WILD TROUT TRUST

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# The River Ouse, Staplefield, West Sussex

**Advisory Visit June 2021**

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**Key Findings**

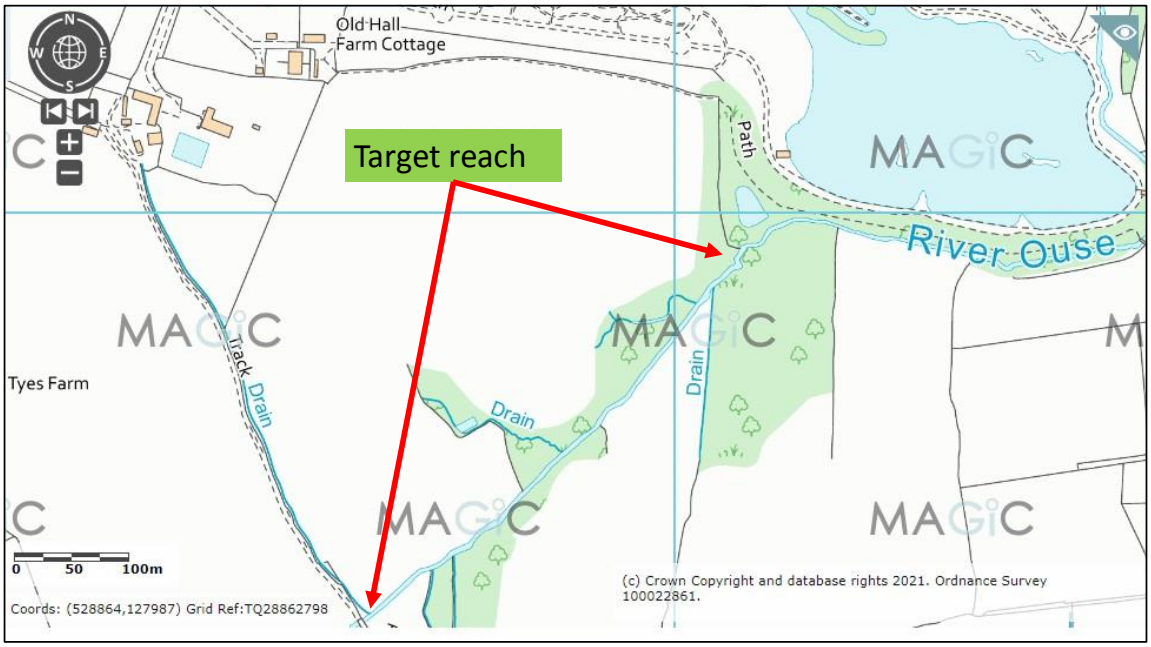
- **This section of the Upper Ouse has lots of potential for wild trout.**
- **The existing low weirs are encouraging detrimental sediment deposition and should be modified.**
- **There are opportunities for wild trout production, with the presence of outcrops of sandstone gravels. These can be further improved to boost trout production.**
- **Habitat quality is currently being adversely impacted by the lack of in-channel and riparian low-level cover.**
- **It is likely this reach will be very important for suppling sea trout smolts for the Ouse system.**
- **Varied flow patterns and scoured pool habitat would encourage resident brown trout and enhance the reach's fishery potential.**
- **The reach supports a valuable dappled light and shade regime but would benefit from more complex low cover in the stream margins.**
- **Planting goat willow into the toe of the bank will provide dense, low-level cover.**
- **The reach has the potential to support an interesting wild trout fishery for the wading fly angler.**

## 1.0 Introduction

This report is the output of a site visit undertaken by Andy Thomas of the Wild Trout Trust, to a section of the upper Ouse at Tyes Place, near Staplefield in West Sussex.

The request for the visit came from the landowner who is keen to develop the stream as a wild brown trout (*Salmo trutta*) fishery.

Comments in this report are based on observations made during the site visit and discussions with the landowner. 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. Sussex Ouse near Staplefield.

| | |
|---|---|
| **River** | Sussex Ouse |
| **Waterbody Name** | Ouse Upper |
| **Waterbody ID** | GB 107041012730 |
| **Management Catchment** | Ouse and Adur |
| **River Basin District** | South East |
| **Current Ecological Quality** | Moderate Status (failing for water quality). |
| **U/S Grid Ref inspected** | TQ 28725 27640 |
| **D/S Grid Ref inspected** | TQ 29072 27979 |
| **Length of river inspected** | 1.0km |

**Table 1. Overview of the waterbody information sourced from: https://environment.data.gov.uk/catchment-planning/WaterBody/GB107041012730**

## 2. Catchment overview

The Sussex Ouse is a very important local fishery and wildlife resource and supports a number of threatened and nationally protected species. The Ouse is particularly valued for its sea trout population and the Environment Agency and local stakeholders are keen to protect and improve the stock, along with other conservation species such as eel (*Anguilla anguilla*), bullhead (*Cottus gobio*) and brook lamprey (*Lampetra planeri*).

The underlying local geology is dominated by the Wealdon groups of mudstone and sandstone, overlain with alluvial deposits of clay, silt and sand. The high banks of the stream channel are, in part, natural but decades of maintenance dredging work, carried out during the last century, have left a legacy of straightened and deeply incised channels (photo 1), clearly visible in the reach at Tyes Place today.

The characteristics of deeply incised channels that drain clay catchments inevitably lead to exceptionally fast flow velocities following periods of heavy rainfall. Long sections of river that are disconnected from their historic flood plains cannot get the same relief as rivers where the water can quickly spill out onto adjacent land much sooner in the flood cycle. Like many lowland rivers, the Ouse also suffers from the impounding effects of a plethora of weirs, mills and dams. This inevitably leads to displacement of juvenile fish when three-quarter bank-full floods generate huge flow velocities and small fish get flushed downstream, over barriers and cannot return.

## 3.0 Habitat assessment.

The section of river running adjacent to Tyes Place forms part of one of the headwater branches of the Sussex Ouse. The river locally supports a decent population of wild trout, with density and size of individual fish often limited by habitat availability. The Environment Agency's Water Framework Directive assessment of this stretch states that the river is failing to meet good status, mainly due to barriers and structures, fragmenting habitat and fish populations, as well as point source discharges emanating from waste-water treatment works. Further information is available in the link under table 1.

A key feature of the upper Ouse is the numerous low, impounding weirs that have been installed in an attempt to create deeper holding water. The reach at Tyes Place is no exception (photo 2). Some of these low weirs do provide limited holding habitat for trout. However, upstream of each weir, the effect is to reduce flow velocities and drown out high-quality habitat that could be suitable for increased wild brown and sea trout production.

As the water flows over a weir there is often a slight increase in dissolved oxygen immediately downstream. However, this effect is negated by the impounding effect upstream, as water velocities over long sections above are reduced, leaving the river vulnerable to increased warming and a reduction in overall dissolved oxygen levels. These impounded sections also act as a repository for nutrient-rich sediment, which would otherwise be flushed through the system on a river with a natural morphology, or at the very least, be deposited into areas such as the inside of bends. Rivers with a meandering planform generate areas of erosion and deposition and as a direct result, will usually support a more diverse range of habitats suitable for all trout life stages.

As the river here is predominantly straight, rather than meandering, the vast majority can be characterised as "shallow glide". The river flows over a mixed bed of gravels and sandstone bed rock, overlain with fine sediments. Shrubs, trees and low cover emanating from the toe of the bank were comparatively sparse. Annual herbs and very occasional scrubby bramble were present in a few locations and any vegetation that trails into the river margins should be valued and encouraged, rather than strimmed back. The deeply incised nature of the channel does not always lend itself to the provision of vital marginal cover, with the steep clay and sandstone banks being a difficult environment for the establishment of low cover, which is always prone to washout during spate conditions.

The comparative lack of low, scrubby cover in the toe of the bank (photo 3), was especially evident at the upstream end of the reach. Apart from a short section near to the bottom boundary, the reach was also lacking much in the way of fallen woody debris, which provides important cover for fish and food for invertebrates. Large woody material is also critically important in helping to scour the bed and toe of the banks. This can help to create diversity in the bed shape and free up precious outcrops of eroded sandstone which then form pool tails and gravel bars, essential for wild trout spawning.

The amount of shade cast by riparian trees was well balanced (photo 4), with mature trees promoting a dappled light and shade regime. Riparian shading on these upper reaches of the Ouse is critically important and helps to moderate

water temperatures during hot, dry spells. It was noted that most of the shading was being cast by trees sitting well back from the top of the bank adjacent to the RB.

With the limited amount of complex marginal cover, it is even more important to retain as much naturally fallen woody material as possible. There were examples of fallen trunks and the occasional build-up of brushwood debris towards the lower end of the beat. This woody material provides essential habitat and feeding opportunities for aquatic invertebrates, such as shrimp and caddis larvae, which are the foundations of the wood-web in clay-based spate streams. The amount of terrestrial food that falls into the channel from overhanging tree and shrub branches is also immensely important for sustaining trout populations in streams such as the Upper Ouse.

Photo 1. High banks and deeply incised channel, typical of the Ouse system.

Photo 2. Bag-work weir, presumably installed to hold up water levels upstream.

Photo 3. A long, straight, shallow section devoid of low scrubby cover or large pieces of woody material. The bed and bank toe here has a valuable outcrop of sandstone gravels. Currently the gravels are poorly sorted and heavily infiltrated with fine sediments. Large woody flow deflectors installed near the head of this run will help to scour and sort bed gravels. More low, trailing cover in the downstream margins is also required to provide vital cover for juvenile trout. With more diversity in bed shape and cover, this section could be an ideal spawning and nursery site.

Photo 4. Large, mature trees were present along most of the reach, casting valuable shade that will be essential during low flow periods in high summer. Low, scrubby cover growing out of the toe of the bank was far less common. Any branch that hangs over the river is potential a food conveyor for hungry trout.

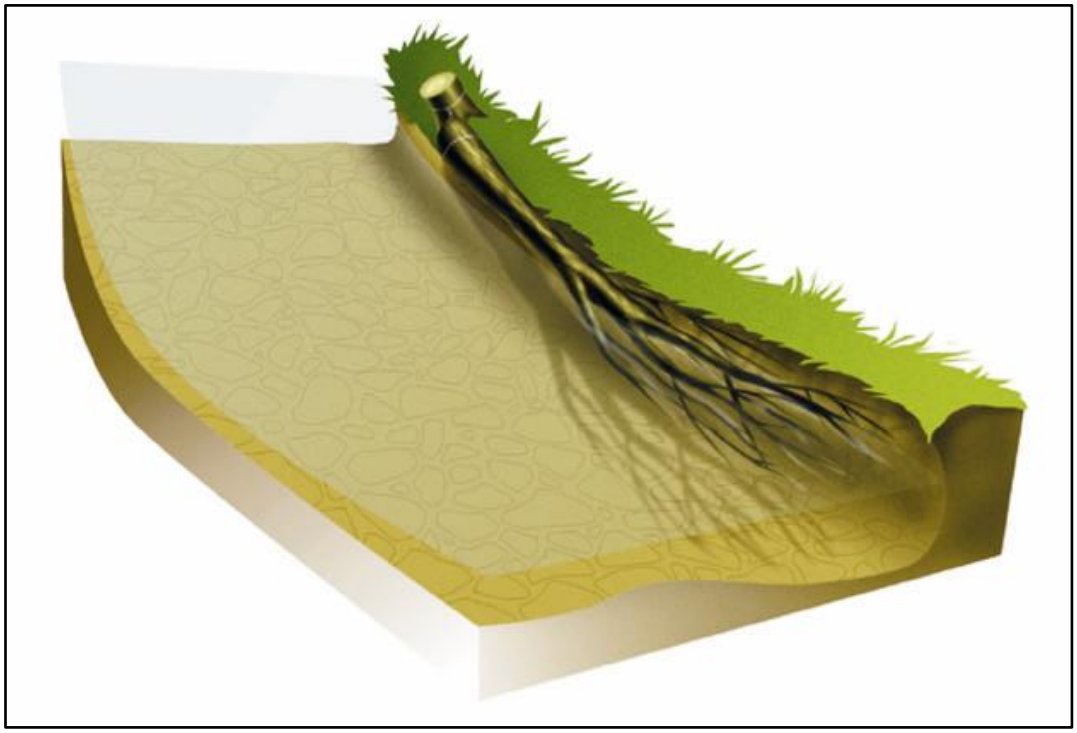
Opportunities to create improved marginal cover do exist. Although not common, there were a few trees (photo 5) growing out from the toe of the bank and these lend themselves to "hinging" techniques and laying downstream into the stream margins (photo 6). Hinged alder and willow will regrow to form low cover and the complex wood material lying in the channel provides cover for both adult and juvenile fish, depending on the local depth of the stream margins.

Where there are no trees to "lay", it is possible to cut whole trees from areas away from the riverbank and import them; the more complex the branch structure, the better. These can then be secured with galvanised cable, butts facing upstream, and clamped to the trunks of live bank-top trees (sweepers - drawing 1 and photo 7). Care must be taken not to "ring-bark" the anchor trees and this can be avoided by punching a wood auger through the trunk to take the cable which can be secured using simple cable clamps (photo 8).

Photo 5. One, or possibly both of the righthand trunks have the potential to be hinged into the channel to provide much needed cover and promote complex flow diversity.

Photo 6. Typical tree hinge.

Photo 7. A large branch cut and cabled to a live trunk (sweeper).



Drawing 1. A schematic of a tree sweeper, felled whole tree anchored to its own stump with cable.

Photo 8. Clams used to secure sweepers using galvanised cable.

There were examples of valuable woody material to be found near the bottom of the reach. Where naturally fallen trunks drop into the channel (photo 9) they can often promote bed scour provided they are not blocked underneath with lots of fine brushwood. These fallen trunks can be left in situ and monitored for blockage, or if deemed problematic, moved and secured so that they can perform a valuable function.

Coarse woody material (brash) that collects in the margins (photo 10) should also be left in situ. It should only be moved if it clogs up underneath a fallen trunk and forms an impounding weir, with water flowing over the top. A good way of monitoring these debris dams is to ensure the bed level upstream does not start to rise due to a build up of sediments. If this occurs, then it is time to intervene by cutting out a channel so the flow can scour underneath the debris dam.

Photo 9. A naturally fallen tree perched just off the bottom will help scour a pool below provided it does not get blocked up with brushwood below. Only move it to form a cover log if necessary.

Photo 10. Valuable coarse woody material forming a natural groyne, with a narrow notch allowing elevated flow velocities to whip around the outside edge. Valuable, if only temporary habitat to be left in situ.

## 4.0 Trout Stocking

There was a brief discussion about a beat managed by the Balcombe Fly Fishers, located a short distance downstream. This club manages the fishery primary as a stocked fishery, although the beat is known to support a decent head of wild fish.

Whilst many landowners, clubs and commercial fisheries stock rivers and streams with farm-reared trout, increasingly more fishery managers are realising the benefits of investing in better habitat management and a reduction or cessation of stocking, resulting in increasing numbers of wild trout repopulating their rivers. Fishing for wild fish in a wild environment can be sustainable when properly managed and is deemed by many to be more rewarding than angling for stocked fish.

The practice of rearing trout to stock out into river fisheries is very much a product of Victorian management principles and came about in response to a reduction in stock densities at a time when most captured fish were killed, thus resulting in depleted adult fish stocks and poor angling returns. The need to accommodate stocked fish in habitat that is likely to hold them successfully has also had a knock-on impact on how our rivers have been managed. Promoting good "holding" water via channel modifications and impoundments usually results in the maintenance of comparatively deep, steady glide habitat, which is often considered ideal for settling stocked fish. Farm-reared stock fish are well adapted to slow-flowing environments and often struggle to hold up in more dynamic river environments that favour wild fish.

Some landowners, fishery managers and anglers believe that stocking is necessary to maintain viable and profitable fisheries. There is a view too that on beats that have been stocked for over 100 years, the continued presence of wild fish indicates that stocking does not adversely affect the wild-born fish. Science from around the world has shown that there are negative effects upon wild fish from stocking, namely adverse genetic effects from interbreeding and the direct effects of increased competition and predation. In the UK, the mandatory use of triploid stock fish has addressed the genetic impacts, but the potential effects of competition and predation in stocked waters remain.

Modern fly fishers have embraced catch-and-release fishing and many are now happy to either limit their take, or return all the fish they capture. Coupled with the observation that stocked triploid trout seem more likely to over-winter than stocked diploids means that often fishery owners are now introducing more trout than are required to sustain the fishery; this does not make sense from either an economic or an ecological viewpoint. There are numerous examples where stocking densities have been greatly reduced or stopped altogether, only for the rod catch to increase, with wild fish filling the niche vacated by stocked fish. With good catch return data, it is possible gradually to reduce the numbers of fish introduced whilst monitoring catch rates to find a stocking level that provides the optimum return on the money spent on stocking.

To cater for anglers of all abilities, then fishing for comparatively easy and freshly stocked trout has its attractions. Perhaps with attitudes towards the principles of sustainability changing, providing these rods with a different kind of river fishing

experience will require some thought, experiment, and no small amount of support.

Wild fishing generally doesn't attract the kind of high-end ticket prices afforded by some of the stocked fisheries but that very much depends on the quality of the fishery and the reputation it carries. For a wild fishery to be viable, it will require significant lengths of the channel to be managed for the fish, rather than the angler and to be regularly rested. The fish can be caught and released multiple times but fishing a beat the day after a skilful angler under favourable conditions has visited will make it tough for a beginner. Angling pressure has to be carefully controlled and beats regularly rested when managing a wild fishery.

## 5.0 Conclusions

The section of Upper Ouse at Tyes Place has the potential to support an interesting, low-key wild trout fishery. The local geology and hydraulic variability associated with the Sussex Ouse means that work is needed to provide complex and varied habitat to maximise opportunities for all trout life stages. Habitat quality in this reach is currently limited, due to the uniform nature of the channel and comparative lack of complex cover.

The wild trout that exist in this system are well adapted to survival in this environment, but the low productivity associated with the natural water chemistry tends to encourage a migratory life strategy. For the Sussex Ouse trout, this results in a significant proportion of the population being genetically adapted to emigrate from the system as sea trout smolts, only to return as large migratory sea trout. The numerous weirs, dams and barriers on this system mean that some of these upper reaches may only receive large returning adult trout following an exceptionally wet autumn. On these upper reaches there will always be a resident population of smaller brown trout but even when there is no interaction with large sea-run fish, many of the small trout produced will feel the urge to migrate to sea.

There may be opportunities to exploit large adult sea trout from this reach in September or October, following a big spate, but in general, angling interest here will be restricted to fishing for small, feisty, resident browns, which if the habitat opportunities are maximised, will provide interesting and rewarding opportunities for the wading fly-fisher.

Opportunities to improve wild trout production can be achieved via a more relaxed approach to in-channel and riparian maintenance, ensuring that potential spawning sites, where seams of gravel are present, are subjected to bed and bank scour from either naturally fallen woody material, or strategically placed tree sections. These can be procured from the adjacent woodland. Any wood placed into the channel must be secured (photo 11) to bed or bank. Where possible, natural tree hinges provide excellent solutions. Alternatively, brushwood ledges could also be installed and built from locally won coppiced hazel (photo 11 & 12).

Photo 11. Example of a woody trunk deflector keyed into the margins and secured with a combination of driven chestnut clefts and steel rebar. This is designed to promote bed scour in the flume created around the outer edge of the deflector.

Photo 12. Stands of hazel that site back from the RB could be coppiced and materials used to make brushwood ledges. These could be installed to create valuable habitat features and if carefully placed can encourage meandering flow patterns through the comparatively straight section. Ideally brushwood ledges work best when placed on the inside of an existing bend.

Photo 13. Example of a typical brushwood ledge.

Photo 14. A site where a brushwood ledge could add vitally important low-level habitat.

The creation of habitat features using woody materials is regulated by the Environment Agency on rivers that have a "main" river designation. Permits or exemptions to carry out habitat improvement works can be obtained via a Flood Risk Activity Permit. More information can be found here: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Action is needed to modify the existing low-level weirs. These should be notched out to the downstream bed level to ensure bed sediments can trundle through the system. There is no need to remove the entire structures but opening up a narrow gap (min of 300mm) will promote a valuable flume of elevated flow velocities.

## 6.0 Recommendations

- **Cut notches in existing weir structures**
- **Look for opportunities to hinge over bank-toe trees to promote complex habitat.**
- **Where there are no trees available for hinging, install a combination of sweepers and brushwood ledges to promote meandering flow patterns.**
- **Install woody stub deflectors and if necessary, loosen river bed materials in the flume created to promote deep pool habitat.**
- **Install woody material adjacent to areas where there are natural outcrops of gravel.**
- **Plant low scrubby tree species, such as goat willow into the toe of the bank, ideally located over newly created pool habitats.**
- **Manage the river as a low-key "wild" fishery and resist temptations to introduce domesticated farmed fish.**

## 7.0 Making it Happen

Further assistance from the Wild Trout Trust is available in the form of:

Helping obtain the necessary consents for carrying out in-stream works, from either the Environment Agency, or in the case of river not designated as "Main River Watercourse" from the local authority.

A practical visit from a WTT Conservation Officer to demonstrate the simple habitat improvement techniques outlined above. This enables recipients to obtain on the ground training in 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 expenses of the WTT attendees.

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

www.wildtrout.org/content/library
The Wild Trout Trust has also produced a 70-minute DVD called 'Rivers: Working for Wild Trout' which graphically illustrates the challenges of managing river habitat for wild trout, with examples of good and poor habitat and practical demonstrations of habitat improvement. Additional sections of film cover key topics in greater depth, such as woody debris, enhancing fish stocks and managing invasive species.
The DVD is available to buy for £10.00 from our website shop www.wildtrout.org/shop/products/rivers-working-for-wild-trout-dvd or by calling the WTT office on 023 9257 0985.

## 8.0 Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programme in England, through a partnership funded using rod licence income.

## 9.0 Disclaimer

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