



River Test – Lower Mill, Longparish



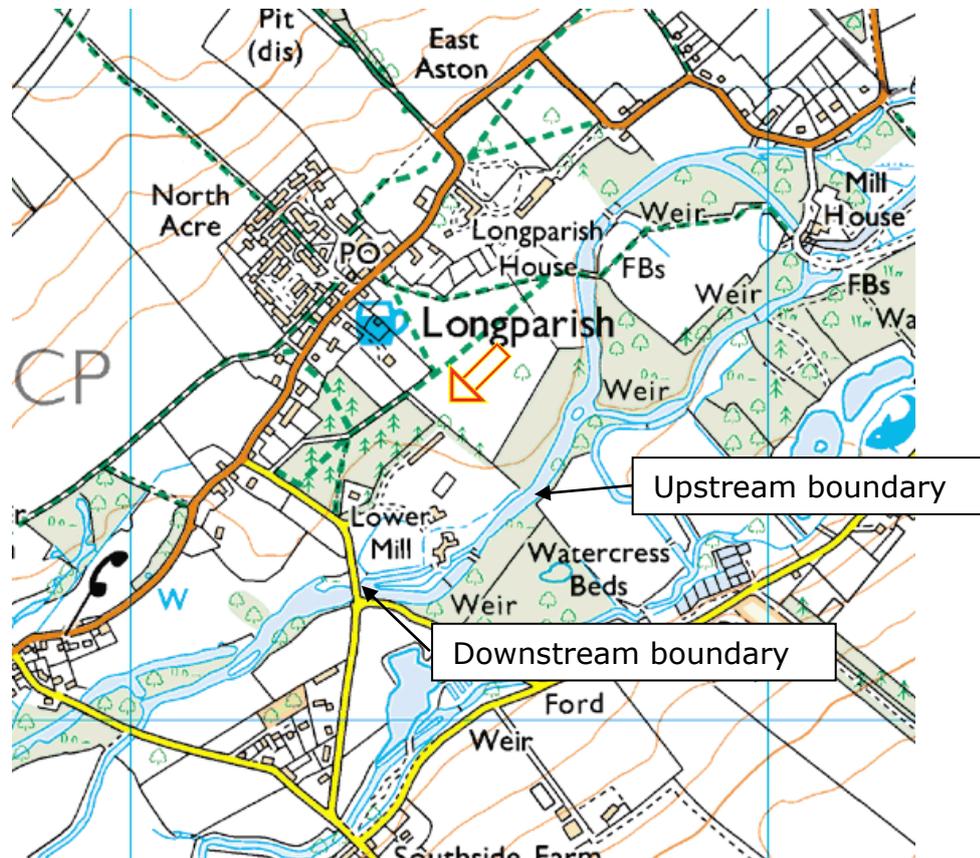
An advisory visit carried out by the Wild Trout Trust – December 2012

1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on a stretch of main River Test and carrier located at Lower Mill, Longparish (NGR SU 433442 to SU 436443).

Lower Mill is owned by Mrs. Karen-Marie Dinesen and the request for the visit was made by the Lower Mill River Keeper, Mr. Mick Blocksidge, who is responsible for the day to day management of the grounds and fishery. Comments in this report are based on observations on the day of the site visit and discussions with Mrs. Dinesen, Mr. Blocksidge and Mr. John Ellicock.

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.



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2. Catchment overview

The River Test is nationally recognised as the quintessential chalk river and is designated for most of its length as a Site of Special Scientific Interest (SSSI).

The Test has a world-wide reputation for being a first class brown trout (*Salmo trutta*) fishery. Much of the middle and lower river is heavily stocked with hatchery-derived trout to support a high level of angling activity. Where good quality habitats are maintained, the river has the capacity to produce abundant numbers of wild fish. A major bottleneck to enhanced wild trout production is thought to be through poor in-gravel egg survival. Comparatively small areas of nursery habitat for juvenile fish also restrict the development of wild stocks. Where good habitat does exist, survival rates of fry are usually very good in the food-rich environment.

Habitat quality on the Test varies enormously. The river channels are virtually all heavily modified, and originally constructed for milling or water meadow irrigation. Flow is rarely contained within a single channel and frequently flows are diverted via a plethora of channels, many of which are impounded (dammed) or perched (raised above the level of surrounding land), and controlled by a multitude of structures, weirs and hatches. This situation has enabled many historical landscape features to be preserved and allowed many riparian habitats to benefit from raised water levels. It has, however, also resulted in poor and fragmented in-channel habitats for flow loving fish species such as trout and salmon (*Salmo salar*).

In the last 150 years, the character of the river has been heavily influenced by management regimes designed to facilitate fly fishing, primarily for farm-reared stocked trout. Estimates vary for the economic value of the fishery but the river is undoubtedly an important economic resource for land owners and the local rural economy in general. Some of the middle beats of the river in particular are very intensively managed and fished. On some beats this has reduced the overall quality and diversity of in-channel and riparian habitats.

The River Test has been assessed by the Environment Agency as being in "moderate" ecological condition under the Water Framework Directive and a summary of its status is set out in the table below:

R. Test (Middle)

		View data
Waterbody ID	GB107042022700	
Waterbody Name	R. Test (Middle)	
Management Catchment	Test and Itchen	
River Basin District	South East	
Typology Description	Low, Medium, Calcareous	
Hydromorphological Status	Not Designated A/HMWB	
Current Ecological Quality	Moderate Status	
Current Chemical Quality	Does Not Require Assessment	
2015 Predicted Ecological Quality	Moderate Status	
2015 Predicted Chemical Quality	Does Not Require Assessment	
Overall Risk	At Risk	
Protected Area	Yes	
Number of Measures Listed (waterbody level only)	2	

3. Fishery and local overview

The fishing rights to the Lower Mill beat are retained by the riparian owner and day rods let via the Rodbox in Kings Worthy. Regular introductions of farm reared stock fish are made to augment the stocks of smaller wild fish that reside within the reach.

Angling activity is relatively low key and the owners are particularly interested in managing and maintaining the reach in an environmentally friendly and sustainable manner. Maintenance of the banks and river margins are undertaken by Mr. Blocksidge and all parties are keen to see the river improved for both fish and wildlife. The main house at Lower Mill is inextricably linked to the river as a former working mill. The milling leat houses a large heat exchanger that is used to provide green energy for the house. The network of main channel, milling leat and bywash channel all pass through a formal garden which has, in the main, been sensitively managed with regard to the river environment. There is a desire on the part of the owner to explore future management and maintenance options to ensure that the conservation value of the river is protected and, if possible, enhanced.

4. Habitat assessment

Habitat quality within the main channel beat was typically uniform shallow glide habitat (photo 1). The reach is defined by vertical, mainly revetted river margins on the RB and two impounding structures adjacent to the Mill House. The main hatches are used to regulate upstream water levels and (together with adjustable hatches on the milling leat) control the flow splits between the main and remaining channels.



Photo 1. Taken from near to the LB looking downstream towards the Mill.

Mr. Blocksidge has deliberately left the LB margin unstrimmed this autumn in line with advice given to all River Test keepers by the Environment Agency and the Test & Itchen Association. The right bank is currently more formally managed as an extension to the house gardens. In an attempt to reduce bank erosion pressures, the keeper has skilfully installed significant lengths of hazel hurdling on sections of the mill leat and carrier (photo 2). This method of bank protection is more desirable than vertical toe boarding, which is currently in place on the RB adjacent to the garden (photo 3), but it is still less than ideal in terms of providing sustainable bank protection and supporting a high quality biological niche.



Photo 2 Hazel hurdle revetment on the by-wash channel.

The wet margins of the bank of most river systems are the most biologically valuable section of the entire river corridor. Well-covered, shallow margins are critically important habitats for a range of plant, animal and invertebrate species, including juvenile trout. Although the toe boarding and hurdle revetment will provide the odd gap and nook for tiny fish and invertebrates, a semi natural margin with a shallow batter, supporting a wide range of native chalkstream emergent plants and herbs will be much more productive and provide a more durable form of bank protection. Many of our native chalkstream plants produce attractive flowers and a carefully managed 'natural' margin will work biologically but can also be aesthetically pleasing.

A different regime for bank management does not necessarily mean removing all of the bank defences and leaving the area to become overgrown and unattractive. Careful management of man-made chalkstream banks and margins, particularly on perched milling leats, will always be necessary to maintain the integrity of the bank and maximize biodiversity.

This approach to river bank management is discussed in more detail in the conclusions section of this report.

With regard to the main channel upstream of the hatches, it is evident that the river bed has risen over the decades since the original Mill was installed. This has enabled the reach upstream of the mill to partially recover and retain some reasonably energetic flow velocities and hence provide some favourable habitat for flow loving species such as water crowfoot (*Ranunculus spp*). Water crowfoot is a plant synonymous with high quality chalkstream habitat and this plant, along with the silt loving starwort (*Callitiche spp*), is present on this impounded reach and provides important habitat for the larval stages of many of the important river flies crucial for high quality trout stream ecology.

The undershot hatch gates (photo 3) are acting as a barrier to fish migration.



Photo 3. Main river hatches used to regulate upstream water levels and flow splits between the channels

It is possible that under certain flow conditions large adult salmonid fish may be able to negotiate this structure. It is highly probable, however, that the water velocity through the hatches, coupled with the significant head-loss will severely restrict upstream fish movements. Fortunately, the milling leat does offer a route for migration, thanks to a series of fish-friendly 'pool and traverses' (photo 4). A viable route for upstream fish migration is essential for the whole river to perform well and fragmentation of fish populations has been identified as a major issue on the River Test. In searching for a route upstream, fish will follow the route of strongest and fastest flow. For a passable route to work, therefore, would mean allowing more flow down the milling leat at crucial migration times (autumn and early winter), or alternatively by squeezing the outlet confluence

with installed flow deflectors so that fish moving upstream are attracted into the channel from the main river confluence.



Photo 4. The 'fish pass' pool and traverse sequence which bypasses the mill wheel and provides a usable safe route for upstream migration. Maintaining strong flows via this route will be very important in the autumn/early winter period.

Downstream of the main hatches there is another small weir constructed from large block stone. It is not clear what purpose the weir serves other than to hold up water levels in the section adjacent to the house. Under strong flow conditions the weir will be passable for fish, however the structure is having an impounding effect which is seriously reducing habitat quality on the reach upstream to the main hatches. Removing a central section of the weir will pull water strongly through this reach, slightly lowering the upstream water levels and scouring the central section of river bed – all improvements to the habitat. On the downstream side, the river will scour a significant holding pool, and throw up river bed gravels to form a shallow ramp, or pool tail which will be ideal for trout, or even salmon spawning. When lowering water levels, the river margins will initially look bare but will soon recover, especially if combined with re-profiling to a gentle slope, rather than vertical sides.

Forcing more water through the central section of the weir will place increased pressure on the remaining ends of the structure. Using the large stones to support the downstream side should strengthen what remains of the original weir. You may decide to seek advice from a qualified engineer before making this change.



Photo 5. The blockstone adjacent to the house could be modified to improve in-channel habitat

Habitat quality on the main channel downstream of the weir is excellent, particularly in the areas where the margins are shallow and gently sloping. Some low, overhanging tree cover, albeit from ornamental coniferous trees adjacent to the RB, provide cover and sufficient security for some recent spawning activity (photo 6). The reach could be further improved by removing hard bank defences and planting the occasional low scrubby tree. The goat, or pussy willow (*Salix caprea*) would be a better option and would provide excellent riverside cover without growing too tall and shading out the adjacent milling channel.



Photo 6. A trout redd (buried nest of trout eggs) immediately adjacent to a bolt hole upstream. The faggot revetment seen in the margin provides lots of micro spaces and cover for trout fry which will hatch out of the gravel in March and bolt into the shallow margin for cover.

The tail of the milling channel has enormous scope for enhancement (photo 6 and 7). Currently the river banks are vertical and heavily defended with toe boarding. The river bed is flat and the flows are predominantly smooth laminar glide. Weed growth is poor, with no crowfoot and a few clumps of starwort and water parsnip. The river is heavily shaded adjacent to the LB and there is a lack of flow velocity because the channel is over wide for the available discharge. River bed gravels are flat, poorly sorted and heavily infiltrated with fine sediments.

The lack of any valuable river margins, paucity of in-channel cover and flat bed topography make this channel a hostile environment for wild fish. Stocked fish may reside here for a while immediately post introduction, but even for them, the environment lacks cover and diversity, probably leaving even the most domesticated trout very nervous and highly likely to vacate the reach in a downstream direction!

The small by-wash channel (photo 8 and 9) flowing around the western side of the mill does provide some good habitat for small wild fish, thanks to the sensitive management regime which I understand has recently been adopted.



Photo 6 Downstream end of the milling channel



Photo 7 Section of milling channel running immediately downstream of the mill.



Photo 8 A natural margin providing excellent bank protection and cover for small fish



Photo 9. A recent change in maintenance has enabled the cress fringe to encroach from the RB, squeezing the channel and elevating flow velocities. Where the flow is strong, the gravels are bright, healthy and silt free. The cress will die back once the winter frosts arrive but the principles of providing great cover and natural flow deflectors can clearly be seen. These features could be replicated on a bigger scale in the milling channel.

5. Conclusions

The River Test at Lower Mill is very typical of many sections of the middle Test. Long sections of main river and carrier have vertical, defended banks and the in-channel habitat is largely flat bottomed, with uniform laminar flow patterns. All of the channels lack physical and biological diversity, that if modified could provide a much more valuable and aesthetically pleasing environment, as well as boosting the wild component of the fish community.

The presence of the milling structures and the need to maintain the formal aspects of the garden adjacent to the river are understandably constraints for physical restoration; however, there are significant opportunities to create a much more diverse river environment, as well as potentially improving the long term sustainability of defended river margins.

There are a number of options available, ranging from minor tweaks to the way the river and carriers are managed, through to a major river enhancement project. The opportunity to improve the main channel by manipulating the rock weir are comparatively low cost, simple and will provide almost instant results. The section of mill leat/carrier downstream of the Mill house also provides a blank canvas for a major scheme that could transform the river into a vibrant and healthy chalkstream channel.

5.1 Main River.

A review of the use and operation of all the sluices could highlight potential opportunities for improving both in-channel habitat and improve fish passage. Drawing the hatches on the main weir and reducing the upstream water levels will increase water velocities and reduce the siltation levels on the reach upstream. A shallower and faster reach will promote improved water crowfoot growth and improve habitat for plants, invertebrates and fish. Water depth in strategic locations can be maintained by using woody debris flow deflectors to help scour the river bed and create deeper pools. Large woody debris (LWD) flow deflectors are only an option on the upstream section if increased water velocities can be achieved.

It is recognised that lowering upstream water levels may not be possible without seriously impacting on flows entering the by-wash channel and possibly also the mill leat. There may be level controls on the mill leat that will enable a corresponding lowering of the inlet to still enable sufficient water to draw through via this route. This will be important, particularly during the autumn and winter period to ensure that fish can safely migrate upstream.

The toe-boarded vertical margins adjacent to the formal garden could be softened by installing a narrow toe to the foot of the bank. A partially submerged log, or even a rock roll revetment could be pinned in place and then back filled with gravel to just above normal summer levels and then planted with attractive native emergent plants and herbs. The installed shelf need only be 0.5 to 1m wide but should provide a valuable toe to the bank that will support a biologically rich habitat. Adjacent to the formal lawn setting, the plants could be trimmed at the top of the bank level to maintain the neat formal look to the garden from the LB. From the RB, the view toward the house would be much improved and the

new emergent fringe would act as protection for the existing toe boarding, absorbing energy during peak spate flow conditions.

The rock weir represents the easiest 'win' and notching out a central section of the weir is recommended.

Downstream of the weirs, there is the opportunity to create improved in-channel habitat through the use of woody debris flow deflectors. These can be pinned to the river either as modular flow deflectors keyed into the bank, or as comparatively short trunk sections pinned into the centre of the channel to promote bed scour. Flow deflectors have the capacity to trap and catch cut weed but it is possible to install deflectors that are just subsurface so that they still promote bed scour and surface upwelling, without become a maintenance liability.



Phot 10. A LWD deflector pinned to the bed of a chalkstream channel and designed to scour the bed, sort gravels and provide a safe lie for a trout.



Photo11 A small single chunk of wood pegged in at right angles to the flow can transform a flat shallow glide. Breaking up the gravel crust where the water eddies with a fencing spike will greatly accelerate the scouring effect.

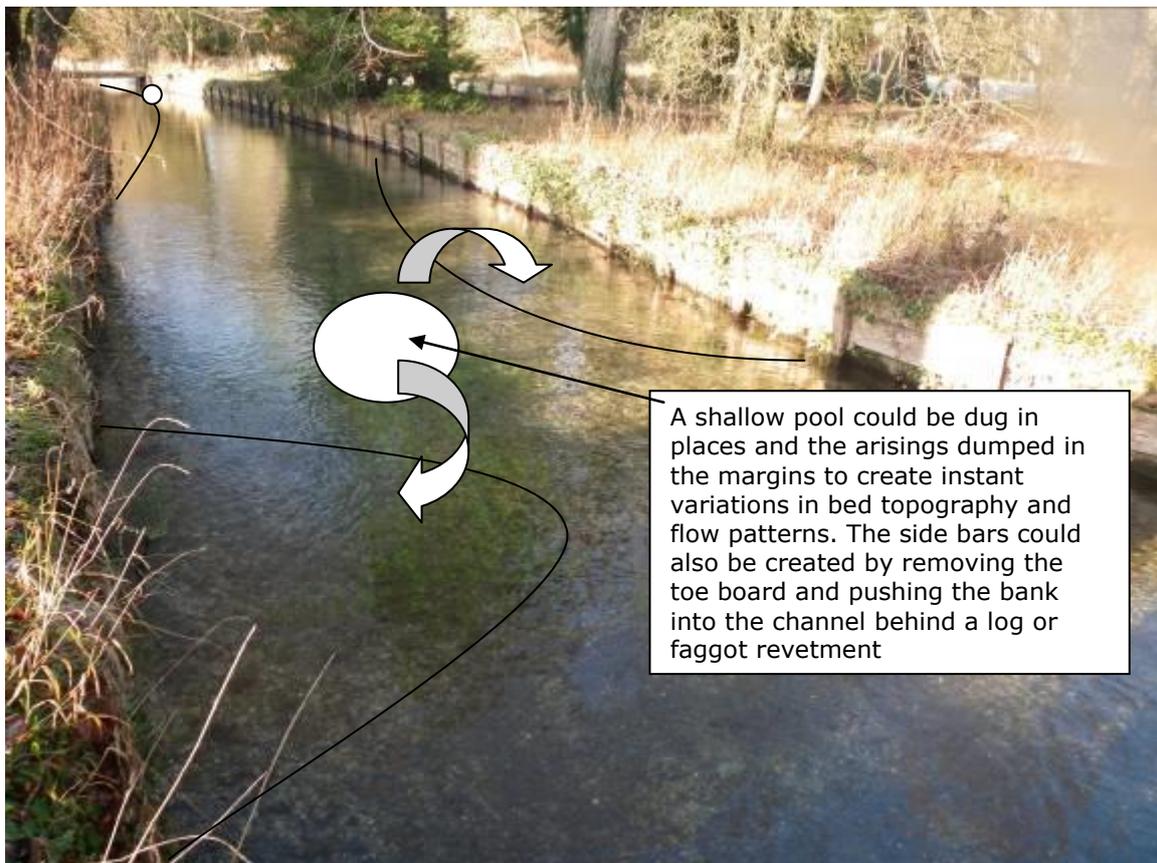
It is recommended that a site meeting and consultation is made with your fishing agents because these structures can sometimes be deemed by some anglers as a nuisance. Many anglers, however, will recognise that providing more variations in depth and flow patterns will also provide increased numbers of high quality trout lies.

5.2 Mill leat

The mill leat does provide the best opportunities for free passage through the Lower Mill reach. Maintaining a good flow through the leat is therefore essential unless plans are in place to radically improve access via the main hatches. Maintaining strong flow via this route is very important, especially in the October to January period. Making this channel more attractive for fish migration could be achieved by installing a LWD deflector at the confluence of the leat with the main river to promote an attractant plume of fast water. Fish seeking an easy route upstream will be attracted by the illusion of extra flow and may then swim up into the leat and easily ascend the river via the stepped by-pass channel.

The mill leat channel itself is ripe for enhancement. This can be achieved on a number of levels. Simply allowing a little more light to reach the channel by thinning the conifer canopy will help, as will the installation of LWD to kick the flows patterns from side to side and promote some variation in bed profile. As the leat is significantly impounded by the Mill structure, there are huge opportunities to pinch the width of the channel in places downstream without increasing flood risk. A wonderful enhancement could be achieved by removing the toe boarding on one, or both margins outside the formal garden area and

pushing the top of the bank into the channel behind a newly installed log, or hazel faggot revetment. Currently the channel is far too wide for the given discharge and narrowing the channel by approximately 50% is entirely possible with no risk of flooding. It would be wonderful to have a naturally meandering channel with a variety of depths, bank heights and channel widths. This could still be achieved with the toe boarding in place by redistributing the existing bed material with a tracked excavator. A mixture of narrowing and creating a meandering channel would provide the best results.



Micro habitats for small fish such as trout parr and bullhead could be created by dotting the occasional large stone (ideally of local provenance such, as a big flint) into shallow sections of the Mill leat and by-wash channel. In places, the small by-wash channel is extremely bare and flat and represents a hostile environment for small fish.

A more relaxed approach to maintenance within the channel, as demonstrated outside the front of the house will greatly enhance the biological value of the stream.

7. Recommendations

- Re-evaluate the current operation of all water level control structures. Shallower, faster flowing water will, in time, improve in-channel habitat.

- Notch the centre out of the rock ramp weir.
- Consider options for a radical improvement of the Mill leat on the reach running downstream from Lower Mill. A project here designed to improve fish passage and habitat quality might attract external funding.
- Consider installing a new low toe to the RB of the main channel to enhance the aesthetic and biological quality of the defended bank.
- Consider options for tree work to allow more light to penetrate into the Mill leat channel.
- Consider a programme of planting low native trees to promote low, overhanging scrubby cover.
- If a programme of river enhancements is planned, then it is recommended to have an early consultation with the Environment Agency and Natural England. The Wessex Rivers and Chalk Stream Trust may also be source of support in helping to deliver improvements to the river.
- Further information on many of the techniques suggested in this report are available via our Chalkstream Habitat Manual available on our web site www.wildtrout.org or via a disc obtained from our office address.

Acknowledgement

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