WILD TROUT TRUST

Project Proposal

Thornton Beck, R Nidd (GB104027063850)

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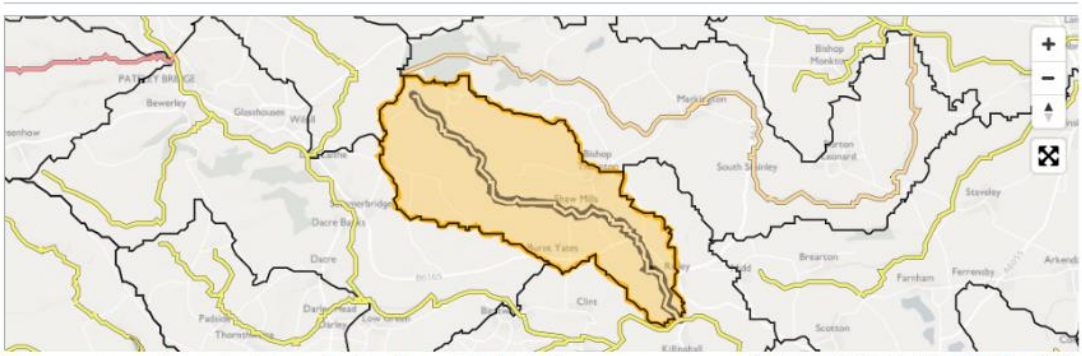
1.0 Introduction

The following is a brief report based upon observations during a walkover of Thornton Beck for ~1km immediately upstream of High Mill, Shaw Mills, carried out by Prof J Grey at the invitation of local residents. This is a follow-up and extension to an Advisory Visit to identify any issues for the perceived decline in health of the watercourse, and should be used in reference. Indeed, the potential identified in Fig 1 in the AV report was part of the impetus for, and is the downstream limit of, the current Project Proposal.

Throughout the report, 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 locations.



Thornton Beck Catch (Trib of Nidd) Overview

Download Water Body as CSV / GeoJSON

Overall classification for 2016: Poor

Id	GB104027063850
Type	River
Hydromorphological designation	not designated artificial or heavily modified
NGR	SE2523262655
Catchment area	2458.75 ha
Length	12.294 km
Surveillance Water Body	No
Catchment area	24.588 km2

Map & data extract from:
https://environment.data.gov.uk/catchment-planning/WaterBody/GB104027063850

The EA data give an overall classification of 'Poor' ecological status driven primarily by the failing for Macrophytes & Phytobenthos (plants and algal biofilm that forms on the rocks); Fish only achieve Moderate in the last assessment and prior to that, also Poor. Reasons for Not Achieving Good status (RNAGs) are listed as point & diffuse source pollution from agriculture and the water industry, as well as physical modification (redundant mill infrastructure).

2.0 Habitat Assessment

A series of images are used to exemplify ideas generated during the walkover, progressing from the uppermost site in a downstream direction. Some detail is given in the legend for each figure, and more can be found in the summary following on.

Fig 1. The remains of a weir (which was probably higher with removable boarding in the past) in place to provide the offtake for a mill lade and pool ultimately through to High Mill. As it is now defunct, it should be considered for removal as it is a barrier to free passage of sediment and fish.

Fig 2. Evidence of dredging and formalisation to bypass the mill pool immediately d/s of the weir (Fig 1), leaving the channel heavily incised and unable to connect with the floodplain except under exceptional high flows. The RB comprised stone walling that has since been colonised with a variety of native tree species. The LB (here on the inside of a bend) could be reprofiled and lowered substantially to reconnect the floodplain. This area, downslope from the mill lade, was also appropriate for wet woodland creation.

Fig 3. Evidence of limited 'out-of-bank' flow, an ephemeral channel which has cut behind a line of historically coppiced alder trees along the LB of the beck.

Fig 4. From a distance, the small beck flowing through the wet woodland to the east of the mill pool (SE 24704 62730) appeared to retain natural physical channel characteristics in terms of a meandering course and should provide good macroinvertebrate and spawning habitat. However, closer inspection revealed it to be a biological disaster, poisoned by apparently chronic nutrient pollution assumed to be from slurry. The bed was completely smothered with billowing sewage fungus. This should be monitored and reported to the Environment Agency via National Incident Reporting on 0800 80 70 60 using the NGR above, until it is sorted. This was reported on the date of the visit (incident #1865559).

Fig 5. Looking u/s & d/s (upper & lower panel, respectively) from the LB at SE 25017 62665. The LB was slightly elevated hinting at historic dredging spoil and there was clear evidence of wetter soils ~15-20m away from the bank: this was probably water seeping downslope perpendicular to the beck and pooling because of the dredging bund.

Fantastic potential here for reprofiling the LB along ~250m to remove the bunding effect and reconnect the beck with its floodplain. Note however the presence of Himalayan balsam, an Invasive Non-Native Species that will require biosecurity measures to reduce its spread if any reprofiling work is to take place.

Fig 6. Image lifted from the original AV report (therein labelled Fig 1) highlighting the change in vegetation from drier meadow (upslope, tawny grass) to wetter rushes (darker green inside the triangle): opportunity again for better floodplain reconnection and/or wet woodland creation

3.0 Recommendations

Reconnection with the floodplain

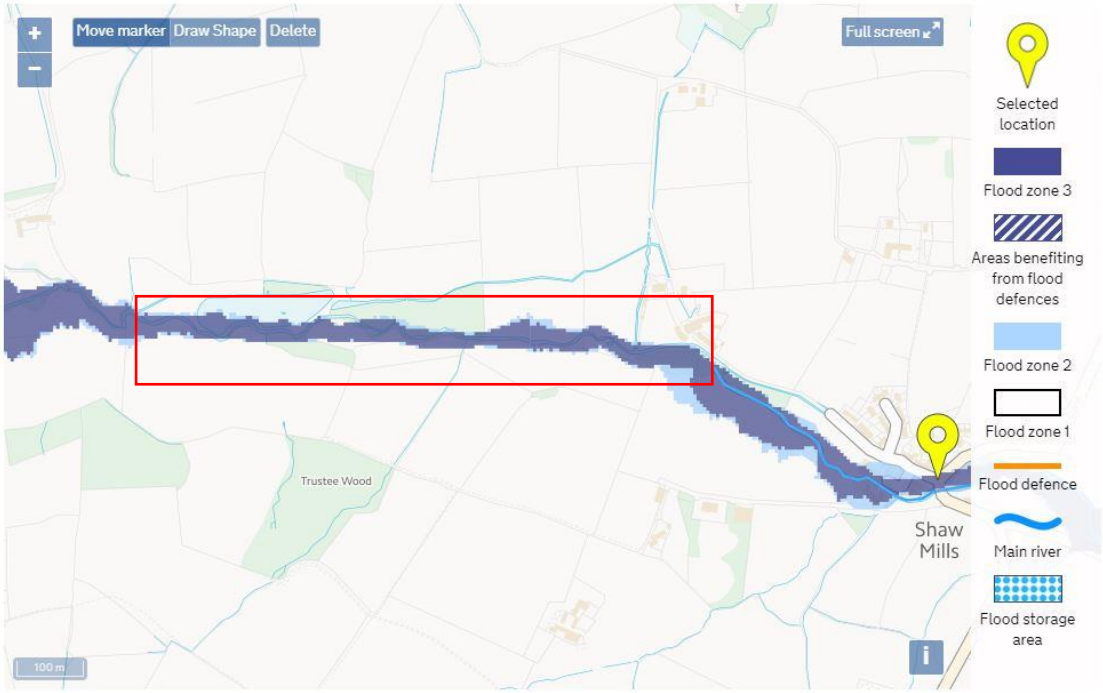


Fig 7. Flood risk assessment for the assessed reach (bounded by the red rectangle).

The flood map indicates the likelihood of flooding in the locality, confirming that the channel is relatively tightly constrained and disconnected from its floodplain compared to reaches u&d/s (red rectangle; Fig 7).

Fig 8. Areas marked in red proposed for bank reprofiling to ~25m distance from the LB, reseeding with wet meadow mix, and sparse tree planting.

To reconnect with the floodplain, the LB could be lowered by ~0.5-0.7m and reprofiled gradually for a distance of ~25m perpendicular to the channel in the areas marked in Fig 8. Note that these measurements are currently only estimated; there has been no

surveying of the site. Spoil arising can be used on site further upslope to improve the pasture; if so, then stock-proof fencing will be required along the northern boundary to allow the regeneration of the area. A cross-sectional schematic is provided below (Fig 9). The channel is not widened in any way but as flow and consequently water level increases during high rainfall events, that excess water and the associated energy can thereby dissipate across the floodplain more easily.

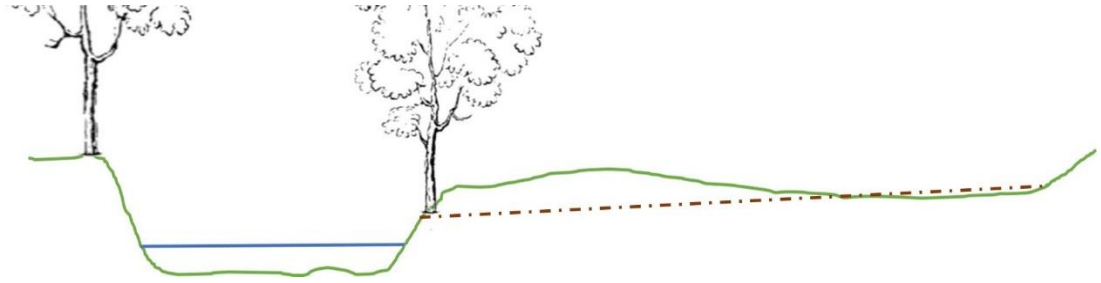


Fig 9. Looking u/s, a schematic of the proposed reprofiling of the LB (dashed brown line ~25m). The horizontal scale is necessarily truncated.

It was noted that Himalayan balsam was prevalent along the LB within the proposed reprofiling zone and this presents a biosecurity risk of spreading an Invasive Non-Native Species. As much of the shoot material as possible should be pulled before moving any earth, and no earth should be translocated from the site (wider field boundary) because of the dormant seedbank.

To rehabilitate the site as quickly as possible (to prevent ingress of bare earth into the beck), the site should be seeded with a 'wet meadow' mix of appropriate native species sourced locally, as well as some judicious planting of wet woodland tree species. A hedgerow at the bottom of the slope (ie extreme right-hand side of Fig 9), parallel to the beck course, would be beneficial to diversify habitat and intercept flow, nutrients and fine sediments.

To encourage out of bank flow onto the reconnected floodplain, one or two of the previously coppiced alder trunks at the beck bank edge could be felled and winched into position to lie from bank top to bank top, perpendicular across the channel. Natural tree fall at several locations u/s within the wet woodland performs the same function. Under normal flows, the beck continues to flow underneath the trunk. However, as the water level reaches the trunk height, it will begin to back-up and flow out of the wetted channel onto the floodplain. Note that because of the disparity in bank height due to the reprofiling, flow will be encouraged onto the LB preferentially. The felled trunks

could simply be wedged in between standing living trunks on both banks to maintain their position.

Improved riverine habitat

Given the relative abundance of riparian trees evident along much of the bank (if only one-tree-deep ie a fringe), there was very little wood fall retained within the channel. Naturally, such structure provides the physical resistance to water leading to diversity of flow paths and speeds, and consequent scour and erosion that diversifies the channel cross-section. Physical diversity begets biological diversity. Currently the straightened and incised channel is rather uniform and consistent in profile except for where tree root boles protrude.

Fig 10. An example of a riparian tree hinged or laid into a (much larger) channel to provide physical diversity and cover.

Hinging some of those existing trees (eg Fig 10) or felling and wedging / tethering into position using appropriately rated cable to a living anchor (tree-kickers) are tried and tested techniques to improve habitat. These management actions also diversify the age and structure of the riparian fringe canopy by encouraging new low bushy growth at the coppiced trunks.

The majority of the reach identified in Fig 7 would benefit from the addition of wood in the channel although the narrowest sections alongside the mill pool embankment are least suitable. Nevertheless, material could be gleaned from the mill pool embankment as part of proposed maintenance there. An estimated 30 trunks could be used in this way.

The redundant weir in Fig 1 should be removed or notched to near bed level at the very least to improve connectivity along the system. Given the relatively small scale and size of the stonework involved, either option easily could be achieved by experienced operators using a hydraulic breaker and stone-cutting saw.

It is recommended that these ideas are considered in conjunction with the detail provided in the Advisory Visit report.

4.0 Making it happen

Thornton Beck u/s of Shaw Mills is designated as ordinary watercourse and hence permission to undertake much of the proposed work herein is required from North Yorkshire County Council. Note that WTT is already engaged with a flood defence consent regarding habitat works downstream at Shaw Mills and it would be prudent to make reference to that.

WTT Fundraising advice - Help and advice on how to raise funds for habitat improvement work can be found on the WTT website - www.wildtrout.org/content/project-funding and should be discussed with your local Conservation Officer.

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

http://www.wildtrout.org/content/index

We have 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 http://www.wildtrout.org/product/rivers-working-wild-trout-dvd-0 or by calling the WTT office on 02392 570985.

5.0 Acknowledgement

The WTT would like to thank the Environment Agency for supporting the Advisory Visit programme.

6.0 Disclaimer

This report is produced for guidance only; 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.