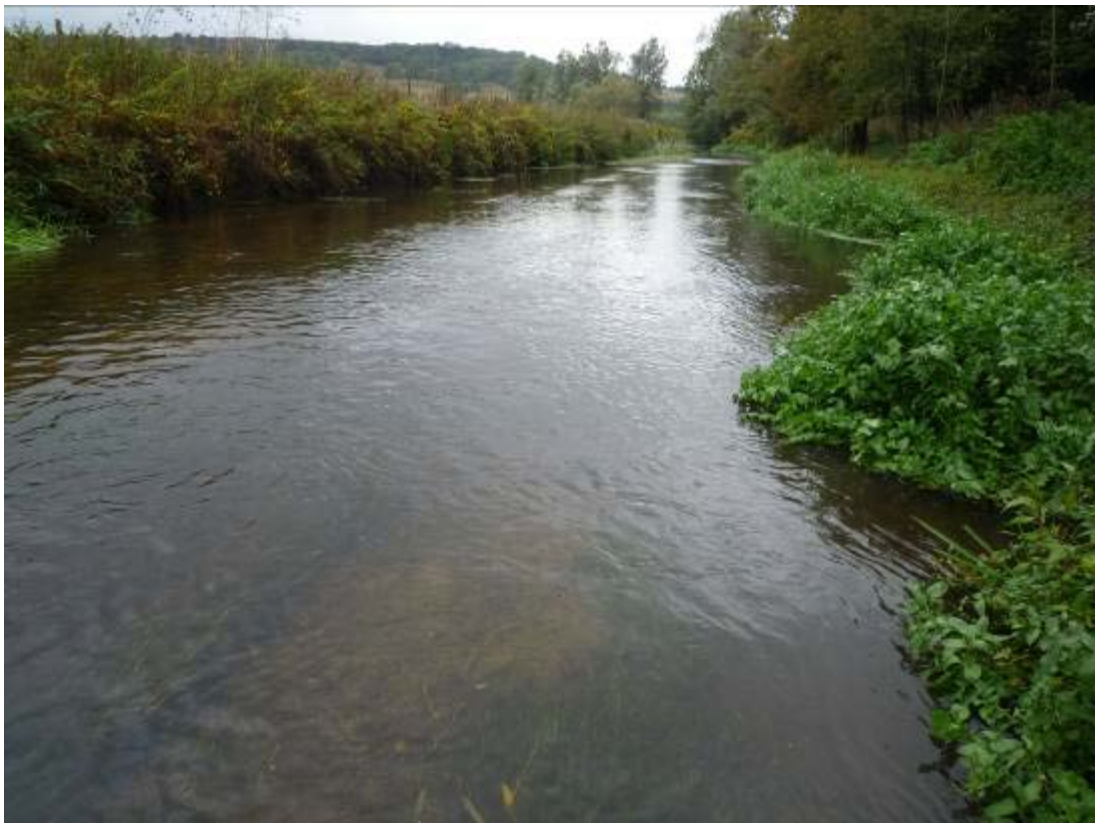
Great Stour – Stour Fisheries Association



An advisory visit carried out by the Wild Trout Trust – October 2009

1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on the Great Stour in Kent. The advisory visit was undertaken at the request of the Stour Fisheries Association (SFA) who control a six-mile stretch in the middle reaches of the river. The Stour Association are a long established fishing club who have been actively improving their stretch over many years and who are particularly keen on enhancing the wild component of their brown trout (*Salmo trutta*) stock.

Currently the SFA is totally reliant on trout stocking to provide a viable trout fishery and it is recognised that some stocking is likely to be part of future management plans. The SFA are, however, very keen to explore opportunities to improve trout habitat in order to expand the wild component and to derive the maximum benefit from their introduced fish.

Comments in this report are based on observations on the day of the site visit and discussions principally with Mr. Peter Bracher and Mr. Neil Jones and other serving members of the SFA, including the club's river keeper, Mr. Nigel Cox.

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.

2. Catchment overview

The Great Stour is formed from several headwater streams that eventually join in Ashford to form the Great Stour. The upper reaches of the catchment run through a mixed geology of greensand and gault clays but below Ashford the river starts to run through the Kent chalk, picking up groundwater and taking on the characteristics of a true chalk stream.

Unlike some of the chalkstreams further west, the Great Stour is heavily influenced by the comparatively flashy nature of its headwater streams and this is compounded by the large conurbation of Ashford. Flows can therefore be much more variable than on many true chalkstreams, with the river experiencing spate conditions following heavy rainfall but also suffering from acute low flows following long dry spells. It is likely that a significant proportion of the dry weather flow is made up of treated effluent emanating from waste water treatment works found further upstream.

Significant groundwater abstraction pressures are also likely to impact flows and therefore habitat quality on some sections of the river. The WTT does not have specific information regarding any pressures impacting the SFA waters although more information will be available from the Environment Agency through their Catchment Abstraction Management plan for the Stour catchment.

As well as brown trout, the river also supports a significant run of sea trout which are known to run upstream as far as the Chilham area. Mixed coarse fish and good numbers of eel are also found on many stretches of the Great Stour.

Further upstream it is believed that white clawed crayfish (*Austropotamobius pallipes)* are still to be found, making this river one of the last strongholds for native crayfish in the south of England.

3. Fishery overview

The sections of Great Stour controlled by the SFA provide fly fishing opportunities for the membership covering approximately six miles of river. The sections inspected during the advisory visit were at lower and upper Shalmesford, a section known locally as the Cement Bridge reach, East Stour and Olantigh.

Over the years the SFA have instigated a number of habitat and management initiatives designed to improve the fishery. The measures taken to improve habitat are discussed in more detail in the section 4 (Habitat assessment) of this report. There was also a debate about the FSA stocking programme and this area is covered in more detail in section 5 (Trout stocking).

4. Habitat assessment.

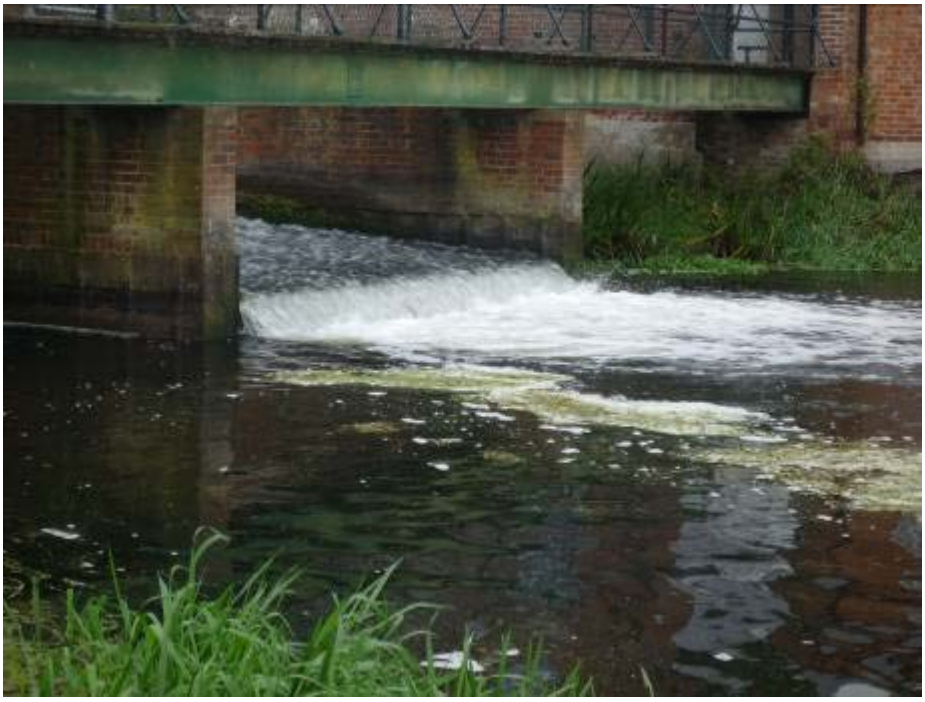
4.1 Lower Shalmesford

The large weir (Corn Mill) forms the bottom boundary of the fishery. This is a significant impoundment which has a profound effect on habitat for a considerable distance upstream of the structure. There is a fish pass installed at this site but it is not known how efficient this pass is for connecting trout populations. The structure itself is very substantial and borders a number of properties on the left bank. A cursory inspection of the structure would suggest that any proposed options for reducing the significant head loss may well be difficult and extremely expensive.

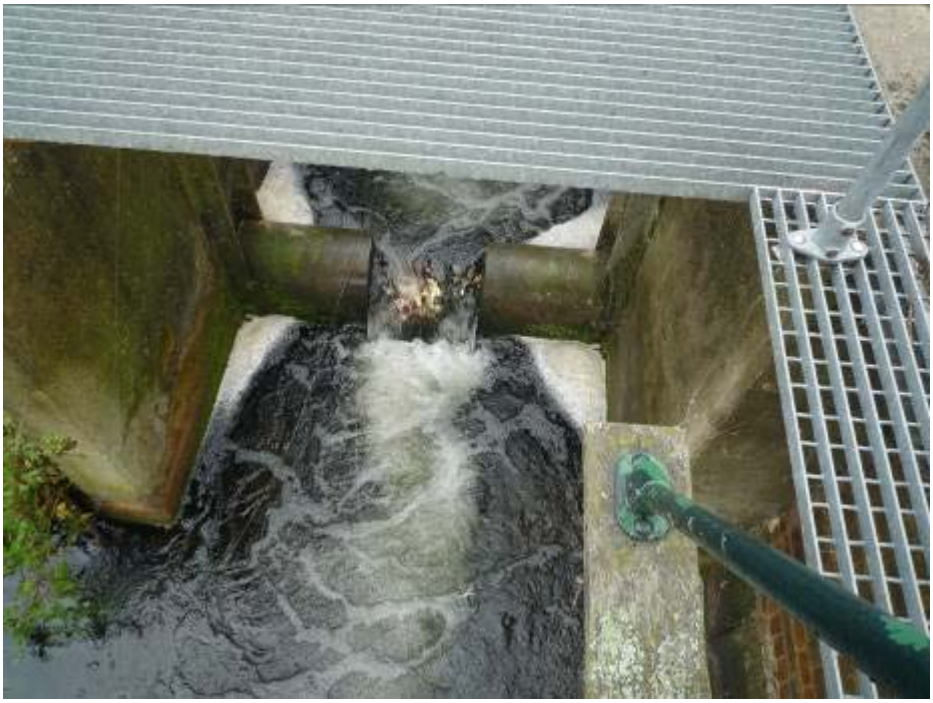
Dams, weirs and structures like the Corn Mill can be very damaging to fish populations and habitat quality. Their effect is to slow down upstream water velocities resulting in silt deposits. Also, mills and dams often fragment fish populations by preventing them from moving up river to exploit good spawning habitats, with the offspring then dropping back down to take up residence in good quality holding habitats. This natural cyclical process can be impossible on rivers with large impounding structures, or at the very least impaired if any fish pass lacks efficiency.

Adjacent to the weir, a small spring-fed tributary joins the main river. This small stream was heavily overgrown and silted in places just upstream of its confluence with the main river. Further upstream, where gradients were steeper, the stream did appear to provide what could be excellent wild trout habitat, particularly for juveniles. It is understood that this stream was used for a series of stew ponds in the past and a closer inspection should determine whether this stream has real scope for developing into a wild trout sanctuary, with the potential for providing a source of wild stocks for the main river. It is unfortunate that this stream drops out below the bottom boundary of the fishery so any net downstream migration of growing juveniles will be lost to SFA waters. There may be some scope to explore other opportunities to harvest wild fish

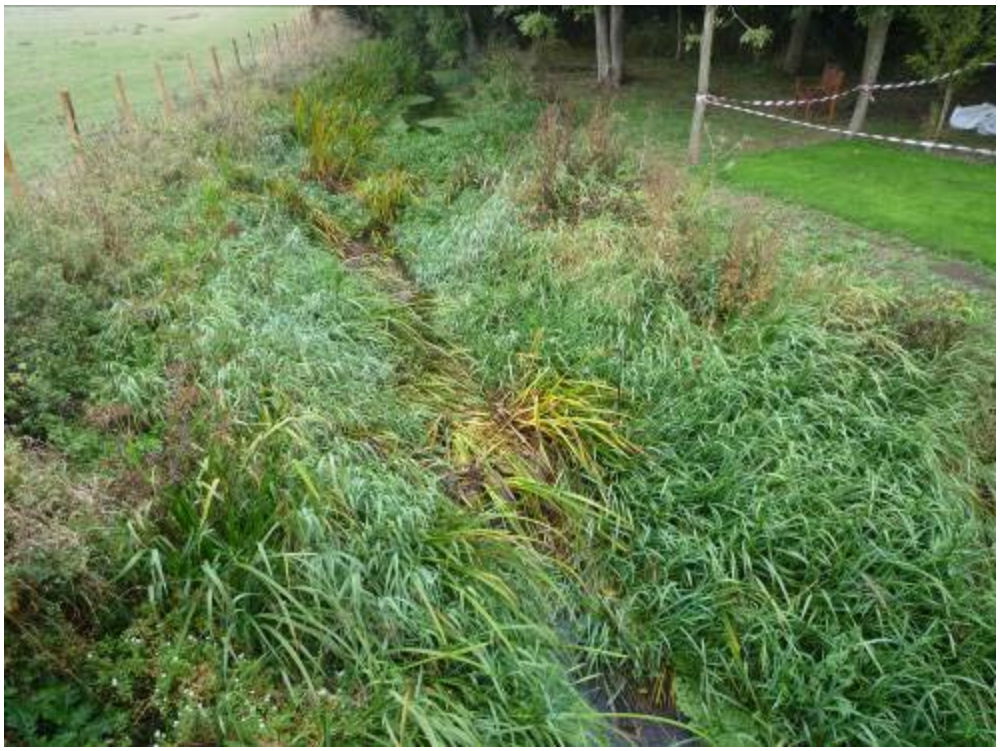
from this stream to augment wild stocks in the main river as an alternative to stocking small hatchery derived trout. This option is discussed in more detail in the recommendations and trout stocking section of this report.



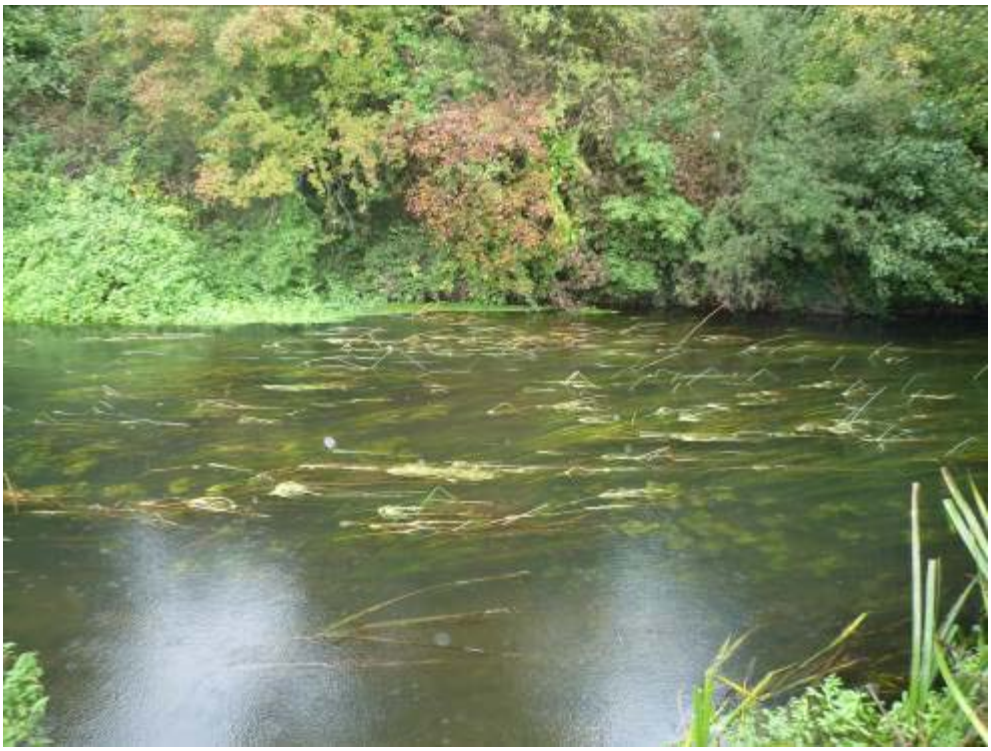
The lower sill of the Corn Weir.



Notched “pool & traverse” style fish pass. Efficiency will depend on how attractive the pass is to fish wishing to move upstream



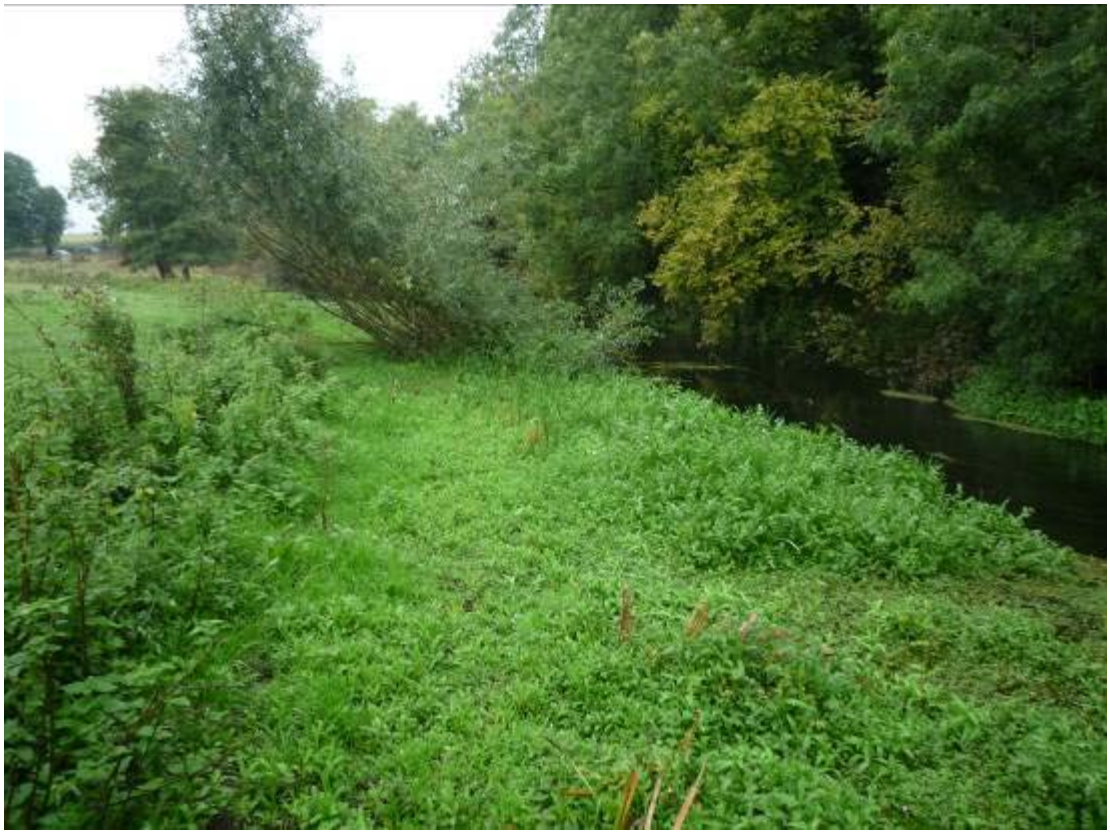
The small spring fed stream joining from the right bank



A section of channel several hundred metres upstream of the Corn Mill. The presence of pipe reed and yellow lily is indicative of slow water velocities

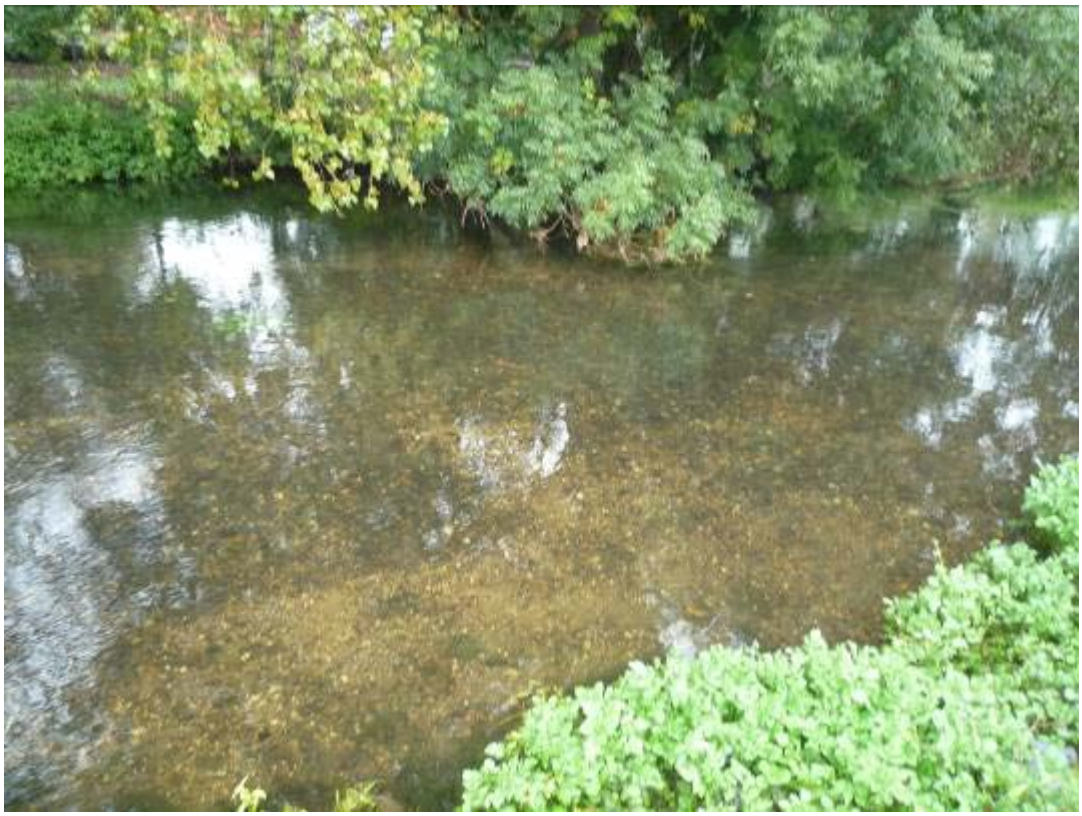
Upstream of the Corn Mill the channel shows all the classic characteristics of an impounded channel. The loss of gradient and hence water velocity caused by the downstream structure is evident by the thick growth of emergent macrophytes growing in the centre of the channel. Although pipe reed (*Schoenoplectus lacustris*) can sometimes grow in channels with high water velocities, the cabbage or yellow lily (*Nuphar lutea*) will not usually tolerate higher water velocities that produce favourable trout habitats. In wide, comparatively slow flowing channels, these plants will accumulate sediments which smother river bed gravels and reduce these sections to deep glides, usually only capable of supporting the occasional adult trout.

Further upstream the influence of the impoundment starts to wane and some decent in-channel habitat can be found. Better quality habitat has also been promoted by allowing a thick marginal fringe of fool's cress (*Apium nodiflorum)* to develop on the RB and allowing a nice low scrubby margin of trees and shrubs to develop on the LB – excellent holding water for adult trout.



Natural encroachment of the marginal fringe will help to increase in-channel water velocities and provide better habitat for trout.

At the very top of beat, just below Shalmesford Bridge, the river becomes much shallower and has good potential for spawning and nursery habitat. Overall the channel is still quite wide and the bed comparatively flat. On sites such as this it is likely that the river bed gravels are compacted, heavily infiltrated with organic sediment and encrusted in calcium carbonate deposits. The net result is that the gravels become concreted and extremely difficult for the trout to break up into useful depressions for spawning. In the event of a redd being created, the high level of organic sediments within the gravels is likely to reduce egg to fry survival rates. In addition, the smooth laminar flow and comparative lack of in-channel cover will make any potential spawning fish extremely vulnerable to predation and consequently very shy of using the site.



A potentially good spawning and nursery site downstream of Shalmesford Bridge

There are various prescriptions available for improving the spawning potential of sites like this and these are described in detail in the conclusions and recommendations section.

4.2 Upper Shalmesford

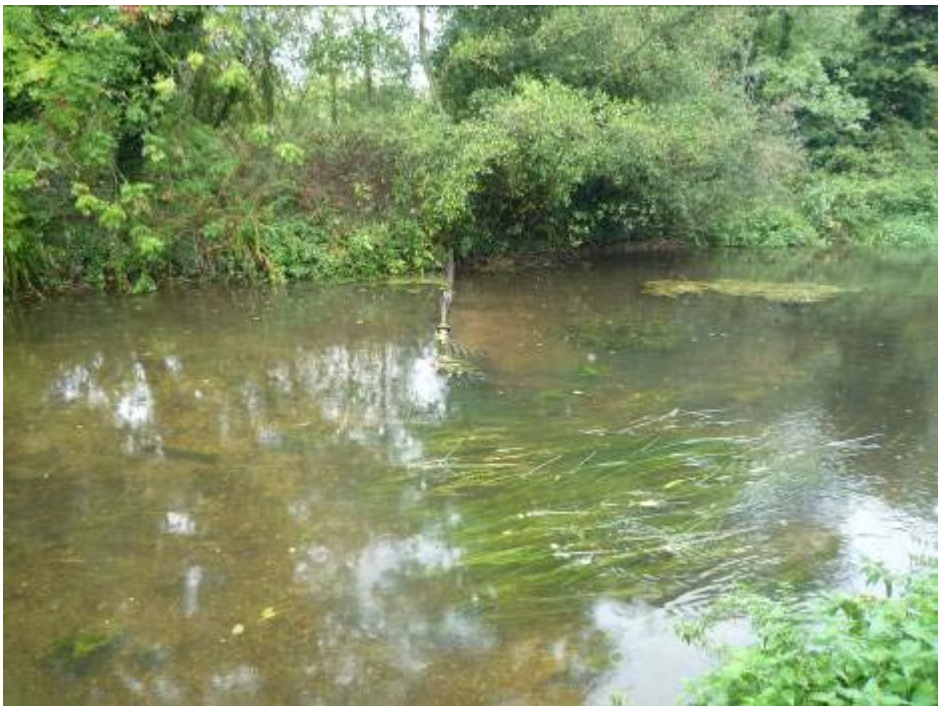
In-channel habitats on the Upper Shalmesford beat were some of the best seen on the whole fishery. This section appears to have been subjected to some channel re-alignment, presumably to facilitate the railway line. As a result the river, particularly towards the top end of the beat, is set down in a deeply incised channel. In addition, the river has been straightened, resulting in a channel length which is probably considerably shorter than it once was and now

has a much steeper gradient. Water velocities are therefore brisk, and this has enabled the river to carve out a valuable and varied morphology of pool, glide and riffle. For wild trout to thrive in any system they must have access to a wide range of habitat types. This will include holding pools for adults, clean gravel ramps for spawning, very shallow and gently flowing marginal areas with plenty of low scrubby cover for newly hatched fry, and some shallow, slightly faster-flowing sections (riffles) for trout parr. This section appeared to support a range of habitats, possibly with the exception of very shallow marginal areas.

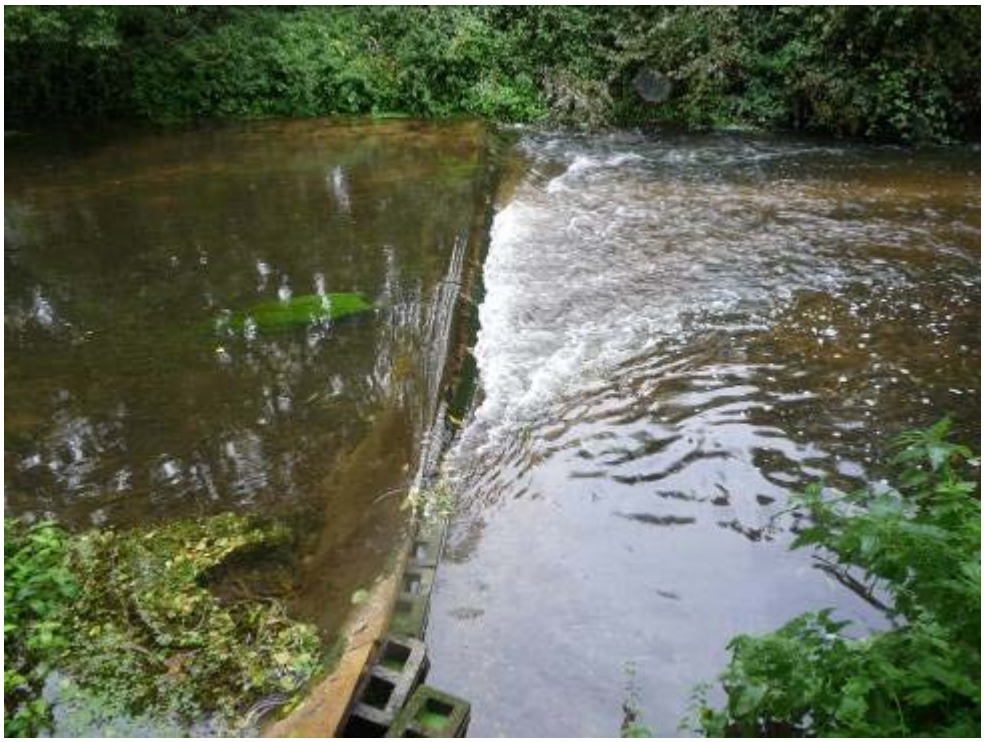
This section was also quite heavily shaded, primarily by mature alder (*Alnus glutinosa).* There was some debate about the level of shading. Research has indicated that ideal habitats for trout are found in streams and rivers where there is a dappled mosaic of light and shade. My feeling was that this reach had about the right balance, despite being set well down in the deep channel. Research on some trout streams in the New Forest has proved how valuable trees are in keeping sections of flowing water cool during warm summers. This is obviously an important factor bearing in mind the impacts of climate change.

4.3 Cement Bridge

The Cement bridge section has been the subject of some improvement work carried out by the SFA some time ago. Here the club, working with the Game and Wildlife Conservation Trust, have installed several groyne-type flow deflectors and some low weirs constructed from angled concreted slabs. The work was designed to scour pools to provide improved holding water for adult trout.



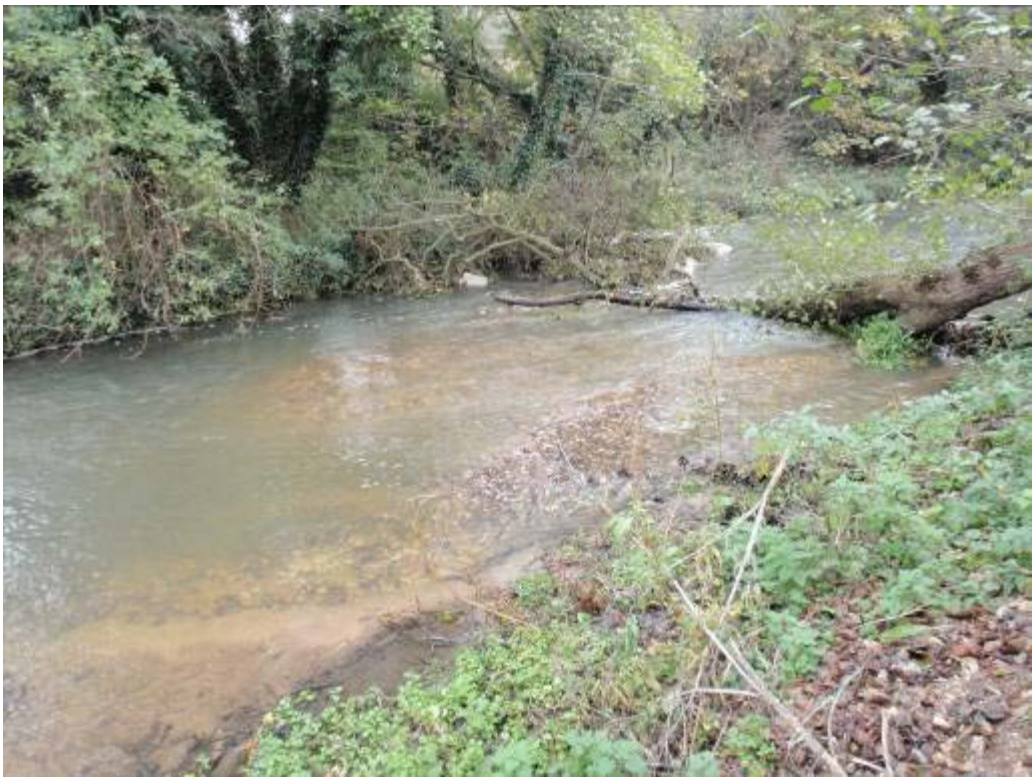
Far bank flow deflector



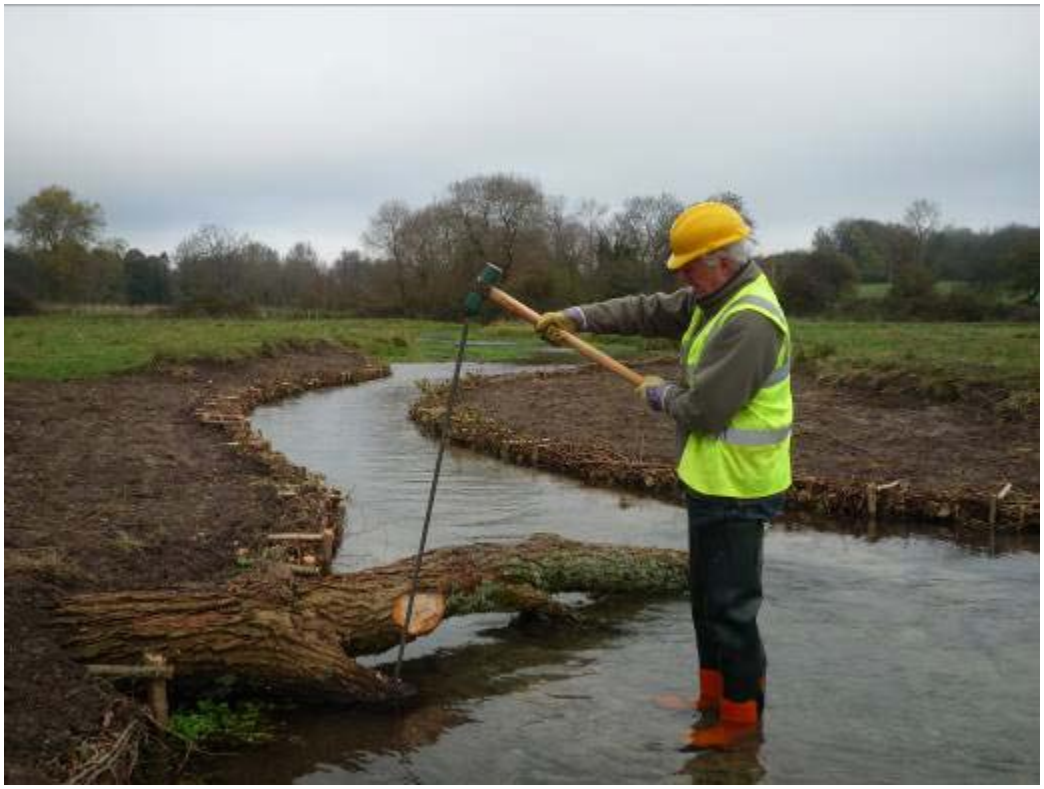
Block and slab low weir

My impressions of the groynes were mixed. I believe that some flow deflectors in this section would greatly enhance trout habitat. Unfortunately some of the half board groynes are not providing adequate bed scour downstream of the structure, nor encouraging any deposition behind the deflector. This is probably because the deflectors are set at a height that, following a modest lift in water levels, causes them to act as weir sills; any material deposited behind the deflector will be washed away. At times of low flow, the only scour available is that flowing around the tip of the deflector which has only created some very localised scour in the bed. A preferred option would be to use some large woody debris (LWD) to promote more under-scour and create a pool for holding adult fish. There is a good example of this on the Stour at Chilham Mill where a recently fallen tree had promoted the most amazing pot in the bed and freed up a large bar of fresh, loose gravel. I would not advocate dropping trees wholesale into the channel but it is perfectly possible to configure LWD into the channel to promote bed scour and therefore better holding areas as well as providing useful spawning ramps.

The slab and block weirs are also less than ideal. Although a really nice 5-m section of habitat downstream of the weir has been created, this has undoubtedly been at the expense of ten times that length of channel on the section above, which has been slowed and become silted as a result of the structure. This really short holding spot downstream of the weir will only support two or three adult trout at the most, and this is at the expense of the reach above, which has the potential to hold two or three times that number. At present the section upstream of the structure will be a comparatively hostile environment for trout to lie, and in all probability very few trout will remain in this section for long.



A fallen tree on the Stour at Chilham Mill promoting superb trout habitat – note the large gravel bar blown from the bed



Installing an “undershot” LWD flow deflector on a Hampshire chalk stream

4.4 East Stour Farm

Habitat quality on the East Stour Farm beat was variable. The channel was predominantly wide and shallow and the margins lined with a good mix of native trees. On the LB, a very wide access strip separating the margin of the fishery from the adjacent grazed meadows provides an attractive and functional buffer zone.

Some comparatively small clumps of Himalayan balsam (*Impatiens glandulifera)* were present throughout this reach. This non-native plant is undesirable because its suppression of other vegetation, coupled with its winter die back, combine to leave extensive areas of bare bank, contributing to excessive erosion.

The control of Himalayan balsam can be achieved by physical or chemical means:

Physical Control

The main method of control, and usually the most appropriate, is pulling or cutting plants before they flower and set seed (usually in June or July). Working parties are the best means of doing this.

Limited grazing access appears to be controlling balsam in some sections of the fishery. This could be continued, but needs to be carefully controlled and balanced with preventing overgrazing of desirable species, damage to coppice re-growth or damage to river banks. Access in late spring or early summer before the balsam has flowered would be ideal. In areas inaccessible to livestock, physical or chemical control is recommended.

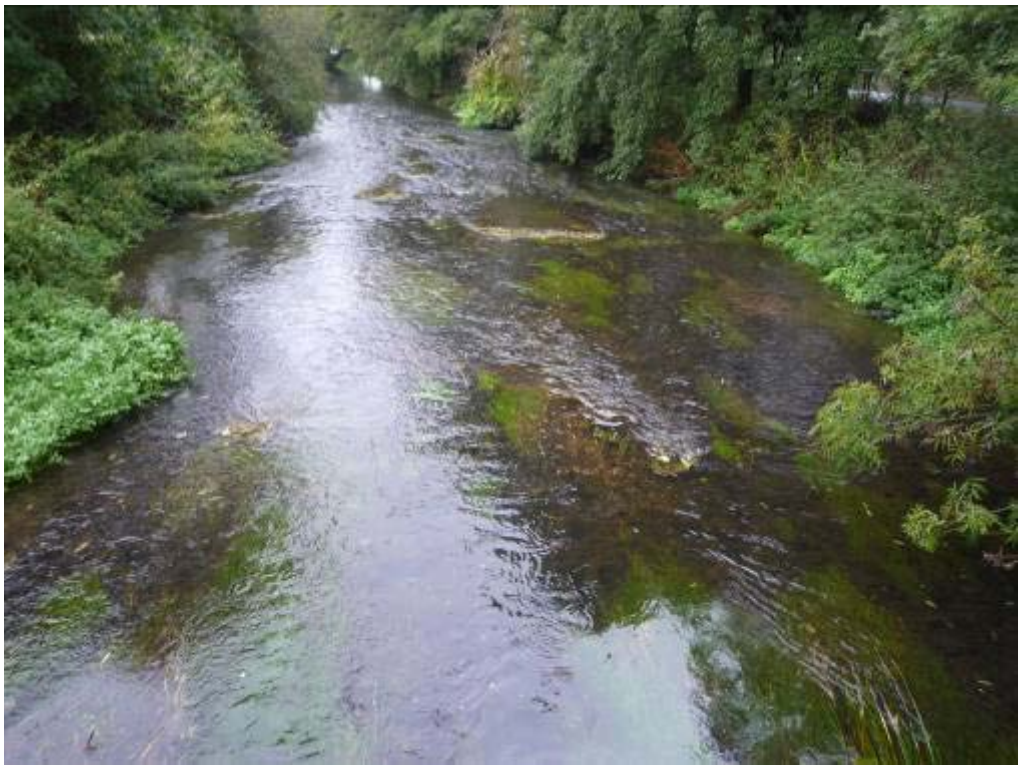
Chemical Control

Before using weedkillers alongside waterways it is necessary to contact the Environment Agency and obtain their written consent via form WQM1 (http://www.environment-agency.gov.uk/homeandleisure/wildlife/31350.aspx). It can also advise on suitably qualified contractors.

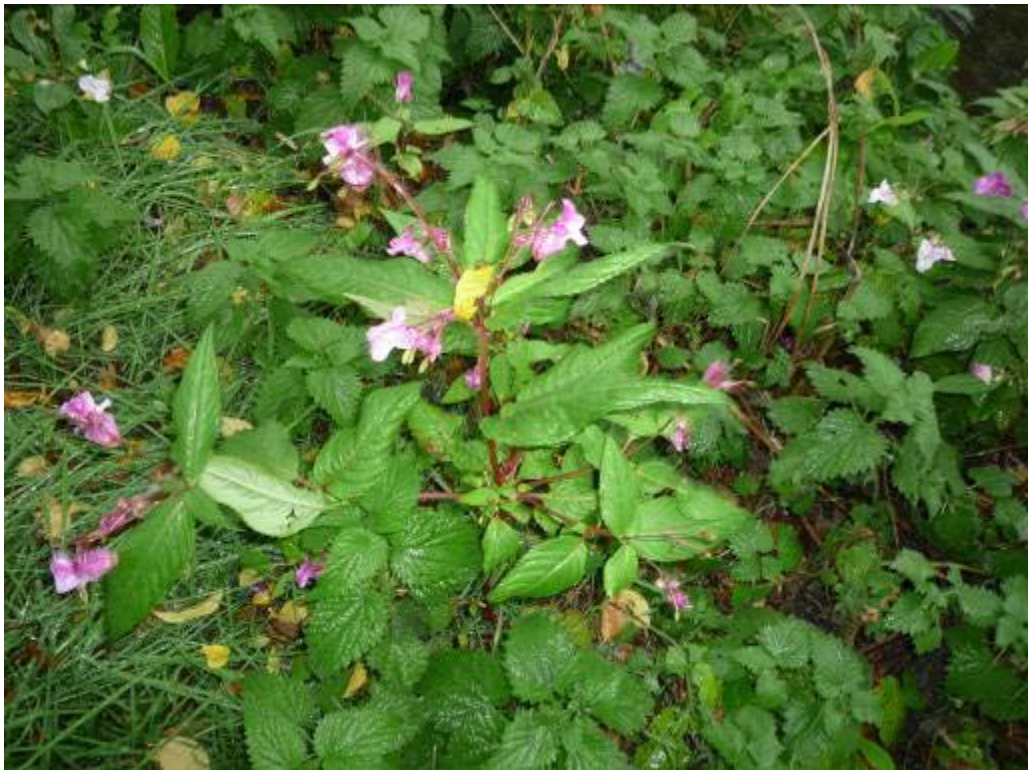
Himalayan balsam can be controlled with a weedkiller based on glyphosate, such as Roundup. Glyphosate is a non-selective, systemic weedkiller that is applied to the foliage. It is inactivated on contact with the soil, so there is no risk of damage to the roots of nearby plants, but care must be taken that the spray doesn't drift onto their foliage. Glyphosate is most effective when weed growth is vigorous. This usually occurs at flowering stage but before die-back begins; with most weeds, this is not earlier than mid-summer.

It may take a couple of seasons to obtain good control due to the germination of more weed seedlings.

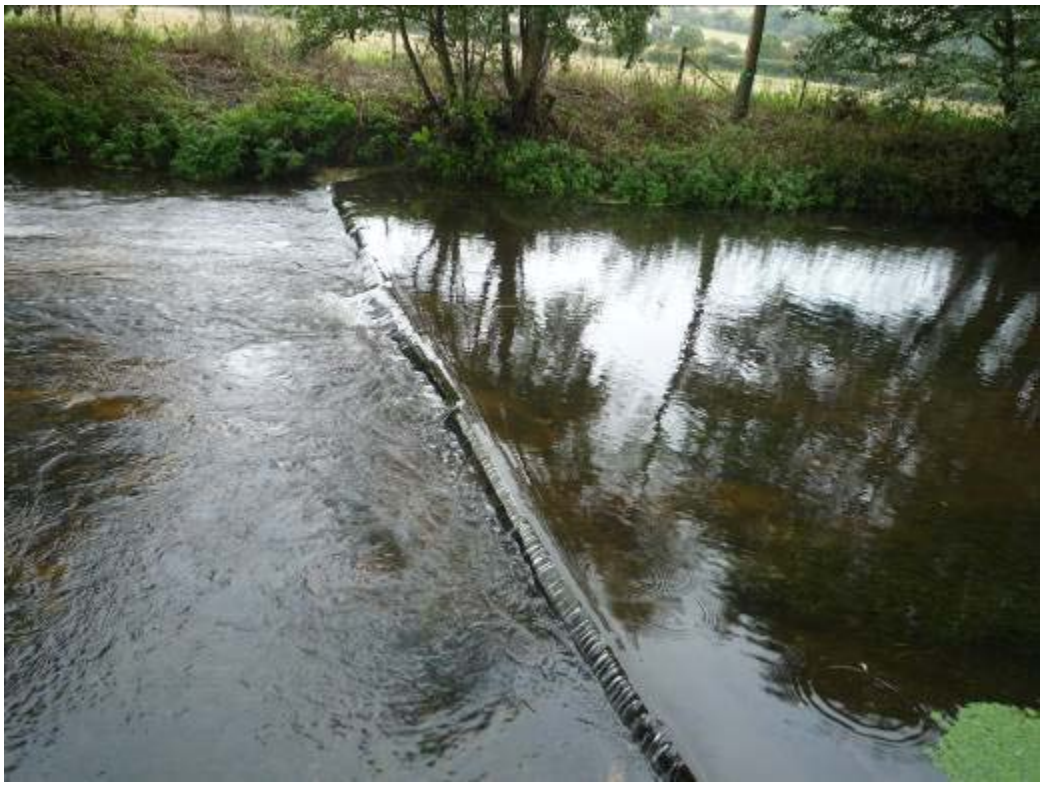
Several more structures have been installed along this reach in an attempt to enhance holding habitats for trout. Unfortunately a combination of the very wide channel, which reduces in-channel velocities, and the hard, concreted nature of the bed has only provided very limited success in terms of diversity in the river bed profile.



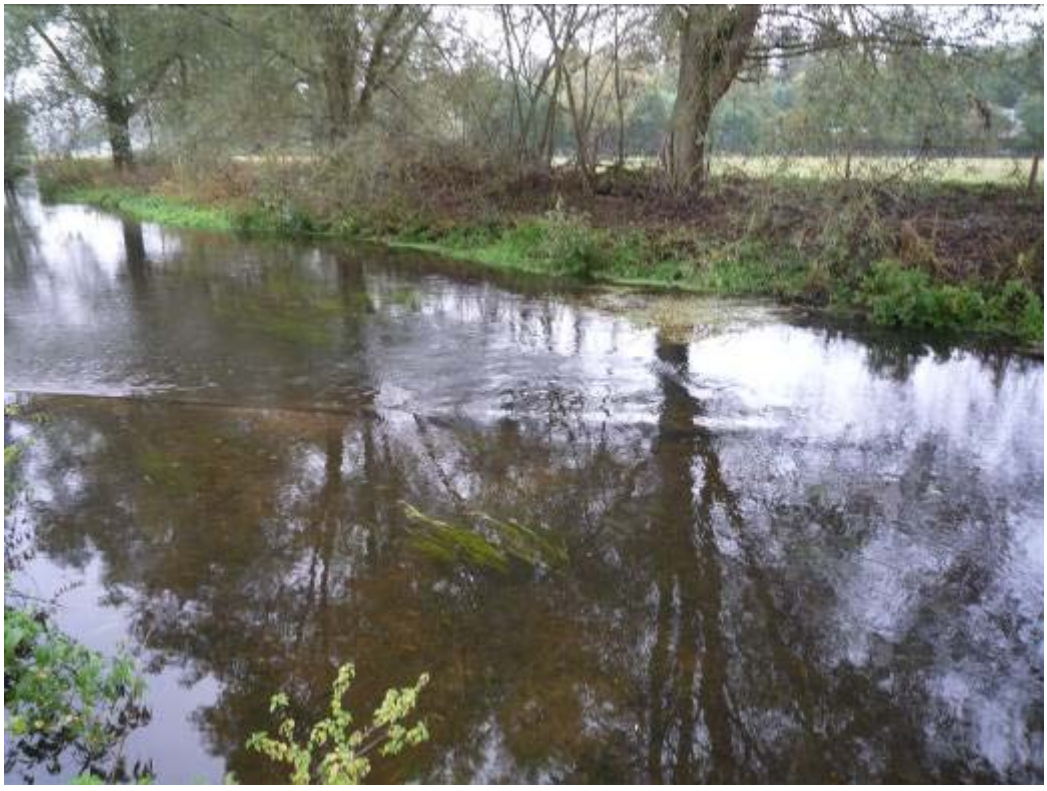
A short but excellent section of channel at East Stour Farm. Some good spawning and nursery habitat for trout



Himalayan balsam should be controlled if at all possible

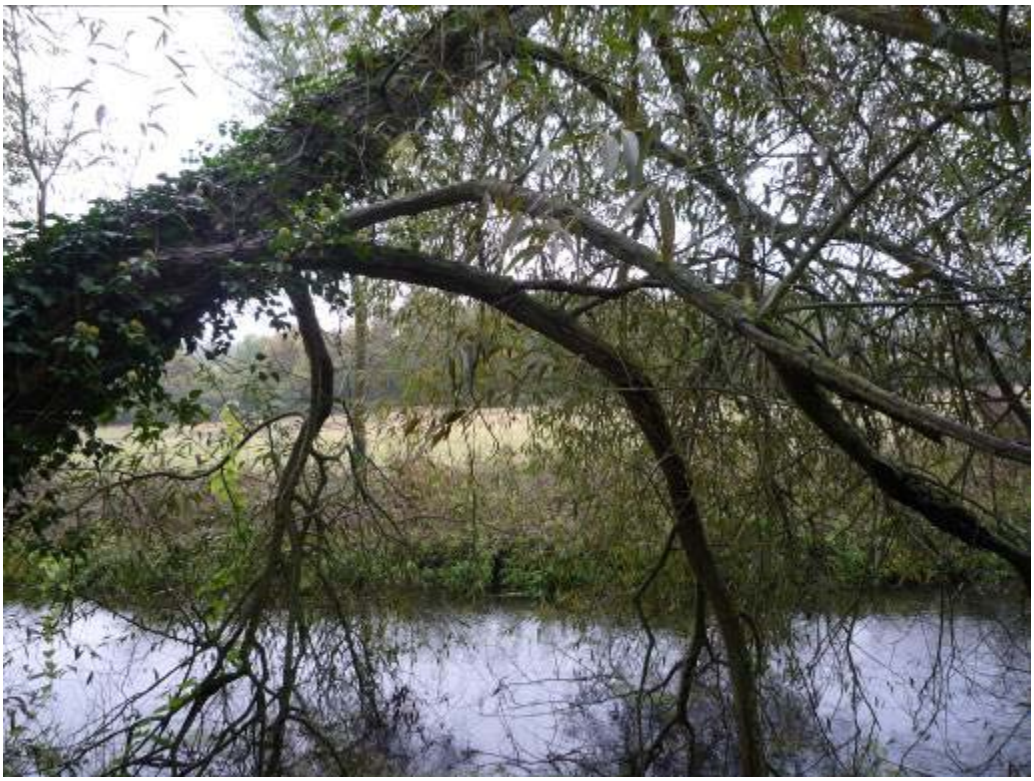


Low weir on the East Stour Farm beat



A submerged groyne providing some limited holding water. Note the long length of smooth laminar flow above and below the structure

My overriding impression of the East Stour beat was that it was an extremely attractive beat that had been very sensitively managed but one which lacks any significant in-channel diversity. Other than a short section downstream of the footbridge, the section was extremely wide, shallow and comparatively sluggish. Some clean gravel was visible but all too often it appeared to be very flat and compacted. Smooth glide habitat will hold adult trout if there is sufficient overhead cover or well managed in-river weedbeds, but more variations in depth and water velocity are desperately needed.



A half fallen willow on the East Stour Farm beat could be topped and hinged into the channel to provide a live flow deflector

4.5 Olantigh

The last site to be inspected was the SFA top beat at Olantigh. The upper reaches of any trout fishery are always extremely important and often have a big influence on how the rest of the fishery performs. Some good quality habitat was observed on this reach. In places the channel was much narrower and faster flowing than on some of the lower beats, with a greater variation in depth profile. Some reasonable spawning habitat was seen and this should be enhanced to help provide a decent stock of wild fish.

Improving spawning and juvenile habitats near the top of the fishery makes sense as any over production will result in a net downstream migration of juveniles, where they will usually settle and grow on, depending on the quantity and quality of available habitat.

5.0 Trout stocking

There is mounting evidence that interbreeding between domesticated farmed trout and wild fish can lead to lower fitness and survival amongst the offspring, reducing the numbers of river-bred fish in the population. Recent changes to the Environment Agency's National Trout & Grayling Strategy reflect this concern, and by 2015 all farmed trout stocked to rivers will be required to be sterile all-female triploids, or derived from local broodstock. The WTT believes that if stocking is necessary, then it would be sensible to use all-female sterile fish.

The SFA have been engaged in stocking both mature adult diploid trout and significant numbers of fingerlings for many years. The SFA are very keen to promote improved natural production and believe that the stocking of fertile fish will potentially provide fish capable of contributing to recruitment to the next generation. Although this is possible the evidence gathered from dozens of research projects indicates that in all probability the hatchery-derived stocks are performing very poorly.

In itself this would not matter but interbreeding between farmed and wild fish is known to occur and the resulting offspring are of a reduced fitness and therefore far less likely to survive and reproduce within the Stour system. The practice of stocking hatchery-derived fingerings masks any success that the club might be having in supporting wild trout reproduction. The natural selection processes that will result in the best quality fish coming through to maturity does not guarantee that you have a fish capable of passing on the traits of wild survival. Capabilities for predator avoidance, food exploitation and fecundity can only be passed on by a process of survival and recruitment over many generations in a particular river environment.

Hatchery fish are selected by the fish farmer for growth, health and aesthetics and most fish farm strains have not seen a wild brood fish for many years. The result is often a fish that looks fantastic but is will be prone to early spawning and poor survival.

During lunch there was also some discussion about taking local Stour trout from the river to use as broodstock to either populate egg incubator boxes or to provide eggs for a hatchery programme. The SFA should not underestimate how difficult it is to catch enough wild broodstock and keep them alive to maturation. The whole process is fraught with difficulty. Problems include catching enough wild broodstock - a minimum of 25 pairs is recommended to avoid genetic bottlenecking. That is 50 fish that in all probability would have spawned successfully in the Stour had they been left to access good quality habitats. If electric fishing fails to catch enough broodstock, there is a risk that fish that are caught will not be successfully returned to the river to spawn, resulting in a net damage to the wild stock. Monitoring the success and impact of native broodstock schemes versus habitat improvement alone is also an issue that has not been satisfactorily resolved.

The WTT believes that local broodstock schemes should only be used as a method of restoring a population that has been badly damaged, and only then when the bottlenecks impacting them have been removed (e.g. lack of suitable

habitat for all life stages). If bottlenecks are not addressed, stocking with fertile fish will bring no benefit to the wild trout population.

6. Conclusions

The Great Stour has the potential to provide a superb recreational trout fishery. There is every possibility that the wild component of the stocks can be significantly improved to provide a much more interesting and sustainable fishery.

From discussions with Neil Jones and others it would appear that the Great Stour is a very productive river for aquatic invertebrates. This is encouraging in terms of the quality of the water (which has, in the past, been questionable) and because of the quality of the sport, which in any river where there are good hatches of upwing flies is likely to be in great demand. The other big advantage is that survival of trout emerging from the gravel is likely to be excellent when there is an abundance of natural food available.

The major bottleneck on this river is that the quality and extent of spawning and juvenile habitat is extremely limited. To some extent this is exacerbated by the impounding effect of the numerous structures.

The current lack of good quality spawning habitat is not insurmountable. Despite popular belief, huge numbers of redds are not required to fill up every niche on six miles of chalkstream. Effort should be focused on improving survival rates from egg to fry. It is imperative that those sites that already have some scope are enhanced to ensure that spawning gravels are loose, silt free and well sorted. More winter cover is also desperately needed on shallow nursery areas.

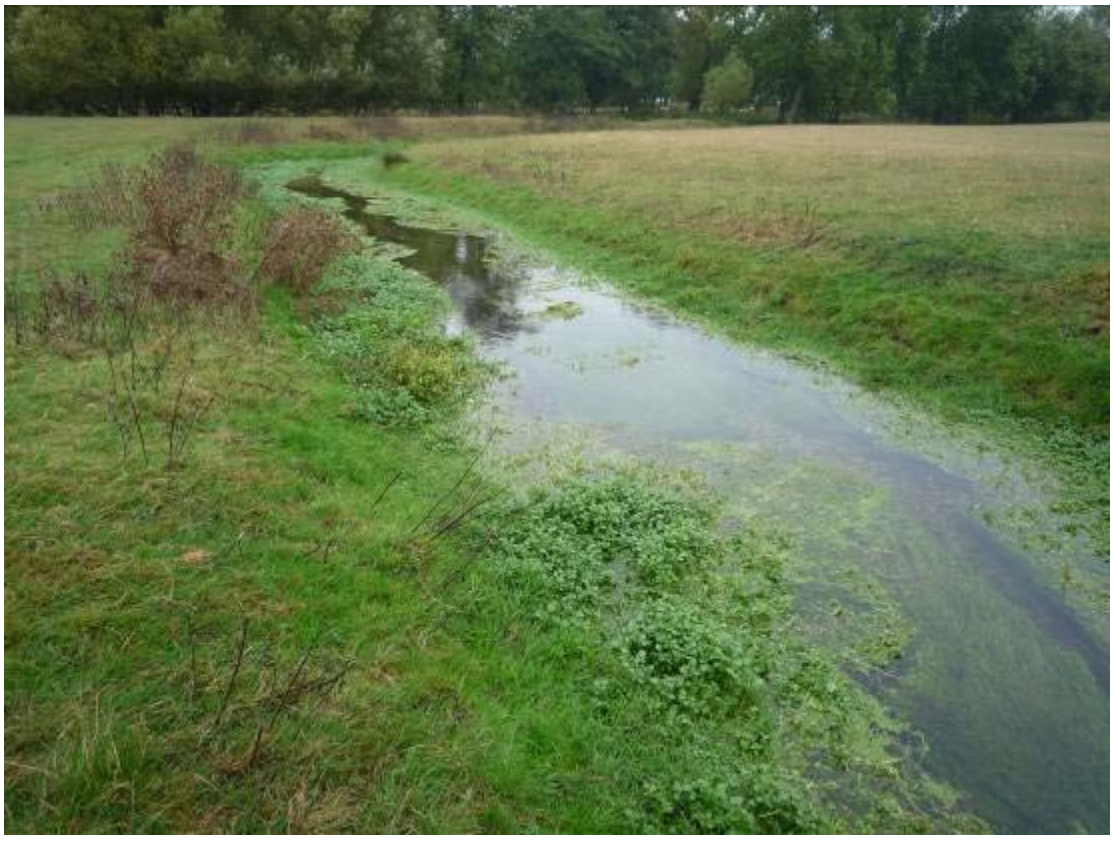
This can be achieved through a range of techniques ranging from the use of small pegged down sections of LWD through to gravel cleaning programmes.
Gravel cleaning is not seen as being very sexy. It is hard work and the results do not always appear to be tangible but on rivers like the Great Stour it can make a huge difference, with well placed work capable of achieving a huge boost in wild trout egg survival.

Work to existing spawning sites is therefore the number one priority followed by the creation of new sites.

There is no lack of suitably sized spawning gravels in this section of the Stour – it just needs to be made available to trout. Many sections of comparatively shallow water with potential for spawning are just too wide to promote the elevated water velocities necessary to clean and sort gravel. A combination of channel pinching, weir removal and the promotion of vertical river bed scour will create fresh spawning sites and provide more interesting lies for both wild and stocked trout.

Another possibility may be to explore using the small spring fed side stream that feeds into the river below the Corn Mill. Although there will be no benefits to the SFA from improving it, it might be possible to get consent from the EA to use this stream as a ranching zone for wild fish. With a little bit of work this site could be enhanced for spawning and wild trout production and if the EA are

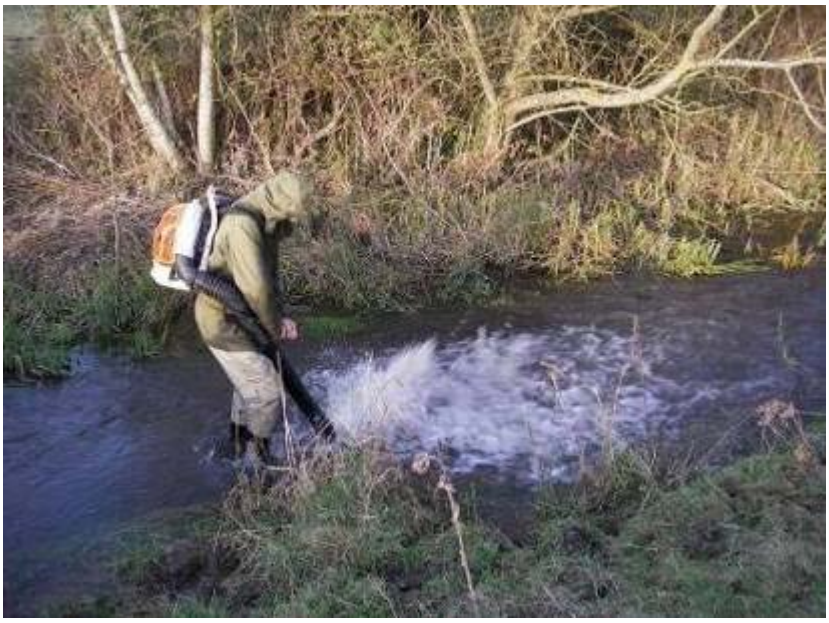
agreeable permissions might be granted to annually thin out wild parr and seed them out into suitable main river sites. This should only be contemplated if the programme of introducing hatchery-derived diploid fry is brought to an end. There is simply not enough good quality parr habitat available for a decent population of wild fish as well as large numbers of stocked fish. The emphasis around this programme should be quality rather than quantity and should go hand in hand with a long term programme of improving habitat through the entire reach for all life stages.



Spring fed side stream could be improved to produce true wild stock fish.

A first step would be to arrange a meeting with the EA to discuss the idea and ask for an initial survey to get a better feel for the stream's potential.

It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking any works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require a land drainage consent on any river designated as "main river". Advice can be obtained from the EA's Development Control Officer.



Gravel cleaning using a back pack leaf blower. Cleaning gravels on potential spawning sites should be a regular October activity

6. Recommendations

- Open up a dialogue with the Environment Agency over the potential of using the small side stream as a “wild” nursery zone to be used to augment stocks in the main river. The WTT is willing to provide further advice on how this might work.

- Consider removing any structures which are failing to provide any significant benefit. Consider notching the middle sections from the low weirs that extend across the full width of the river.

- Identify some wide shallow sites that might benefit from channel narrowing to increase water velocities and then use undershot LWD to promote pools and gravel ramps. Look for partners and funding to help you with these projects.

- Undertake a programme of early autumn gravel cleaning on the sections of shallow glide. Guidelines for gravel cleaning are attached as an appendix to this report. If the bed level drops too much then consider raising the bed to the original depth to reform the riffle using imported angular gravels.

- Control the growth of mid-channel pipe reed on the section upstream of the Corn Mill. Maintaining a narrow but open central section will reduce siltation and enable other submerged flow loving plants to become established. This work may require mechanical removal of root systems (see picture below)

- Set about controlling the invasive Himalayan balsam

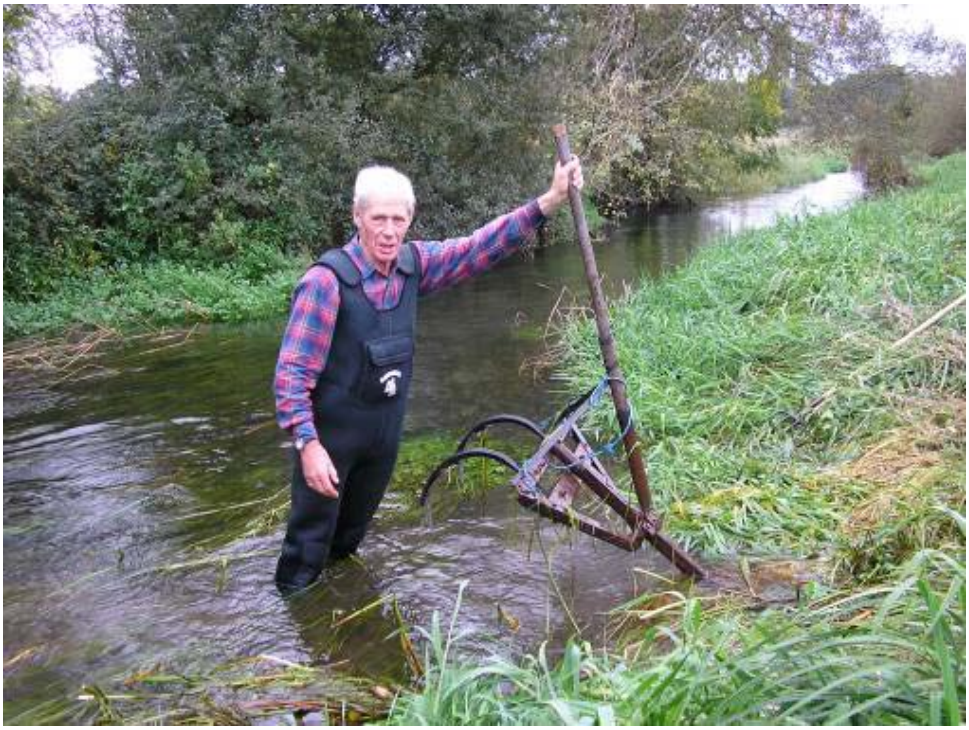
- Continue the sympathetic programme of allowing some margins to naturally encroach.

- Undertake a programme of tree planting with sallow or goat willow on the more open sections of channel to promote low (water level) cover which will promote better holding opportunities.

- Try and stabilise rather than remove any fallen LWD or brashings that end up in the channel. This is particularly important in the shallow nursery zones.

  Only use sterile stock fish to give wild fish the best possible opportunities for successful recruitment and stock with takeable sized fish. Given their poor over-winter survival there is no merit in catch-and-release of stocked fish towards the back end of the season so consider removing the bag limit for stock fish in September, if these fish can be reliably distinguished from wild fish.

- It is understood that members of the SFA are already signed up as part of the Anglers Monitoring Initiative. This is an excellent initiative should be continued



Anthony Mitchell with his winch driven “ripper” designed to remove pipe reeds from the Dorset Allen

6. Making it happen

There is the possibility that the WTT could help to start an enhancement programme. Physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). PV's typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams 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.

The WTT can fund the cost of labour (two/ three man team) and materials (max £1800). Recipients will be expected to cover travel and accommodation expenses of the contractor.

There is currently a big 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 clubs, syndicates and landowners through guidance and linking them up with others that have had experience in improving trout fisheries.

Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programmes.