River Rother - Empshott

A advisory visit by the Wild Trout Trust – October 2013

1. Introduction

This report is the output of a Wild Trout Trust visits undertaken on 100m section of the Western Rother at Bullsbrook Cottage near Greatham in Hampshire. The request for the visit came from Rose Manning, who helps to manage the garden with the owners, John and Brenda Shapiro.

The request for advice was made due to some concerns arising from river bank erosion issues and also the desire to explore ideas for enhancement and general stream maintenance.

The walkover concentrated on a short section of the river running upstream from the road bridge at Snailing Lane, National Grid Reference SU 766 303.

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 Western Rother is the main tributary of the River Arun, rising from the chalk hanger near Hawkley, and is quickly augmented by a stream rising from deep greensand springs near Longmoor.

Much of the Rother is characterised by a soft sand substrate, a function of the greensand geology. River bed gravels are relatively scarce. Those that are present tend to be derived from two principle sources, either from broken outcrops of sandstone, or from the small quantities of flint that have washed down from the streams that drain the chalk slopes. Although strong populations of wild brown trout are to be found upstream of Petersfield, generally low densities of both trout and coarse fish are found through the middle reaches, where the substrate is quite soft and habitat relatively uniform. Sections that possess a firmer substrate and more varied habitat, however, do support better fish populations.

The Rother does support a strong population of sea trout, which run the lower and middle river and tend to spawn in small tributaries. Sea trout access as far upstream as Petersfield is extremely difficult due to the numerous weirs and milling structures which block and delay upstream migration.

Water quality is generally good, particularly above Petersfield. Occasional pollution incidents have been reported in the area resulting in fish mortalities, but these are fortunately rare.

The river suffers periodically from low flows, and the intensive nature of agricultural within the catchment can put enormous pressure on the river. Large quantities of water are removed for spray irrigation in the middle reaches; in

recent years a move towards salad crop production has led to concerns over increased siltation derived from finely tilthed soils in the flood plain and surrounding valley slopes. Coniferous plantations on the greensand valley side are another source of fine sediments, which find their way into the river via a network of small tributaries and side streams. The huge volume of sand entering the Rother is thought to be compounded by intensive rainfall events regularly experienced during the last decade.

The Rother (Waterbody ID 107041012840) has been assessed as being in 'moderate status' under the Water Framework Directive although the river is known to be both over abstracted and over licensed for abstraction under the EA's Catchment Abstraction Management Plan. The middle and lower Rother are failing WFD targets for siltation pressures and impoverished fish communities. The WFD assessment process for the upper Rother does not reflect the fact that the local trout population is performing well.

Western Rother (Upstream Petersfield)	
Waterbody ID	GB107041012840
Waterbody Name	Western Rother (Upstream Petersfield)
Management Catchment	Arun and Western Streams
River Basin District	South East
Typology Description	Low, Small, Siliceous
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

Summary of Water Framework Directive information for the River Rother

3. Habitat assessment and project opportunities

The upper reaches of the River Rother in the Hawkley to Empshott area are regarded as being a good example of a healthy trout stream. The river bubbles up from the chalk aquifer and enjoys comparatively stable flow and good quality water. The stream is known to support a healthy wild brown trout *Salmo trutta* population and was until very recently home to one of the last populations of white clawed crayfish *Austropotamobius pallipes* in the South. Crayfish have not been found in recent years and it is thought they may have contacted crayfish plague brought in via non native signal crayfish *Pacifastacus leniusculus.* Signal crayfish appear to be still absent in the upper reaches of the Rother and it is still possible that a small population of our native crayfish exists in small pockets.

The section of stream running up above the Snailing lane bridge is very typical of much of the upper river. Long sections of the stream meander down through unmanaged river margins, forming classic sequences of pools, riffles and glides and flowing over a mainly gravel bed.

The channel at Bulls Brook is fairly wide for the average discharge and heavily shaded by mainly mature alder *Alnus glotinosa*, ash *Fraxinus excelsior* and willow *Salix sp*. Signs of bank erosion were evident in several locations, confirming the fact that this stream is very energetic following periods of above average rainfall, compounded by the comparatively steep channel gradient which rises up from this location from the nearby chalk hangers above.

Towards the bottom boundary, the river is slightly impounded by a small stone weir (photo 1). Some concerns have been raised over bank erosion on the RB, where the river flow is being squirted towards the margins and as a result is nibbling the bank away. The garden staff have made some valiant attempts to slow down the rate of erosion by planting willow spilling. This will undoubtedly help to protect the bank but heavy shading via a large weeping willow located on the opposite bank may restrict how well this material strikes.

Erosion pressures on the bank at this location are mainly due to the configuration of the stone weir structure. Currently the weir forms a gentle downstream facing arc and under spate conditions it is thought that high velocity water is being forced out and into the margins, rather than being funneled into central channel locations.

The weir was installed at least 20 years ago, presumably to hold up water levels in the reach adjacent to the property gardens. This increased water depth is slowly but surely disappearing as the river bed has started to accrete sediments and is slowly rising, causing a distinct step in the river bed.

The property owners value the sound of the water as it tumbles over the stones but unfortunately this feature is having an adverse impact on the streams morphology and ecology, as well as being responsible for the bank erosion on the downstream side of the structure.

Reconfiguring the weir to construct two upstream facing stub groynes will resolve the erosion issues. Leaving a free gap between the groynes will also enable the river bed to erode back the settled sediment that has deposited in the

section upstream of the weir. The groynes, or flow deflectors could be constructed from the existing stones, or be fabricated from tree trunks. Under most flow conditions this alternative design should still be audible as water will bubble over the top of the stub groynes.

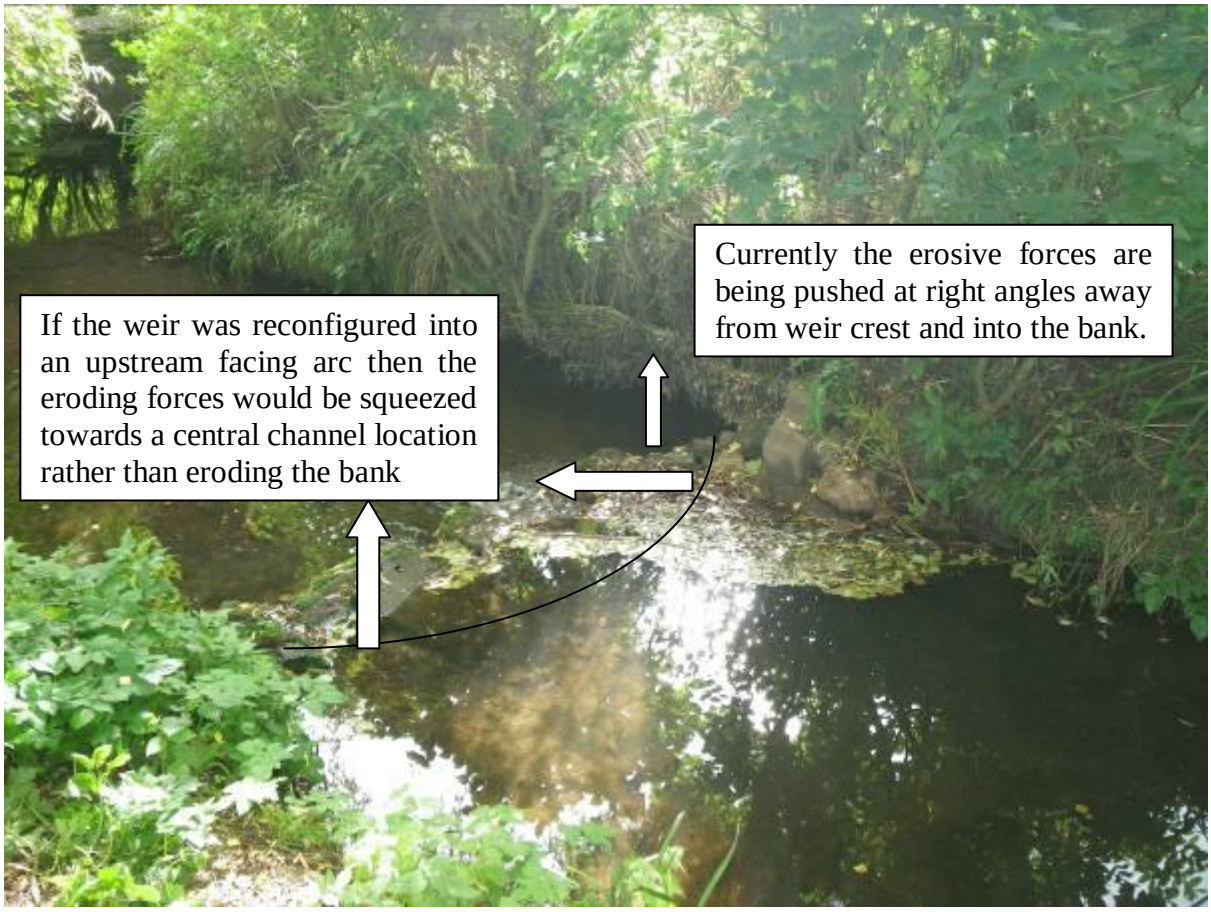

Photo 1 Weir at Bulls Brook cottage

Replacing the stones to form two upstream facing flow deflectors and removing the central section of the weir all together is the best option. This will initially lower the water levels upstream and pull the water through much faster and lower. Initially the river will look very unattractive in the reach immediately upstream of the structures because the deposited bed material will be exposed. The increased flow velocities generated by pulling out the central section will some help to clean the bed and will soon become a much healthier environment for invertebrates and fish, especially if coupled with exposure to slightly more direct sun light. The principle of driving the river bed down by encouraging swift water velocities, rather than impounding the level with a full channel width weir will provide a high quality stream environment for gravel spawning fish species such as trout and bullheads (*Cottus gobio*).

An example of what upstream facing stub groynes might look like is shown in photo 2

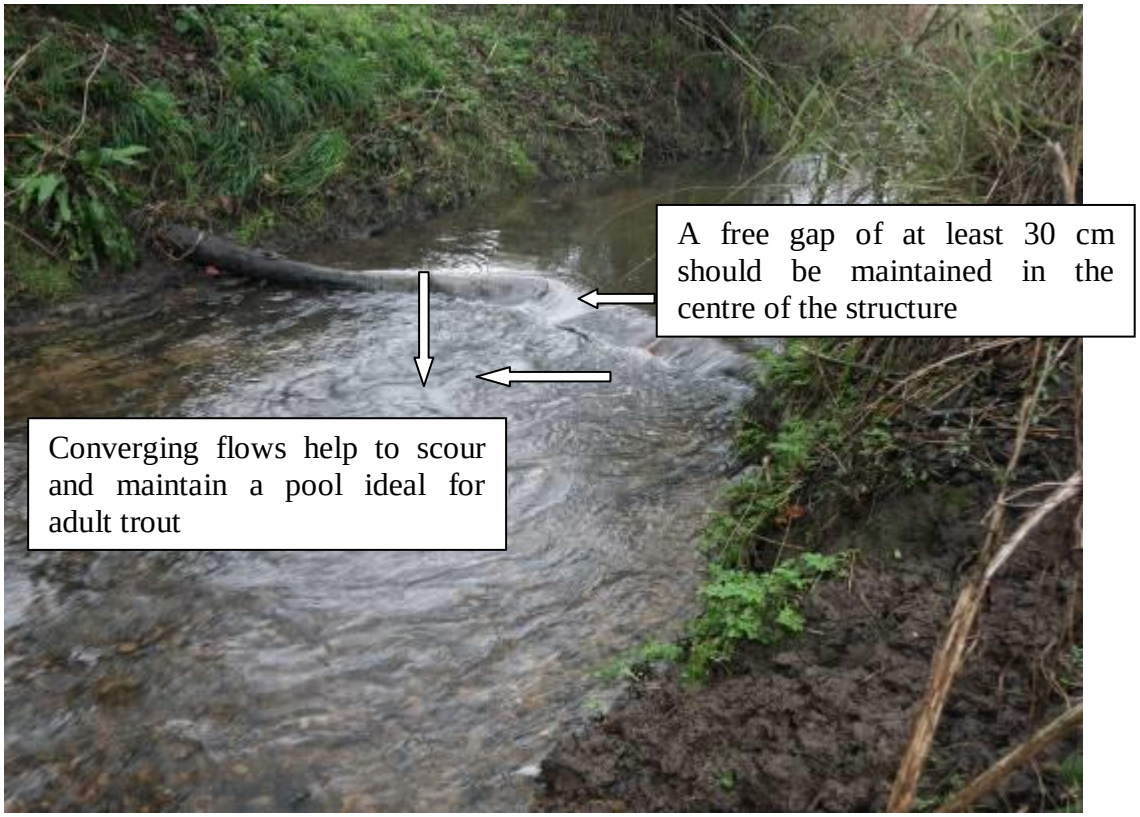

Photo 2. Upstream facing V deflectors. These can be made from tree trunks or stones.

Stub groynes made from simple tree branches can be secured in place either with driven chestnut clefts and wire, or can be drilled through with a wood auger and nailed to the bed with pieces of steel reinforcing bar. Information on these techniques can be found on the WTT web site www.wildtrout.org

4. Conclusions and recommendations

Removing the existing structure and replacing it with upstream facing stub groynes will reduce bank erosion pressures and create improved habitat upstream.

The use of planted live willow in the area adjacent to the bank erosion is recommended. Willow spilling works best where the whips can be pushed down into the toe of the bank at water level and where there is sufficient light to promote vigorous growth.

Acknowledgement

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

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