Hunt’s Stream (Wylye Carrier)

Advisory Visit October 2018

Key Findings

- **The lack of a naturalistic flow regime is primarily responsible for excessive sediment deposition and encroachment within the Hunt Stream**
- **A flushing winter flow could be secured via the construction of a new off take structure that provides a higher proportion of available flow when levels in the main channel are up. When reviewing flow splits, protecting high quality habitat in the main river will be of paramount importance.**
- **The ford and the downstream hatch structure are exacerbating the deposition of fine sediment.**
- **It is likely that live willow has been used for bank revetment and now needs increased levels of maintenance.**

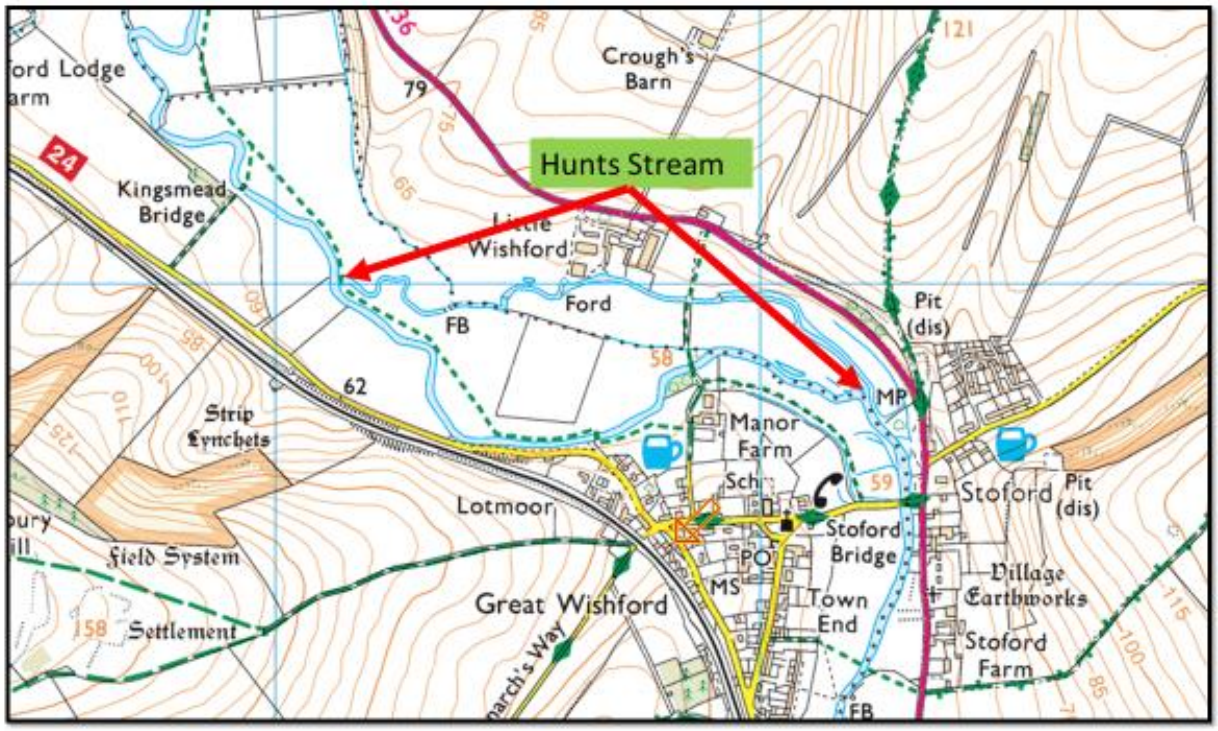
1. Introduction

This report is the output of a site visit to the Hunt's Stream, a major carrier of the River Wylye near Great Wishford in Wiltshire. The request for the visit came from the fishery owners, the Wilton Fly fishing Club (WFFC)

The club have owned and managed several miles of double bank fishing on the Wylye above Wilton for well over a 100 years. In recent years the WFFC has moved towards a completely wild fishery and now no longer augments the native stocks with introduced hatchery derived stock. The ethos of the WFFC is very much geared towards the production of a high quality chalkstream fishery and therefore the club is reliant on the river being able to support a healthy, self-sustaining population of wild brown trout *Salmo trutta* and grayling *Thymallus thymallus.*

The Hunt's Stream is a water meadow carrier (loop) of approximately 1km in length and has historically been a very important angling beat for the WFFC. In recent years a reduction in the amount of active management of the riparian zone has led to concerns that perhaps the stream might require radical works to reinstate a valuable angling resource.

Comments in this report are based on observations made during the site visit and discussions on the day with the President, Secretary and Keeper of the WFFC. 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.



Map 1 Hunts Stream ©streetmap.

2. Catchment Overview

River	Wylye
Waterbody Name	Lower Wylye
Waterbody ID	GB 10804302210
Management Catchment	Avon
River Basin District	South West
Current Ecological Quality	Good Status
U/S Grid Ref inspected	SU 0712836008
D/S Grid Ref inspected	SU0821135770
Length of river inspected	1.0km

Table 1. Overview of the waterbody. Information sourced from

http://environment.data.gov.uk/catchment-planning/WaterBody/GB108043022510

The Wylye is a tributary of the Hampshire Avon and is designated as a SSSI and SAC as part of the Avon system. It rises on the southern outskirts of the village of Maiden Bradley and flows north through the Deverill valley to Warminster. The river arches east across the southern boundary of the town and flows south west through the Wylye valley between the A36 and the Wessex Main [railway] Line towards Salisbury. The Wylye joins the Nadder at Wilton, subsequently flowing into the Hampshire Avon at Salisbury.

The Wylye rises from aquifers in chalk and greensand and the bed is characterised by sand and flint gravel. The waters are often not quite as gin-clear as some other English chalk streams and are sometimes coloured by surface run-off. Long reaches of the Wylye have been modified and diverted over the years and it no longer follows its natural course through some parts of its valley. There are several pumped groundwater abstraction sites within the Wylye catchment and abstraction is a major concern for fishery and wildlife interests.

Along with classic chalk stream plant communities of water crowfoot *(Ranunculus spp.)* and starwort *(Callitriche spp.)*, the Wylye is noted for its wild brown trout *(Salmo trutta)* and grayling *(Thymallus thymallus)* populations, as well as abundant hatches of river flies. Much of the river is managed as a wild trout fishery although some reaches are stocked with triploid brown trout.

The Lower Wylye is currently meeting its targets for achieving good ecological status as set out in the Water Framework Directive (WFD), however, the Upper and Middle Wylye are presently failing targets for fish, phosphates and overall biological quality. In order to meet WFD targets for the whole system, a number of actions have been proposed by the Environment Agency as part of the *Strategic Restoration of the River Avon* (SRRA). These actions range from full-scale restoration works to simply assisting natural recovery.

3. Fishery Overview

The WFFC has a long history of active stewardship and has put conservation of the chalkstream environment at the very heart of their management policies. The club has been actively monitoring fly life as part of the Riverfly Partnership initiative for many years and has maintained a progressive approach to managing their fisheries, based on the hard work of their River Keepers and Officials, coupled with the very latest scientific thinking.

The Club was one of the first Wessex clubs to challenge some of the more traditional chalkstream stocking practises in favour of supporting local Wylye wild trout. A move away from stocking large, "takeable" farm reared fish, to augmenting the stock with fry, reared via egg incubator boxes stocked with imported eyed eggs has subsequently evolved into a policy that recognises the importance of protecting and improving local habitat to enable wild "Wylye" broodfish to naturally produce all of the stock required to underpin the fishery.

Since abandoning their stocking programme in favour of developing improved habitat for wild stocks, the club has enjoyed the fruits of their labour. From discussions on the bank, there appears to be no concerns about any lack of wild trout recruitment, with strong numbers of fry, parr and young adults now found throughout the fishery. The carriers have, however, traditionally supported large individual specimens that have provided a supreme challenge to those who seek quality over numbers. As the club has moved over the years to a position where the environment for the fish has perhaps become more important than the environment for the angler, the club are keen to take stock and assess if that balance needs to be tweaked, or perhaps even radically changed. This is discussed in more detail in the conclusions section of this report.

4. Habitat Assessment.

Like all chalkstream carriers, the amount of flow entering the Hunt's Stream is dictated by a water level control structure (photo 1) constructed to be contiguous with the LB of the main river. The hatch structure is square sided and has grooves to accommodate drop boards, as opposed to any controllable hatch gate. The structure also has a crude but probably highly effective adjustable weed rack constructed from a timber pole and retractable rebars. At the time of the inspection there did not appear to be any drop boards located in the structure, therefore taking its maximum available flow share from the main river. There is a secondary high level spillway that will take additional flow into the Hunt's Stream when the main river is at bank-full flows. The structure was considered to be passable for fish.

Photo 1. The offtake structure at the head of the Hunt's Stream. Note the adjustable rebar weed rack with all pins fully drawn.

Photo 2. The hatchpool at the head of the stream provides high quality lies for adult trout.

The top end of the Hunt's Stream has an uncharacteristic meandering planform. This suggests that it was at one time the original course of the Wylye, or perhaps it was a natural braid from the main river. It is very unlikely that the stream would have developed a meandering planform as a wholly artificial carrier, as the control structure regulates the amount of flow, and therefore the amount of energy the stream can convey. Carriers are usually comparatively straight in nature and would never be constructed to have naturalistic meanders.

This meandering planform is typically also associated with a gentle bed gradient and this is also evident in this location, with the upper reach being mainly deep and slow flowing and lined with emergent reeds (photo 3 and 4), including Norfolk reed *Phragmites australis*, branched burr reed *Sparganium erectum*, reed-sweet grass *Glyceria maxima* and reed canary grass *Phalaris arundinacea*. This luxuriant marginal vegetation provides wonderful bank protection and diverse habitat but also poses some difficulty in terms of accessing the fishery. However, it is important to maintain a comparatively narrow channel width here to ensure that mid-channel water velocities are maintained.

Occasional goat willows *salix caprea* punctuate the more open sections to provide the odd section of channel shading, which helps in part to restrict the dominance of the emergent plants and in some cases also provides good quality low-level cover for fish.

A short distance downstream there is also a bed of bulrush, or great reedmace (photo 5) *Typha latifolia.* This plant is typically found lining the margins of lakes and ponds and is not normally associated with the margins of flowing chalkstreams. The encroachment of this plant into the channel is usually naturally controlled by flow velocity but in a low flow year, this plant, along with the Norfolk reed has the capacity to encroach into quite deep water. All of these species of emergent reed and rush are valuable marginal plants but care should be taken to ensure that they do not become established in central channel locations. Emergent plants can be relatively easily grubbed out with hand tools if absolutely necessary but again it is important that a squeezed channel cross section is maintained to keep soft sediments rolling through the reach.

Beds of emergent plants that become established in the natural deposition zones, usually on the inside and downstream of sweeping bends, can be encouraged to create even more sinuous flow patterns. This diversity of flow pattern will create distinct opportunities for different plant and invertebrate communities and help support the food webs that are essential for a healthy wild fishery.

Photo 3. The meandering upper section provides good holding habitats for adult trout

Photo 4. The odd goat willow punctuates the reach and provides some modest shading.

Photo 5. A thick bed of great reed mace lines the inside of a sweeping bend, helping to trap sediment and providing high quality habitat for invertebrates and birds such as various warbler species. Established beds of emergent plants on the inside of meander bends help to accentuate channel sinuosity and will encourage bed scour and faster water velocities on the outside of bends.

Habitat quality through some of the middle reaches of the Hunt's Stream is compromised via a combination of impacting factors. The ford crossing (photo 6) may have been located at a naturally shallow point at some stage in the past but it is more likely that it has been constructed from imported material, artificially raising the bed and resulting in increased upstream fine sediment deposition. The invert of the downstream hatch structure will be having a similar effect, which will be even more pronounced when drop boards are in position.

Several sections of river upstream of both the ford and the hatch clearly demonstrate that these areas are collecting zones for fine sediments that rarely get flushed through. In turn, this has created an ideal environment for encroaching emergent vegetation (photo 7). Difficulties in maintaining the fishery have also arisen due to the encroachment of what looks like either hybrid willow, or possibly native white or crack willow formed into LB revetment, either via willow spilling or live willow faggot work (photo 8). Areas where so much live willow has been planted will require periodic maintenance work to avoid excessive channel shading and encroachment.

Short linear clumps of low-level tree shading via native goat willows are considered to be extremely valuable but long sections of linear willow scrub, which currently dominate some sections require maintenance. Ideally the reach should support a mosaic of tall landscape trees that help restrict too much scrub, interspersed with the odd low-level willow that casts marginal shade and

provides cover for fish. A 50:50 dappled light versus shade regime that also allows sufficient light for in-channel plants is the ideal scenario to aim for.

In some areas the combination of the flat bed gradient, compounded by the raised bed levels at the ford and the hatch invert have left flow velocities so low that rafts of duck weed (*Lemna sp*) were forming (photo 9) behind any debris that was partially blocking the channel. It should be recognised that at the time of the river inspection the flows entering the Hunts Stream were extremely low, however, rafts of surface duck weed is a clear indicator that habitat quality for flow-loving species like brown trout and grayling is likely to be very poor.

Photo 6. The Ford is likely to be made up from imported material and will be contributing towards fine sediment deposition in the reach above.

Photo 7. The combination of lots of settled sediments, ideal for emergent plants and the encroachment from the left bank of willow has resulted in lost "open" channel. It is possible to peel back the raft of fool's cress and water parsnip back onto itself with a chrome/turn-down rake to maintain a narrow open channel. The willow also needs to be pegged back in places.

Photo 8. Excessive willow encroachment is possibly the result of past revetment work using live willow

Photo 9. The formation of rafts of duck weed indicate stagnant water

Further down the reach, the combination of just the right amount of maintenance work has resulted in some lovely water that will be attractive to both adult wild trout and the angler alike (photo 10 and 11).

The refurbishment of boards for the hatch structure (photo 12) is likely to split opinions in terms of its value in maintaining a high quality environment. It is not clear what purpose the hatch serves, unless it is a replacement for an old water meadow drowning structure. It is possible that the value of this structure has been assessed as part of a Water Level Management Plan associated with the local SSSI. Before making any long term plans for how this structure is managed it would be advisable to consult with Natural England to make sure the structure hasn't been identified as being of critical importance to the future management of the SSSI. In terms of in-channel habitat and the overall health of the carrier as a whole, it would be better if it was completely removed.

Although the head of water dropping over the boards provides a localised improvement downstream by scouring away fine sediment and providing good trout holding via increased depth and flow through the pool (photo 13), the structure will be adversely impacting on a long section of channel above. The structure with boards in place will also arrest any upstream fish migration, potentially corralling fish into this area that might otherwise redistribute into favourable upstream lies. This is likely to be more of an issue in the last month of the season when fish will be looking to move up on spawning migrations. Although the height of the impoundment is modest, the lack of depth immediately below the boards caused by the wide hatch invert will make navigation over this structure very difficult for small and medium sized trout.

Unfortunately the short section of high quality habitat created by the extra flow power is a high price to pay for the negative impact on a substantially longer section of channel above the structure. The lack of fine sediment transport in the carrier as a whole is at the very heart of why there is too much plant encroachment. A lack of anything resembling a natural winter flushing flow, due to the throttle at the off-take structure, in combination with the bed impoundments exacerbate the siltation problem.

Photo 10. Good quality holding water for adult trout.

Photo 11. The slightly squeezed channel width is generating sufficient flow velocity to make this reach a decent holding area for adult trout. Pulling the water through faster by lowering the hatch invert would potentially drive the bed down over time and make it even more attractive for trout to hold.

Photo 12. The refurbished hatch structure with new boards and potentially more waiting to be used. Note the shallow erosion apron making it extremely difficult for fish migration.

Photo 13. The structure is maintaining a high quality trout lie downstream but at what cost to the reach as a whole?

5. Conclusions

The WFFC objectives for the Hunt's Stream is for it to provide a viable and interesting beat, where adult trout and grayling will hold in decent numbers. The beat is not conducive for wild trout production but this is not an issue for the club, or the fishery as a whole. There are good opportunities for wild trout spawning with associated nursey habitat elsewhere on the fishery and young adult trout will soon redistribute to populate the Hunt's Stream and fill every avaible attractive niche.

The main issues appear to be slow but increasing levels of siltation, coupled with inevitable encroachment of emergent aquatic plants and rampant success of riparian planted willow. The willow will require some measured physical intervention but issues associated with increased siltation and the encroachment of aquatic plants are best managed by facilitating a more naturalistic flow regime. Any physical removal of bed sediments is considered to be unsustainable and hugely expensive. Given the conservation status of the river, it is highly unlikely that any permissions would ever be granted for mechanical desilting. However, it is possible to look at flow control and explore options for improving sediment transport through the carrier.

In theory, the bed slope from the main offtake structure down to the confluence with the main river should be slightly steeper than the main river. It appears from the map as if the length of the Hunt's Stream is slightly shorter and

therefore will have a steeper gradient over the same drop in elevation. The main channel was not inspected, other than a short section either side of the access bridge but first impressions were that the main channel supports high quality chalkstream habitat. In theory the Hunt's Stream should be able to support similar high quality habitat, albeit on a reduced scale.

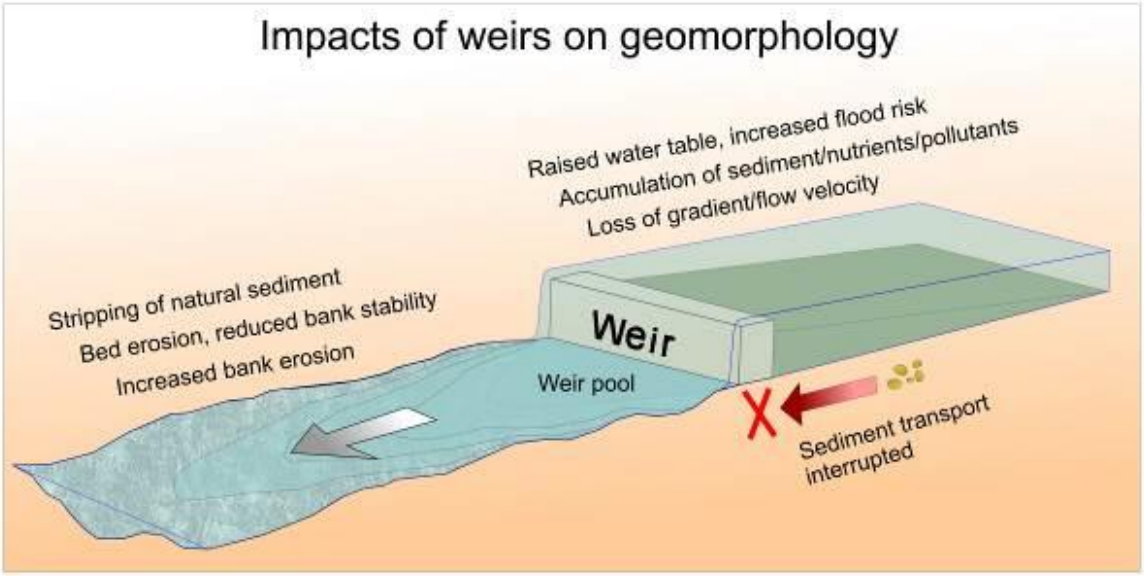
Currently the carrier receives a percentage share of the available low flow via the square notched hatch at the top of the system. Once the springs break and the flow increases in the main river and water levels rise, the carrier also receives an increase in flow but a declining share of the overall available flow to the system as a whole. Redesigning the shape of offtake structure, either into a side-stepped structure, or a wide "V" notch, would enable the Hunt's Stream to enjoy a greater proportion of flow as levels in the main river rise.

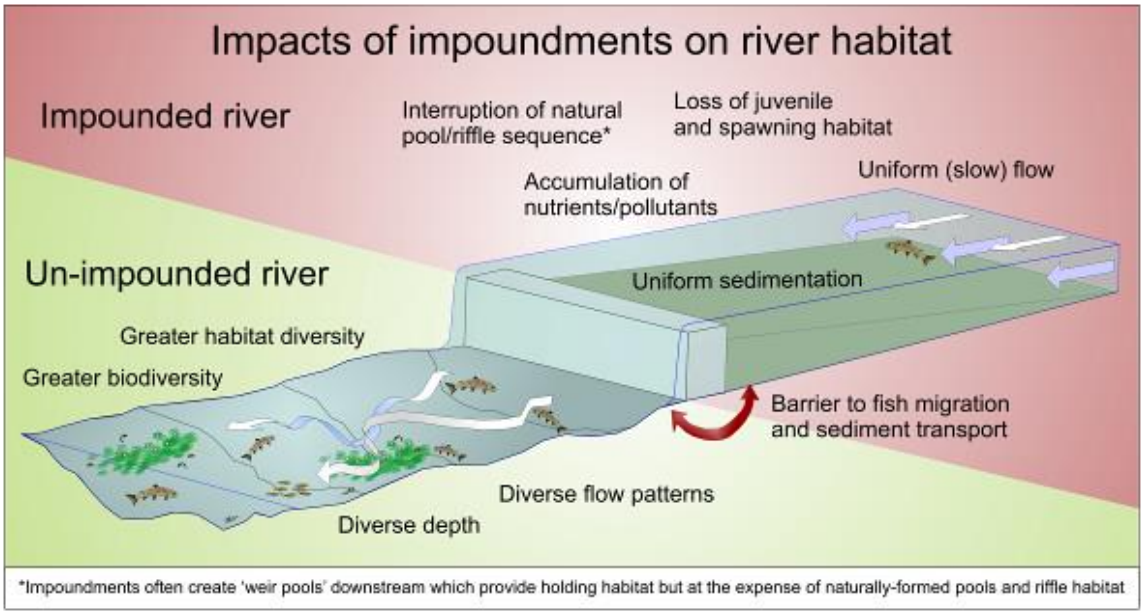
This could be achieved by building a new structure in the location of the current over-flow channel, or temporarily diverting flow through the over-flow channel while rebuilding the main structure. A possible alternative is to construct an adjustable square sided undershot hatch where the existing overflow is located and manually augment a high flushing flow into the Hunt's Stream during times of plenty. A redesigned set of structures that mimic naturalistic flow patterns should be the preferred option, allowing both channels to settle down to the natural rhythms of available flow, rather than having an adjustable structure that might end up as a source for conflicting views as to when and where water is directed.

It is obviously very important to consider the impacts to the main channel of any change in flow splits, however, slicing off some of the available high winter flows that currently bore down the main channel and diverting some of that extra water into the Hunt's Stream should not overtly damage the ecology of the main channel and will help to sweep fine sediments from the bed and margins of the Hunt's Stream.

The bed slope through the entire reach of the Hunt's Stream appears to be quite modest but effective sediment transport is also compromised by having two artificial steps in the river bed, one associated with the ford crossing, which has presumably been augmented from imported materials and the second at the hatch structure located further downstream. If the ford is still in use then the only option would be to construct a clear span bridge. The club could improve sediment transport by removing all of the boards in the hatch structure, and even better, remove the supporting invert as well to restore the natural bed gradient. It is recommended to consult with the EA and NE before making any long-term plans for the structure. There is little point in lowering the ford height unless there is also a commitment to remove the hatch invert. If the hatch were to be removed the attractive holding pool downstream of the structure could be maintained by installing opposing woody flow deflectors to create a narrow flume.

The two schematic drawings below encapsulate the impacts that weir structures have on the physical shape of a river channel as well as its ecology.





6. Recommendations

- Explore options for rebuilding the offtake structure to take a more naturalistic flow regime to encourage winter flushing of fine settled sediments. Make a full assessment of possible impacts to the main channel before making any decisions.

- Liaise with the EA and NE over the possibility of removing the hatch structure, including the stone/concrete invert, to improve sediment transport and fish migration through the reach as a whole.

- Tackle the encroaching willow with increased maintenance effort but be sure to leave plenty of low, water level cover, especially over potential holding pools. Undertaking the control of the willow on a rotational basis will ensure important cover is maintained.

- Peel back encroaching fringes of marginal emergent plants and fold back to form a soft, boggy margin. Be sure to maintain a channel that is sufficiently narrow to maintain swift central channel water velocities.

- Note that before undertaking works, Environmental Permits may be required from the Environment Agency.

7. 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.

8. 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.

9. Disclaimer

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