WILD TROUT TRUST

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Advisory Visit

River Slea, Lincolnshire

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1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the River Slea, Sleaford, Lincolnshire on 28th November, 2022. Comments in this report are based on observations on the day of the site visit and discussions with the Witham Catchment Coordinator for the Environment Agency (EA) and representatives of Grantham Angling Association Fly Fishing Section (GAAFFS), tenants of the fishing rights.

Normal convention is applied throughout the report with respect to bank identification, i.e. the banks are designated left hand bank (LHB) or right hand bank (RHB) whilst looking downstream.

2.0 Catchment Overview

The section of the Slea inspected lies immediately downstream of the reach which was the subject on a Wild Trout Trust advisory visit in 2015, which contains background information on the catchment, summarised again here:

- The river is classified as heavily modified because it is an artificial cut and former navigation between Sleaford and the River Witham (Table 1). The Slea Navigation Trust is the owner of the riverbed and is working to reinstate the navigation. Parts of the former river course are visible in fields to the south of the current channel (Figure 1).
- The river is groundwater-fed from the Lincolnshire limestone aquifer; it suffers from low flows due to over-abstraction of groundwater to the extent that the upper reaches regularly dry up and flow is augmented via a borehole at the upstream (west) side of Sleaford.

River	Slea
Waterbody Name	Slea
Waterbody ID	GB105030056670

Management Catchment	Witham > Witham Lower
River Basin District	Anglian
Current Ecological Quality	Overall status of **Moderate** ecological potential sustained through two assessment cycles.
U/S Grid Ref inspected	TF0745346110
D/S Grid Ref inspected	TF0844347123
Length of river inspected	1.4km

Table 1 Information from https://environment.data.gov.uk/catchment-planning/WaterBody/GB105030056670?cycle=3

The reach inspected lies to the east of Sleaford town centre, between Cogglesford Mill (upstream limit) and the A17 trunk road bridge (downstream limit). There is a tilting weir at the upstream end (cover photo) within a former lock structure, and a weir at the downstream end (Bonemill Bridge), again a former navigation lock.

3.0 Habitat Assessment

The in-stream habitat quality of the Slea is poor, a consequence of it being a straight, artificial cut. The channel is a uniform width, there is little variation in depth and an absence of a pool-riffle sequence. Riverbed substrate comprises unsorted limestone gravels, covered with a layer of silt. Where the channel is unshaded by trees, emergent vegetation grows across the full width of the channel; this is managed by mechanical weed cutting/removal (see below).

The channel has a low gradient with the fall concentrated at the former navigation lock structures mentioned above; between these there is a fall of approximately 0.75m over the 1400m reach (from LiDAR 1m DTM data; Figure 1). The low gradient, combined with the perennially low flows experienced on the Slea, provides very little flow energy, which is evident from the lack of scour around such features as submerged pipe crossings (Photo 3). The little gradient there is along the reach is concentrated around

the railway bridge about halfway along (Photo 4, Photo 5). Here there are riffles upstream and downstream of the bridge and a lateral scour pool against the bridge footings; this was about the sum total of good trout habitat seen.

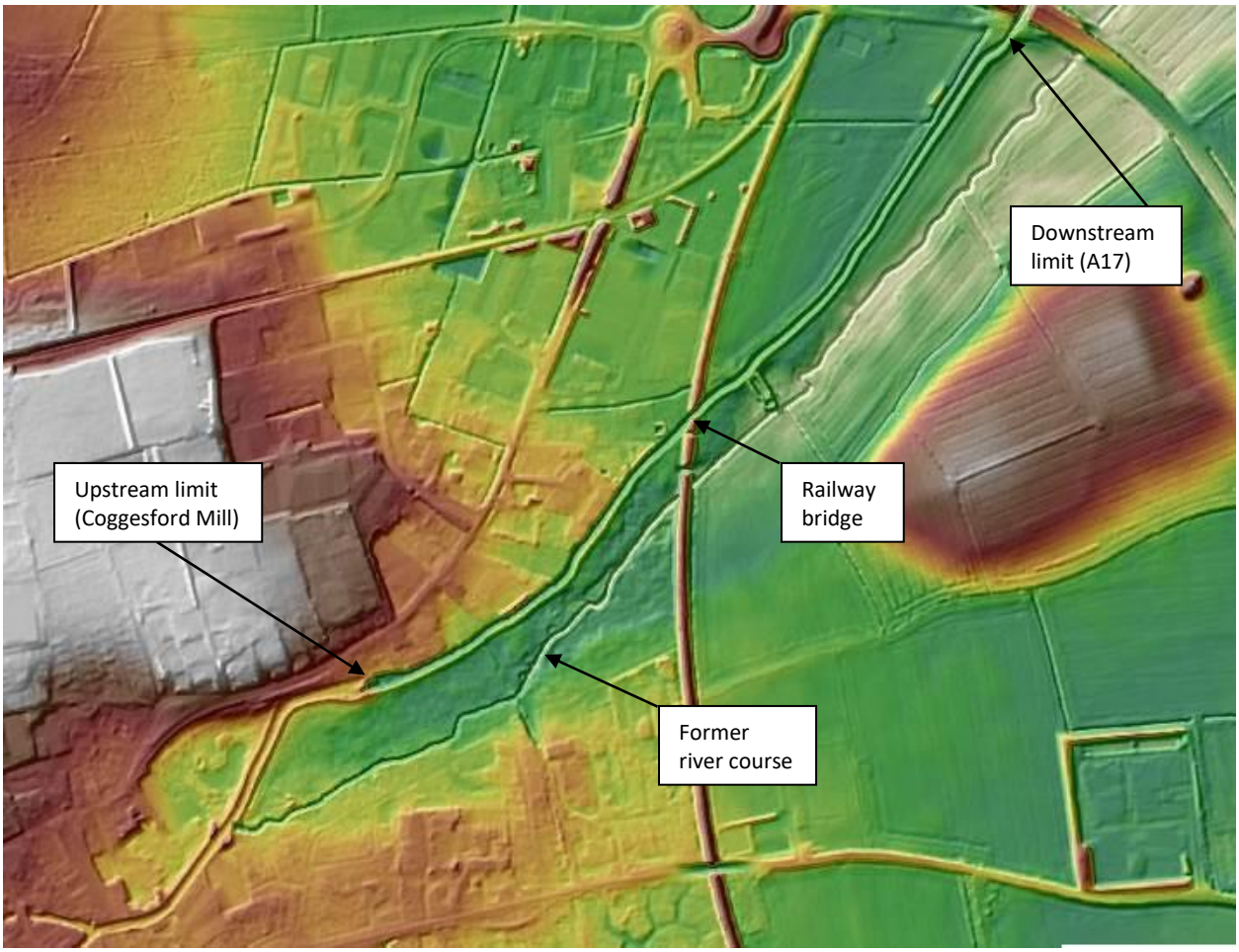

Figure 1 LiDAR map (1m DTM) of the reach inspected (https://www.arcgis.com/apps/webappviewer/index.htm)

At the upstream end of the reach, the river is shaded by mature trees and the relatively faster flows from the mill and lock structures keep the river bed free of silt (Photo 1). Progressing downstream, the river is less shaded which allows emergent vegetation to colonise the full width of the channel (Photo 2).

During the visit, the First Witham IDB delivered to site an excavator with weed cutting bucket to remove this vegetation on behalf of the EA as the Slea is designated main river. This type of in-channel work should not be taking place at this time of year because it is during the spawning period for

brown trout (spawning trout were observed upstream of the reach inspected) and risks the illegal disturbance of spawning fish and smothering of eggs with mobilised fine sediment. Such works should not take place later than 30th October (start of trout angling close season) nor earlier than 16th June (end of coarse fish close season).

Photo 1 Upstream end of the reach, immediately below Cogglesford Mill. Some channel gradient is present here, along with clean (relatively) gravel. Note the exposed margins as a result of very low flows following a drought summer.

Photo 2 Approximately halfway between Cogglesford Mill and the railway bridge – a low gradient, depositional environment choked with emergent vegetation. This section was about to be weed-cut by First Witham IDB on the day of the visit.

Photo 3 Submerged pipe crossing showing no signs of scour.

Photo 4 An increase in channel gradient at the railway bridge allows some riffle and pool habitat to exist.

Photo 5 Faster flows and clean gravels downstream of the railway bridge.

Photo 6 Abstraction point for an irrigation reservoir (winter storage).

Photo 7 Typical habitat on the lower section of the reach, maintained as a drainage channel.

Photo 8 Upstream view from Bonemill Bridge showing weir at the lower end of the reach.

As mentioned above, a short length of improved habitat is present immediately upstream and downstream of the railway bridge where there is a localised increase in river bed gradient. Riffles with coarse substrate are present along with a scour pool under the bridge. This area provides a limited amount of suitable trout spawning habitat.

Further downstream, the habitat type reverts to a steady glide impounded by the weir at Bonemill Bridge. The river bed substrate is dominated by fine sediment and vegetation is typical of still/slow-flowing water (marginal sedges, submerged broad-leaved pond weed *Potamogeton natans*). This section is evidently maintained by mechanical weed cutting to prevent emergent vegetation encroachment. An abstraction point is located on the right bank, apparently supplying an irrigation storage reservoir. (Photo 6 - Photo 8).

4.0 Recommendations

4.1 Maintenance

- Ensure robust screening processes are in place to prevent in-channel maintenance operations such as weed cutting taking place during fish spawning seasons.
- Liaise with weed-cutting contractors to carry out a pattern of cutting which maximises fishery benefit. For example, cutting a meandering central channel would concentrate flows, scour fine sediment and provide better angling opportunities.

4.2 Habitat Improvement

There are various techniques available to improve in-stream habitat in a situation like this (examples in the appendices), but firstly it is important to consider the constraints at this site and the likelihood of any works achieving the desired outcomes of an improved trout population and better-quality fishery.

- Looking at the bigger picture, at present the Slea consists of a former navigation channel with insufficient water (and infrastructure like locks) to function, and a former river (old channel) without water. Restoration of either (or both) is constrained by the current water resource situation.

- The physical nature of the current river (navigation) channel and limited flows greatly limit opportunities for trout habitat improvement – note the existing lack of scour around in-channel structures.
- The river bed and fishing rights are owned by the Slea Navigation Trust which has indicated that any habitat works must maintain a channel width of around 14 feet (4.3 m) with a view to future restoration of the navigation. This limits trout habitat improvements even further because it is not possible to 'pinch' the channel sufficiently to promote scour. Future restoration of the navigation will essentially remove even those limited opportunities by reinstating impoundments (locks) which will drown out the existing gradient.

Given the above, it is unlikely that investing resources in trout habitat improvements on the navigation channel would be cost effective. A more logical approach would be to restore the former river channel and prioritise flows via that route, whilst retaining the navigation channel as a stillwater (impounded) environment and flood relief channel until the navigation restoration is realised. This would have several advantages including:

- Contributing towards a range of conservation objectives (including Water Framework Directive and various species and habitat legislation).
- Development of a naturalised river channel without the need for maintenance.
- Improved biodiversity / fishery benefit, offsetting impacts of navigation restoration.
- Potentially improved flood risk situation for Sleaford.
- Better habitat connectivity (fish passage).

The above would be dependent upon the availability of water and a fair apportionment between the channels.

5.0 Additional Information

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/shop/products/rivers-working-for-wild-trout-dvd 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: www.wildtrout.org/content/library

6.0 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.

7.0 Disclaimer

This report is produced for guidance; no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon guidance made in this report.

8.0 Appendix – Examples of habitat improvement techniques

- "Dig-and-dump" (Photo 9)

This technique is applicable on heavily-modified channels and involves re-shaping of the river bed with an excavator to create pools and use of the resulting material to construct alternating or opposing berms to pinch the flow, create scour and maintain pool depths. The technique relies on there being sufficient gradient (and hence flow energy) over the long-section of

the reach – any high points in the bed further downstream can frustrate the objective, for example an un-dredged section of river beneath a bridge, or a weir; this could well be the case on the Slea with the railway bridge and former locks.

Photo 9 River Lark, Suffolk, following re-shaping of the river bed ("dig-and-dump"), Credit: Ian Hawkins.

- In-stream structures

Structures such as brushwood berms ((Photo 10) and log flow deflectors can be used to pinch the channel and concentrate flows, creating scour, depth variation and sorting of river bed substrate. However, this is unlikely to be the case on the Slea given the evidence of little scour occurring around existing in-channel structures and the minimum 14-ft channel width required by the landowners.

Photo 10

- Gravel Introduction (Photo 11)

Coarse substrate could be used to construct 'riffles' within the channel. These provide improved spawning habitat and may create scour pools at the downstream side. However, upstream they have an impounding effect which can promote settling out of fine sediment and encroachment of emergent vegetation, so their level must be set so as not to create an impoundment.

Photo 11 Introduced gravel, Willow brook, Northants.

- Weir removal (Photo 12).

Removal of existing impoundments would restore gradient to the channel which would allow many of the above techniques to operate effectively. However, this would conflict with the ambition to restore the navigation.

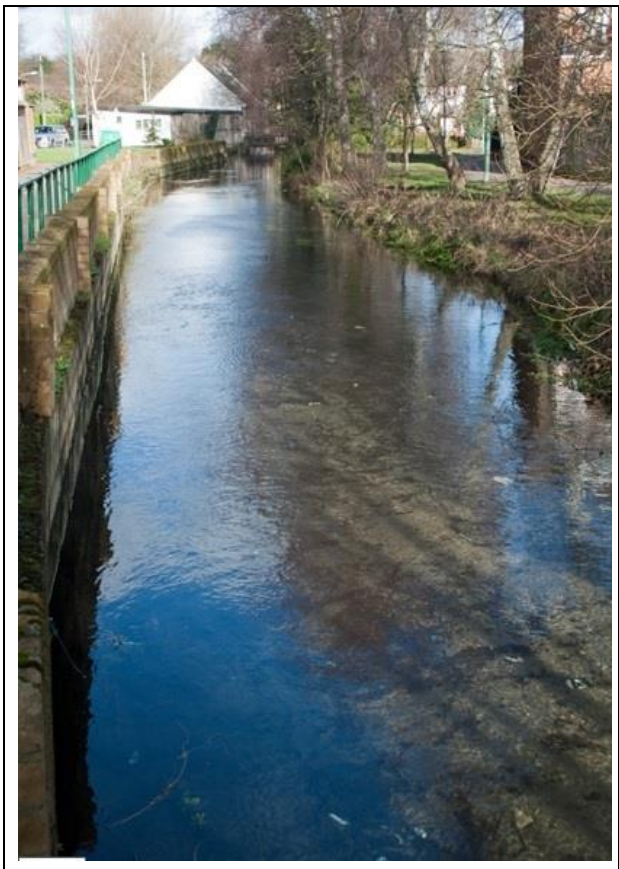

Photo 12

River Wandle, London, before (left) and after (right) weir removal. Credit: South East Rivers Trust