there was good light penetration to the river, there are examples of ideal summer habitat for trout fry and parr, with plenty of available marginal cover from trailing marginal beds of reed sweet grass (*Glyceria maxima*) and reed canary grass (*Phalaris* sp., photo 13). Following early winter frosts, the amount of available cover will be reduced in sections like this. The introduction of woody brushings into the margins to provide additional cover through the winter will help to offset reduced natural cover.

In some of the more heavily shaded sections towards the lower half of the beat, it was again evident how flat and uniform much of the river bed is (photo 14). Shaded sections are considered to be valuable, even in chalk streams where light usually promotes intense weed growth but without a fringe of vegetation to squeeze the channel width, the river loses energy and the ability to scour fine sediment. It is suggested that some of these more heavily shaded reaches would benefit from having more woody material in the channel to promote locally elevated flow velocities and therefore improved bed scour and cover.

At the very bottom of the beat, the owner reverts to single RB ownership. The true LB has several houses that back onto the river and as so often happens, the owners have resorted to defend their properties with wholly inappropriate bank defences, in this case vertical block walling (photo 15). River margins are usually the most biologically rich zone of the river. When banks are vertically revetted, these areas are often sterile in comparison to soft, natural margins, as well as being an eye sore. It is possible to mitigate against the impacts of the wall by creating a new low-level bank toe immediately in front of the existing wall and planting it up with suitable emergent plants. This might be a candidate project that could be tackled under the new Watercress and Winterbournes project, hosted by the Hampshire and Isle of Wight Wildlife Trust.



Photo 13. A shallow run with well covered margins provides habitat for small fish but may prove to be too exposed during the winter months.



Photo 14. Another heavily shaded reach of a wide shallow glide. Pieces of woody material pegged in the river bed here could promote scour and provide additional cover.



Photo 15. The walled margins on the RB at the top of the beat are inappropriate for a chalk stream margin. A new toe to the bank could be installed to support a soft, green margin and help provide long-term protection for the footings of the wall.

5.0 Conclusions

This delightful section of Hampshire chalk stream supports a range of high-quality habitat conducive for a wide range of species, including brown trout. The current low-key maintenance regime has in many ways helped to create a varied habitat, with wide, shallow, shaded reaches giving way to more classic sections of open meadow, where margins are pinched by luxuriant fringes of chalk stream herbs and aquatic emergent plants.

The reach undoubtedly provides good quality spawning and nursery opportunities for brown trout. However, during low flow periods, the lack of well-covered deeper water will limit the river's ability to hold good numbers of larger adult fish. An important principle when trying to create additional water depth for holding adult trout in chalkstreams is to avoid holding up water levels, via any impounding structures, but rather to try and create additional water depth by promoting local bed scour i.e. driving the bed *down*. Additional depth alone is not enough, as any potential adult trout lie must also have proximity to adjacent flows, bringing with it ample opportunities for intercepting food items. A good "lie" also requires there to be a nearby bolt hole, preferably with overhead cover.

Improved holding and feeding lies for adult trout could easily be created by carrying out some sensitive tree work and using trunks, or large branches to act as flow deflectors. These can be either configured to promote meandering flow patterns or positioned to locally elevate flow velocities and maintain scour holes. As the Pillhill Brook is a groundwater-fed headwater stream, it rarely generates sufficient flow power to scour significant pool habitat, but if the bed gravels can be loosened, or even redistributed with machine or hand tools, then the flow deflectors can help maintain the additional depth created. It is critically important that these deeper pool habitats are naturalistic and not too deep. Mimicking the type of scour that might be expected following an exceptionally wet winter is acceptable (no deeper than perhaps 0.75m) but digging 2m deep pools in a chalkstream headwater is inappropriate and undesirable.

In the heavily shaded reaches, punching the odd hole in the tree canopy to create a dappled light & shade regime is recommended. Using some of the woody material to create cover logs and a loose matrix of brushings in the margins will also provide additional cover in shaded sections, where weed growth is compromised and cover limited.

The area of hard, vertical block wall adjacent to the properties at the top end of the beat provides very little habitat for plants, invertebrates, fish or mammals. Provided the landowners were in favour, it would be possible to build a new narrow toe to the bank to support a soft green fringe that would add biological value to the reach as a whole. This might be an appropriate project as part of the "Watercress and Winterbournes" initiative.

The hatch pool is a lovely feature but replacing, or restoring the hatch gate is not desirable, at least not in terms of in-channel habitat quality.

6.0 Recommendations

- Take a relaxed approach to fallen woody material. Only move it and re-secure it when it is essential to avoid bank erosion in sections which might already be too wide. The WTT can help with a training day via a WTT Practical Visit (PV).
- Consider some tree works, particularly at the bottom end of the beat and use the materials won to create improved holding lies for adult trout by promoting bed scour and providing additional cover.
- Coppice out clumps of trees on the reach above the access bridge that are heavily shading shallow glide habitats to win more sunlight and promote improved weed growth.
- Do not replace the hatch gate. If there is an over-riding objective to make the riparian meadows wetter, then it is better to achieve this via some longitudinal bed raising (importing gravels), coupled with locally lowering the bank height.

- Make sure the water company responsible for the pipe crossing makes regular safety inspections.
- Approach the Hampshire and Isle of Wight Wildlife Trust to see if they would be interested in driving through improvements to the walled margins at the top of the beat via their Watercress and Winterbournes initiative.
- Monitor fishery performance via one or two trusted rods providing you with an annual catch return. Keep fishing visits low key and relatively infrequent to maintain a high-quality wild fishery and insist on catch and return of all wild fish captured.
- Note that before undertaking works, Environmental Permits may be required from the Environment Agency.

7.0 Making it Happen

We have 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 www.wildtrout.org/product/rivers-working-wild-trout-dvd-0 or by calling the WTT office on 02392 570985.

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

7. Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency for their continued support of the advisory visit service which is supported by funding from rod licence sales.

8. Disclaimer

This report is produced for guidance; no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon guidance made in this report.