Advisory Visit

Merritt's Brook, Birmingham

23/01/12

Introduction

This report is the output of a site visit undertaken by Paul Gaskell of the Wild Trout Trust to Merritt's Brook on 23rd January, 2012. Comments in this report are based on observations on the day of the site visit and discussions with Nick Hale and James Hale, local residents and conservationists alongside Matthew Ashworth, Environment Officer for the Environment Agency (EA).

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.

1.0 Catchment / Fishery Overview

Merritt's Brook (that becomes known as the Griffins Brook in its middle reaches and then the Bourn in its lowest reaches) is part of the River Trent catchment in the Edgbaston constituency of Birmingham. Frankley Reservoir effectively marks the source of this watercourse that ultimately enters the River Rea close to Pershore Road in the Stirchley area of Birmingham.

Under the Water Framework Directive legislation, the Humber River Basin Management Plan lists Griffins Brook (which includes the section where it is known as both Merritt's Brook and the Bourn) as a single water body (water body reference number: GB104028042520) from source to confluence with the River Rea. Being a heavily modified watercourse in an extensively urbanised area, it has been assessed as currently having "Moderate Ecological Potential". Table 1 gives a breakdown of relevant criteria and stated mitigation measures from the River Basin Management Plan:

Table 1: Water Framework Directive Waterbody status details and stated mitigation measures

Waterbody Name/ID	Griffins Brook, source to River Rea / GB104028042520
National Grid Reference	SP 02905 80945
Status Objective	Good by 2027 (judged disproportionately expensive/unfeasible by 2015)
Protected area designation	Nitrates directive
Biological elements	"Poor" for invertebrates
Supporting elements	"Moderate" for both Dissolved Oxygen and Phosphates (very certain) and "Moderate" for ammonia (uncertain under both physico-chemical and Annex 8 entries)
Mitigation Measures (not in place)	Retain marginal aquatic and riparian habitats (channel alteration), Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone, Increase in-channel morphological diversity

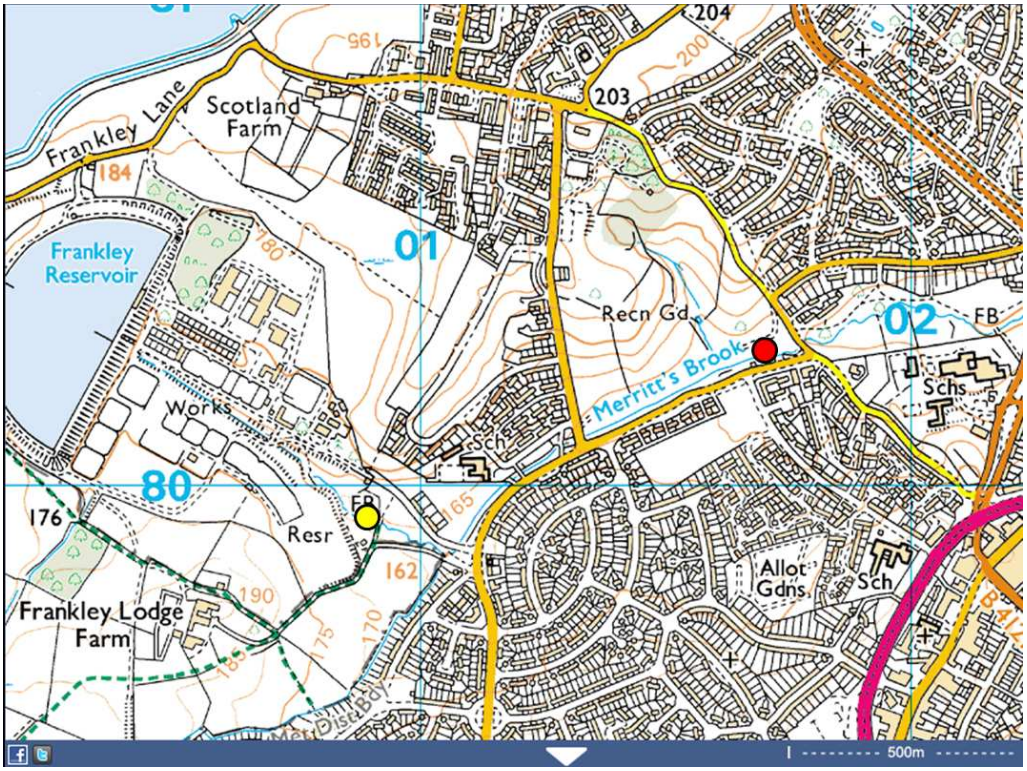

Figure 1: Map of inspected reaches from upstream limit at SP 00889 79931 (yellow circle) to downstream limit at SP02143 80317 (red circle)

2.0 Habitat Assessment

Starting at the upstream inspection limit around SP 00889 79931, the sandy nature of the substrate that is typical of this region is immediately apparent. Soft and highly erodible banks are, in this reach, quite well protected by marginal vegetation. Additionally, the presence of timber within the channel appears to be tolerated by those responsible for overseeing maintenance (Fig. 2). Allowing both lightly managed bank-side vegetation and natural deadfall of timber to occur are valuable means of promoting aquatic (as well as terrestrial) biodiversity. The bankside vegetation provides cover from predation, increases the variety of physical habitat and also helps to slow the rate of bank erosion that might otherwise occur at a rate that limited biodiversity. Fallen tree trunks, limbs and coarse brash all promote localised river bed scour. This process is especially valuable in the grading or "sorting" of gravels for fish spawning as well as often generating pool habitat for adult fish. Even so, the brook in these reaches has a very small rate of discharge – and consequently the potential for developing scour pool habitat capable of sustaining adult trout is quite limited (Fig. 3). In addition, the sheer amount

of fine/sandy substrate present in the stream bed will tend to limit the egg survival and hatching success for flow-loving species such as trout (Fig. 4).

Figure 2: Fallen timber, well-vegetated banks and the presence of gravel. Good ingredients for trout spawning. However, abundant fine sediments may block the gaps in between gravel particles that would be necessary to generate good "within-gravel" flow of oxygenated water required for egg survival

Figure 3: Channel width in the centre of the frame is less than 60 cm and the depth around 5 cm. This section has characteristics of a spawning tributary and juvenile nursery area rather than as a realistic year-round home for adult trout

Figure 4: Fine sand/silt substrate predominates

However, the potential for these upper reaches to be a vital resource within the lifecycle of wild trout populations was highlighted by examples of what may have been spawning attempts by gravel-spawning fish (i.e. trout in this instance). The area beneath the low overhanging branches (Fig. 5) shows a typical ramp or mound of gravel that is favoured by trout for their spawning attempts. The brighter patch of stones could indicate an area where trout have made attempts to cut a nest (called a "redd") using their tails. If areas with this appearance are discovered during autumn and winter, **do not disturb or examine them**. Even treading on or near the gravel mounds can kill the eggs within them – especially during their most delicate early stages soon after laying. Whether or not these areas were genuinely the result of wild trout breeding attempts, the physical conditions of suitable depth, flow, gravel sorting and low, overhanging branch cover for trout spawning all exist in the putative breeding locations. Consequently, it is worth exploring the potential to add to the two or three existing examples of such habitat via creation of several comparable locations in this upper section (i.e. upstream of SP00982 79894). Furthermore, due to the January date of the site assessment, it was not possible to judge how extensive any stands of annual invasive plant species (especially Himalayan balsam, *Impatiens glandulifera*) might be. This could, if allowed to dominate bankside vegetation, significantly increase the rate of fine sediment supply to the watercourse. More information on the biology and control of invasive

plant species is available in the Urban River Restoration Guidelines that can be downloaded from the Wild Trout Trust website (www.wildtrout.org).

Figure 5: Although difficult to photograph, there were what appeared to be examples of trout redds in two separate locations in the visited reaches; this one (central frame) at SP00982 79894 and another a short distance downstream. Overhanging branches can be vital to determining whether adult trout feel sufficiently safe to make breeding attempts

The culvert at SP 01039 79867 (Fig. 6) is a natural border that defines the upper reach described above and is a potentially significant barrier to migration of fish to and from the lower reaches. It is absolutely imperative that, if the potential for spawning and juvenile production is to be realised, the upper section is connected to the lower reaches by tackling this barrier. It is particularly important given the limited potential for the uppermost reach to support adult fish of a breeding age (in other words, all breeding fish must migrate into and out of this reach during a short, seasonal window of opportunity). Simply removing the trash screen (perhaps on a seasonal basis i.e. October to February inclusive) and committing a local community group to keeping the culvert clear of blockages would be extremely valuable. A more expensive alternative would be to investigate replacement of the culvert with an open channel crossed by a flat bridge (section 3: Recommendations).

Figure 6: Culvert with a trash screen that currently creates a serious barrier for fish wishing to migrate into or out of the upper section of Merritt's Brook

Downstream of the culvert, Merritt's Brook runs parallel to "Merritt's Brook Lane" on its RHB with quite dense tree canopy on both RHB and LHB (Fig. 7). The channel here is extensively straightened and there is limited opportunity for a variety in flow depth and velocity to develop. A combination of light coppicing to establish a more varied age/height structure in the woody canopy along with some quite simple in-stream modifications using material arising from such coppicing could be of great ecological value in this reach. The modifications (see section 3: Recommendations) would not be of sufficient magnitude to elevate flood risk. Similarly, the methods of anchoring any introduced material would be tried and tested to withstand much harsher conditions than those experienced in Merritt's Brook. Simple "pinning" of tree limbs to generate river-bed scour and sheltering cover from predation risk would have significant benefits to fish and invertebrate populations alike. The increased physical variation promoted by small amounts of canopy management would be of great benefit to terrestrial and aquatic flora and fauna.

Figure 7: Straight and a little uniformly shaded - a light touch combination of canopy management and adding in-stream structure would pay dividends here (NGR: SP 01180 80009)

A little further downstream (SP 01333 80103), slow, uniform pool habitat with a conspicuous absence of cover was noted (Fig. 8). Many sections of this reach were also obviously affected by nutrient enrichment from either drainage ditches (e.g. ditch joining close to trash screen/culvert at SP 01039 79867) or Combined Sewer Outfalls (CSOs; Fig. 9). If ecological potential is to be improved within these reaches, it is imperative to reduce the influence of these enriching inputs. Opportunities to create reedbed/wetland treatment prior to effluent reaching the river, investment in sewer improvement (e.g. to increase storm water storage capacity) and vigilance for blockages and misconnection problems are all vital to achieving this. Judging by characteristic filamentous algae and bacterial "sewage fungus" growth, the apparent effects of each discharge point disappeared with downstream dilution. It must be noted, though, that any potential improvements in habitat will not translate into ecological benefits in those sections where water quality is too poor. However, there is no harm in pushing forward with both habitat and water quality improvements in parallel. This will minimise the duration that the water body is falling short of its ecological potential.

Figure 8: Open pool. The only structural value for fish is provided by the degrading concrete lintel at the base of the wall

Figure 9: One of several Combined Sewer Outfalls (CSOs) in the reach. A programme to set back the discharge point further away from the river and promote wetland and reedbed development would be hugely beneficial

The section from Merritt's Hill and downstream to the lower limit of inspected habitat contains the highest value habitat that was assessed during the visit. A variety of riparian vegetation is evident and the stream is largely allowed to generate a meandering planform (Fig. 10).

Figure 10: Typical meander and riparian vegetation for the lower inspected reach

Consequently, the stream produces a variety of features that are favourable to a range of critical life stages of wild trout. These include shallow riffles with cover from predation that are favoured by juvenile fish (e.g. Fig. 10; lower right of frame and Fig. 11) as well as pool habitat for adult fish (e.g. Fig. 10: upper/central frame and Fig. 12). The naturally-occurring debris dams that have produced some excellent adult pool habitat with ample cover from predation are worthy of special attention (Fig.12). A simple regime of unsightly litter removal and periodic checks that the dams are passable to fish (and allow sufficient flow of water) at their base will maximise the value of these superb features. The small size of the channel and the nature of the debris mean that the maintenance of these structures is well within the capabilities of community groups. Some limited potential for spawning habitat exists already (Fig. 13). The potential for successful spawning would be dramatically increased by providing cover for adult fish and also promoting scour of the stream bed using installations of woody debris. Such

Figure 11: Perfect juvenile trout habitat

Figure 12: Perfect adult trout pool generated by scour caused by upstream debris dam (white water)

Figure 13: Limited, but not impossible, opportunities for trout spawning exist in the lower inspected reach. These would be greatly improved by provision of cover for adult fish and also promotion of localised bed scour to "grade" gravels and keep them free of fine sediment

localised bed-scour "sorts" or "grades" the gravel into favourable particle sizes for trout spawning – as well as blowing out fine sand and silt from the spaces between gravel particles. This ensures a much greater flow of oxygenated water over the eggs that are deposited within the gravels (and prevents eggs suffocating through lack of oxygen). Figure 14 shows one location that would benefit from the installation of mid-channel scouring structures (such as an upstream V placement of logs).

Figure 14: Candidate location for "upstream V" installation to blow out fine sand/silt, generate pool habitat and grade spawning gravels

3.0 Recommendations

A brief summary of priority actions on the Merritt's Brook would be:

- Formation of a local community group to act as custodians of Merritt's Brook
- Undertaking Riverfly Partnership "Angler's Monitoring Initiative" invertebrate monitoring training and siting monitoring stations to inform on impacts arising from point source discharges (i.e. pairing stations upstream and downstream of outfalls)
- Monitor and control (by hand pulling and composting *in-situ*) any infestations of Himalayan Balsam
- Investigate options with local council for seasonal or permanent removal of trash screen on the culvert at SP 01039 79867
- Alternatively explore potential to convert the short culverted section into an open channel crossed by a level bridge
- Co-ordinate efforts to secure investment in improvements to CSO discharges throughout the reach
- Investigate and develop options to break out CSO pipework and generate localised wetland and reedbed as a means of intercepting runoff prior to entry into surface watercourse
- Combine the sensitive canopy opening at Merritt's Brook Lane section with "hingeing" or "pleaching" of saplings (or cabling of suitable-sized limbs of trees obtained during canopy work) to provide marginal cover and generate flow velocity and depth variety. Figure 15 gives an example.
- Some small in-stream log pinning could also be used to generate greater structural diversity in the channel alongside Merritt's Brook Lane (e.g. Figs. 16 and 17) – **N.B. it is imperative to collate information on underground services where any stakes or pins are proposed to be driven into the stream bed or surrounding banks**

- An upstream V (e.g. Fig. 18) could be considered at suitable locations within the lower visited reaches downstream of Merritt's Hill to promote pool formation and spawning gravel improvement

Figure 15: Hinged (or pleached) saplings used to generate marginal cover

Figure 16: Mini logs being pinned into the urban river Wandle to generate greater spatial heterogeneity within the channel

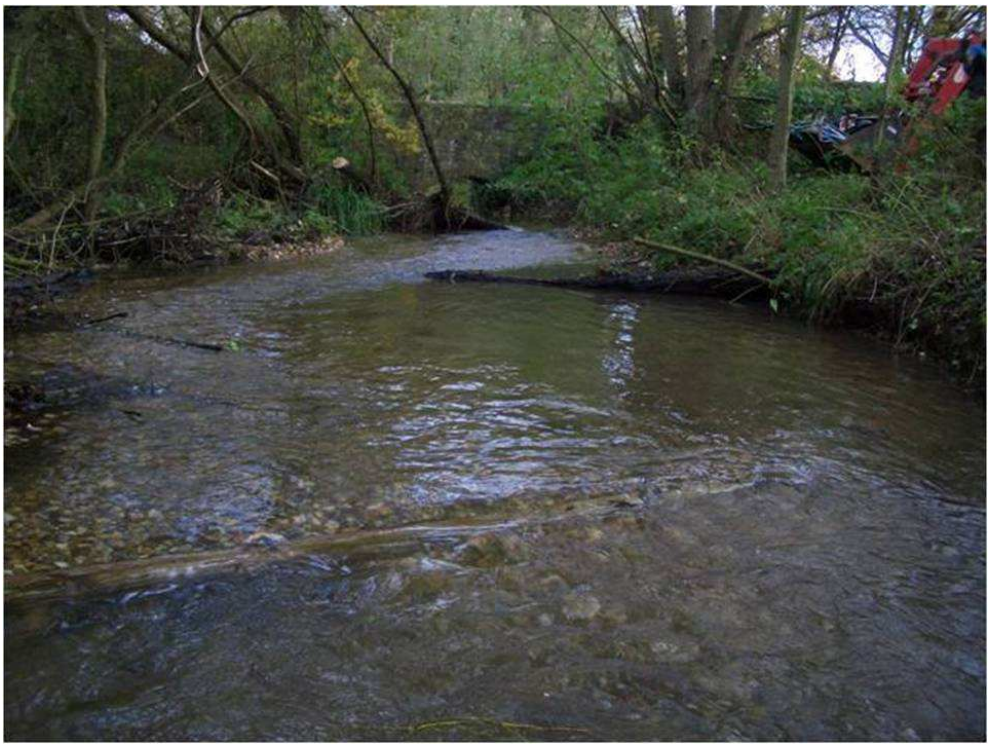

Figure 17: Tree limbs pinned to retain and "grade" spawning gravels in the River Len as well as promote meandering flow in a straightened channel

Figure 18: Upstream "V" installed on the urban river Wandle in Carshalton to clean and sort spawning gravels

It is a legal requirement that all the works to the river require written Environment Agency (EA) consent prior to undertaking any works, either in-

channel or within 8 metres of the bank. In addition, the permission of all relevant stakeholders (including, but not limited to, private and Local Council riparian landowners) will also be an absolute requirement.

For details on Himalayan balsam control, please see section 3.1.1 of the Urban Rivers restoration guidelines:
(http://www.wildtrout.org/images/PDFs/Urban_Manual/urban_section3_habitat%20projects%20on%20your%20river.pdf)

4.0 Making it Happen

Due to the extensive urban development surrounding Merrit's Brook in the reaches considered in this report, there is a critical requirement to obtain all the required written permissions. The first requirement is a "Land Drainage Consent" approval – obtained by completing the standard application form available from local E.A. development control and flood risk management personnel.

Similarly, all works that will require access to the river must be approved by the riparian landowners (both the works themselves and the attendant access requirements). For tree canopy work, it may also be necessary to obtain a felling licence (although this should be picked up during the Land Drainage Consent consultation process).

As a consequence of the involved nature of assessing flood risk implications of the recommended works, it will be necessary for the recipients of this report to provide a person or persons to drive forward the negotiations for permissions and identify all relevant stakeholders. The WTT can provide help and guidance in the completion of the required E.A. application paperwork. In addition WTT staff can also supply a more detailed proposal of each element of the recommended works (should this be required during the application process). Additionally, the WTT funding and communications officer (Denise Ashton; dashton@wildtrout.org) can offer assistance in strategies to raise any funds that may be required to undertake recommended works.

Depending upon availability, it may be possible to complete some of these works as part of a "Practical Visit" (PV) training event. Please bear in mind that demand for PVs is high and the availability of funding and staff will determine the WTT's capacity to run these events.

5.0 Acknowledgement

The WTT gratefully acknowledges the funding support provided by the Environment Agency for the Advisory Visit programme.

6.0 Disclaimer