



The River Brent

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



The River Brent at Tokyngton Park, Wembley

1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on several separate reaches of the River Brent in northwest London.

The request for the visit was made by Dr. Chris Cockel who is the River Brent Catchment Officer for the Thames Rivers Restoration Trust (TRRT) and is currently working on a number of projects designed to improve the ecological status of the River Brent, including the installation of eel passes and morphological river restoration. Comments in this report are based on observations on the day of the site visit and discussions with Dr. Cockel.

There is recognition that the Brent is unlikely to ever support a viable population of wild brown trout (*Salmo trutta*); however, the TRRT is very keen to explore options for improving the ecology of the river by adopting enhancement techniques that are proven to improve habitats for a wide range of aquatic species, including flow-loving, gravel spawning species such as salmonids.

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 River Brent (Waterbody ID 106039023590) is described as a heavily modified water body with poor ecological potential under the Water Framework Directive. Unfortunately there do not appear to be any WFD targets for improving the ecology of the river within the River Basin District Plan.

The River Brent is a heavily urbanised catchment and covers some 170 km² in northwest London. The river and its principal tributaries pass through the London Boroughs of Barnet, Brent, Ealing, Harrow, and Hounslow.

Its influence on the surrounding areas, from its source in Barnet to its mouth at Brentford where the river flows into the River Thames, is reflected in place names like Brent, Brentham, Brent Lodge and Brentford. The river has undergone periodic modifications for flood protection, most significantly during

the 1930s when major channel straightening was carried out and concrete lining used to limit bank erosion. Consequently, much of the ecological value of the river and riparian area has been lost, with an absence of many of those elements normally found within a natural river system that provide habitat, support wildlife and improve water quality.

The lower end of the river below Hanwell has been heavily modified to form the bottom section of the Grand Union Canal. The navigation channel is tidal from Thames lock downstream, and partially tidal between Brentford Lock and Thames Lock. In total there are four locks and weirs separating the fluvial River Brent at Hanwell from the fully tidal River Thames at Brentford.

3. Habitat assessment

The first site to be inspected was just above the confluence of the Brent with the Grand Union Canal at Hanwell. Here the lower reaches of the channel are wide, comparatively deep and slow flowing (Figure 1). The bottom few hundred metres of channel are set within natural earth banks, albeit a heavily modified channel. Water levels in this reach fluctuate frequently, probably as a result of the continuity with the Grand Union Canal, as well as the controlled release of water from the Brent Reservoir. The lack of a stable plant community in the margin may also be due to the flashy nature of the urban catchment. Either way, the marginal riparian habitat reveals the unstable nature of the ecotone.



Figure 1. Note the lack of marginal vegetation as a result of fluctuating water levels.

Some habitat is available for coarse fish species as there is a good assemblage of mature riparian willow trees (Figure 2), which will provide excellent root systems for cover and spawning opportunities for fish species such as roach (*Rutilus rutilus*), bream (*Abramis brama*) and pike (*Esox lucius*). Very little habitat for flow-loving species was observed until the section of river at Hanwell Bridge adjacent to the A4020 Uxbridge Road. From here upstream, the river takes on a much more natural form with some variations in bed topography and planform. Some shallow glides over thin and heavily silted gravels provide spawning potential for dace (*Leuciscus leuciscus*), chub (*Leuciscus cephalus*), gudgeon (*Gobio gobio*) and stone loach (*Noemacheilus barbatulus*).



Figure 2. Excellent cover for fish provided by marginal willows near Hanwell Bridge.

Shallow bays were also evident on the section near to Hanwell Bridge. This type of habitat is crucially important for juvenile coarse fish fry and is often absent from urban rivers where channels are often heavily modified. These areas warm up quickly in the spring and provide optimum habit for summer-hatched fry (Figure 3).



Figure 3. Shallow back water habitat at Hanwell Bridge ideal for coarse fish fry.

A little further upstream at Greenford Island, near Ealing, the river begins to assume much more interesting and potentially valuable characteristics. Much of it is still very wide and in places impounded by the occasional weir (Figure 4), however, upstream towards the Ealing recycling depot the stream takes on a much more natural shape with riffle, glide and the odd pool flowing down a more varied channel shape (Figure 5).



Figure 4. A section of flat shallow glide near Greenford Island – ripe for enhancement.



Figure 5. Shallow glide running into broken riffle close to Greenford Bridge – good spawning habitat – even for trout!

Riparian and in-channel habitat throughout this reach was much better than elsewhere on the lower Brent; however, there is considerable potential to greatly improve in-channel habitats through the imaginative use of large woody debris flow deflectors. Currently the channel is excessively wide in some locations (Figure 6) and although good quality bed gravels are present, they are often coated in a thin layer of soft sediment. Options for blowing away the silt and scouring local pools and pots in the river bed will add to topographical diversity and make the section much more attractive as a habitat for a variety of fish, plant and invertebrate species. Options for enhancement are discussed in more detail in the conclusions section of this report.



Figure 6. A wide shallow section (adjacent to the Greenford recycling depot) running over thin sediments, but with excellent gravels waiting to be exposed.

On one particular section near to Greenford Bridge, a goat willow has taken root in the centre of the channel on a sediment bar (Figure 7). Such mid-channel bars, formed by large woody debris, are characteristic of natural river morphology and should be encouraged, where possible, to improve the river ecology and water quality. The synergy of the mid-channel debris and scoured and cleaned gravel is important and the end result provides excellent habitat. A pinched channel elevates flows down the RB which exposes clean gravels,

combined with a wonderful shallow backwater on the LB, provides ideal spawning habitat.

This example demonstrates how sediments can be stabilised and the channel shape modified with tree planting, or with secured woody debris deflectors. It is absolutely essential that developing habitats like this are protected and not simply swept away following routine river maintenance by flood defence engineers. Preserving such habitat and creating additional similar habitat is likely to be the key to dramatically improving the ecology of the Brent, especially if it were linked to real efforts to secure better quality water by addressing misconnected domestic sewers and excess hard-surface (mostly road) run-off.



Figure 7. A developing habitat that is creating a variety of valuable habitat.

Similar habitats were observed in other locations, some which have obviously been developing for many years (Figure 8). Hopefully there is no justification for any drastic maintenance that would involve the removal of well-established and important in-channel woody debris.



Figure 8. An example of excellent river habitat near Greenford Bridge.

Further upstream, the Brent is incorporated into the landscape of two golf courses, one municipal and one private. Although time constraints did not permit a close inspection of these sections, it was evident at Ealing Golf Course that the river banks lacked much in the way of any natural buffer zone of native plants and as a result some bank erosion has been inevitable (Figure 9). There is probably considerable scope to provide the golf course management with options that will improve the river and save them from expensive bank protection measures.



Figure 9. The Brent carving its way through Ealing golf course

The last site to be inspected was the site of an extensive river restoration project (2002/2003) at Tokyngton Park. The river here had previously been extensively modified into a deeply incised concrete channel which was set behind railings. Prior to the restoration, local residents regarded the park largely as a place to avoid, partly due to anti-social activities, rather than a place to enjoy. In July 2000, the London Borough of Brent, in partnership with the Environment Agency, commissioned Halcrow and the River Restoration Centre to produce a report to assess the feasibility of undertaking natural river restoration of the River Brent through the site. Following the feasibility study, recommendations were implemented for the design and construction of a new, natural river channel (Figure 10).

Unfortunately, the improved channel sits just downstream of a section that is in desperate need of restoration (Figure 11). To compound the effects of poor habitat, the culverted Mitchell Brook joins the Brent at the head of the enhanced channel and frequently carries apparently untreated sewage into the river. There was clear evidence of sewage fungus on the river bed, a situation that in 2012 is clearly unacceptable. At times of even moderate rainfall, the water-quality of

the Brent at this section rapidly deteriorates due to high volumes of surface run-off. The combined effects of sewage input, road run-off and the discontinuous nature of riparian zones, undermines the potential of the restored reach to support any fish populations.



Figure 10. The enhanced river channel at Tokyngton Park that previously ran through a concrete channel.



Figure 11. The Mitchell Brook (RH channel) joining the Brent carries untreated sewage which severely compromises the excellent work carried out on the channel downstream.

5. Conclusions

The River Brent suffers from many of the classic problems associated with a system that runs through a heavily urbanised area. There are glimpses of what this river once looked like, and perhaps how more of it could look in the 21st century. While the river has little scope to sustain a population of wild trout, there are ample opportunities for enhancement which could see the river supporting a much more diverse and healthy flora and fauna, including flow-loving, gravel spawning fish communities.

The lack of ambition as set out in the River Basin District Plan is disappointing; however, the existing legislation to protect the river from the adverse effects of pollution are already in place and action is needed from the relevant authorities to ensure a better future for the River Brent.

There are a range of low-cost, simple techniques that could be employed by community-based groups to enhance the Brent.

Priorities should include enhancing connectivity by improving access for fish species throughout the system. There are numerous weirs and structures present that currently drown out habitats and fragment populations. Some of these structures will carry essential services and have been built for specific purposes, others are likely to be redundant and opportunities exist to either completely remove them, or at the very least to modify them to enable improved fish migration.

Many sections of the Brent are blighted by the presence of non-native plants. It is understood that Dr. Cockel and the TRRT are well placed to help tackle this problem in collaboration with the Brent Catchment Partnership.

Opportunities exist to significantly enhance habitat and protect eroding banks in areas where the Brent runs through amenity land, especially golf courses. It is recommended that the TRRT approaches the relevant land owners to offer advice and support on how banks can be protected and money saved.

The fact that significant lengths of the lower Brent in the borough of Ealing run through an adequate green corridor, where there is room for the river to function, present additional opportunities for enhancement works involving community volunteers. Good habitats are already forming as the river reasserts itself, but there are significant opportunities for the TRRT to engage with the local authority and community groups to create improved in-channel habitats for fish, plants and invertebrates.

A combination of lowering, or notching existing weirs to locally increase water velocities, coupled with pegging into the channel sections of woody debris to scour the bed and sort river gravels is recommended. Local woody material appears to be available on many sites but can always be imported if supply is limited. Woody debris can be utilised on the Brent in two key forms: as large woody debris (LWD) flow deflectors (Figure 12) - either in the form of whole trees, sections of trunk or branches - laid into the channel and secured to promote river bed scour. In addition, coarse woody debris (CWD) or brashing, can be laid parallel with bare open margins, or pegged up against the face of bare banks to trap sediments and slow the rate of erosion (Figure 13). The CWD also provides a primary source of food for shredding invertebrates as well as superb cover for juvenile fish. Techniques for using woody material are set out in the Wild Trout Trust Urban Rivers Manual, which can either be obtained via the Trust's office as a CD ROM, or downloaded as pdf files from the website (www.wildtrout.org).

Due to the ever-present risk of pollution, it is recommended that a network of water quality monitors is set up. The Riverfly Partnership (www.riverflies.org) can help with training volunteers in the Anglers Monitoring Initiative (AMI) where training and support is given for groups to be able to sample and identify key river invertebrates that are sensitive to changes in water quality. This could be extremely valuable information for the TRRT and the Brent Catchment Partnership in their efforts to put pressure on the authorities to provide good quality water and regulate those who might wish to pollute it.



Figure 12. An example of a LWD flow deflector secured to the river bed and designed to erode and redistribute river bed gravels.



Figure 13. CWD being laid up against the margin on the River Wey in Surrey.

6. Recommendations

- Identify any redundant in-channel structures that can be lowered or removed.
- Establish a network of volunteers interested in being trained in the Anglers Monitoring Initiative, and use the data obtain from water quality monitoring to gain commitments for improved water quality.
- Map the locations of non-native plants and instigate a management programme.
- Implement a programme of in-channel enhancements using woody debris.
- Highlight the advantages of natural river margins in reducing bank erosion. (Engaging with the various golf courses would be a good starting point.)
- Use the Tokyngton Park model as justification for bidding for more resources to extend the scope of the work already undertaken, or to tackle an annual capital project on additional degraded river reaches.
- Lobby local and national government for greater ambition for the River Brent.
- **It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking those works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require land drainage consent on any river designated as "main river". Advice can be obtained from the EA's Development Control Officer.**

7. Making it happen

There is the possibility that the WTT could help to start an enhancement project. We could potentially help to draw up a project proposal (PP) which could be used to support any application for Land Drainage Consent. The PP might also be used as a document to be shared with potential partners as a vehicle for raising project funding.

Alternatively, physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). PVs typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams to obtain on-the-ground training regarding the appropriate use of conservation techniques

and materials, including Health & Safety, equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

Recipients will be expected to cover travel and accommodation expenses of the contractor.

There is currently a high demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources. The Trust is always available to provide free advice and help to clubs, syndicates and landowners through guidance and linking them up with other people and organisations who have had experience in improving trout fisheries.

Acknowledgement

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

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