



Advisory Visit

River Idle, Nottinghamshire

June 2011



1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the River Idle on 27th June, 2011. Comments in this report are based on observations on the day of the site visit and discussions with Ron Trevis of Derbyshire County Angling Club and James Simpson of Nottinghamshire Wildlife Trust and subsequent correspondence with Joel Rawlinson (Environment Agency Fisheries Officer).

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 and Site Overview

The River Idle is a tributary of the tidal Trent, joining the latter downstream of Gainsborough at West Stockwith. The Idle is formed by the confluence south of Retford of its tributaries the Rivers Maun, Meden and Poulter. The catchment drains an area of north Nottinghamshire which includes Mansfield, Worksop and Bawtry.

The area covered during this visit is from downstream of Retford to Chainbridge Lane (Figure 1). Extensive gravel quarrying is ongoing in this area and a large area of flooded former workings now form the Sutton and Lound Gravel Pits SSSI, designated for its exceptional diversity of breeding and wintering wetland birds.

(www.sssi.naturalengland.org.uk/citation/citation_photo/2000458.pdf).

Nottinghamshire Wildlife Trust manage the site as a nature reserve and run a visitors centre here (www.nottinghamshirewildlife.org/nature-reserves/idle-valley).

The River Idle in this area was subject to a major land drainage scheme during the 1980s which had a substantial detrimental effect upon riverine habitat. The fishing rights on the river are owned by Derbyshire County Angling Club (DCAC). It is understood that a small budget is available from the local Environment Agency for river habitat improvement works; this visit was carried out at the request of DCAC to advise on potential river habitat improvements.



Figure 1 Location map. (Image produced from Ordnance Survey's Get-a-map service. Image reproduced with permission of Ordnance Survey).

In the Humber River Basin Management Plan (Water Framework Directive), this section of the Idle falls into two waterbodies. The first (Maun/Poulter confluence to Tiln) is designated as a heavily modified waterbody with a *poor* (*very certain*) current ecological potential; the elements contributing to this poor status are fish, phosphate levels and quantity and dynamics of flow. The second (Tiln to Ryton confluence) is not designated as a heavily modified waterbody and has a current ecological status of *poor* for the same reasons stated above. Works to improve in-stream habitat will contribute to addressing the status of fish and flow dynamics and help towards achieving good ecological status/potential.

3.0 Habitat Assessment

The land drainage works of the 1980s do not appear to have substantially altered the plan form of the river, but the channel was widened and

deepened, creating a uniform, trapezoidal cross-section with flood embankments following the river's course on each bank. This has created an impoverished in-stream habitat, lacking a diversity of depth, flow velocities and bed substrate. These uniform characteristics are reflected in the impoverished fish community.

The habitat deficiencies in this reach of river and how they influence the fish fauna are described in more detail in Table 1.

Unsorted river bed substrate	Natural river processes sort sediments into different sizes, depositing smaller particles as flow velocities decrease. Coarse gravels in fast flowing areas are necessary for the spawning of lithophilic fish species (gravel spawners like salmon, trout, lamprey, chub, barbel and dace). The lack of diversity of flow velocities in the uniform channel has led to an unsorted mixture of particle sizes on the river bed.
Floodplain disconnection and a reduced riparian zone	The river is disconnected from its floodplain with most flows being contained within the channel. The riparian zone is limited to a narrow strip of emergent vegetation at the toe of a steep bank. These are significant problems for the survival of juvenile fish. The very early life stages of river fish rely upon areas of static and very slow flowing water for refuge and a supply of rotifers (microscopic plankton) for food. Natural floodplains with ephemeral or permanent standing water and connections to the river channel provide essential juvenile fish habitat. A wide, shallow-gradient riparian zone provides slow-flowing refuge areas at all stages of discharge preventing washout of juvenile fish.
Lack of riparian trees and in-stream woody debris	<p>Riverside trees provide shade (moderating water temperatures) and inputs to the aquatic food chain in the form of leaf litter (for shredding invertebrates) and terrestrial insects. Woody debris in the river channel (fallen trees, branches) are essential in providing cover for adult fish and helping to increase diversity of flow (and hence bed substrate).</p> <p>The present river maintenance regime carried out by the Environment Agency removes tree cover and in-stream woody debris to the direct detriment of the fish fauna. Instances were seen on this visit where woody debris previously providing cover for shoals of barbel (evidenced by DCAC catch records) had been removed.</p>

Table 1

The river was seen upstream of Chainbridge Lane and further upstream around the weir at National Grid Reference SK692835. The upstream section was relatively faster-flowing than the Chainbridge Lane section and

the section downstream of the weir had some good habitat with varied depths, flow and clean gravel substrate. Some sections of river were very open (cover picture) and others had some reasonably good marginal cover (Photo 1) although the visit was in summer with growth at its maximum. However, the above habitat deficiencies apply to the majority of this river reach.



Photo 1 Reasonably good cover is provided by the overhanging willows on this section



Photo 2 The inside of bends could be re-graded to a shallower profile



Photo 3 Extensive aquatic weed growth at Chainbridge Lane. Weed cutting is carried out by the Environment Agency.



Photo 4 The middle section is shallow and faster flowing with a gravel substrate, but there is no variation in channel dimensions.



Photo 5 An ideal site for woody debris introduction



Photo 6 A shoal of chub in fast water over gravels below the weir



Photo 7 Better habitat downstream of the weir – sorted bed substrate and varied flow



Photo 8 The weir the function of which is reportedly to control water levels in Retford upstream (despite the propensity for flooding there....?)

4.0 Recommendations

The following recommendations are made bearing in mind the constraints of the funding currently available.

Narrowing the low flow channel

The river channel which currently accommodates low flows could be narrowed using various techniques (Figure 2) which introduce diversity to flow patterns, but which drown out at higher flows, not compromising the flood channel capacity. The basis of these techniques is the cut-and-fill technique (Figure 4) which also provides additional channel capacity for flood flows (making them neutral in terms of impact on overall channel capacity).

The causeway (Figures 2, 3) could be used to create low velocity areas suitable for juvenile fish, amphibians and invertebrates.

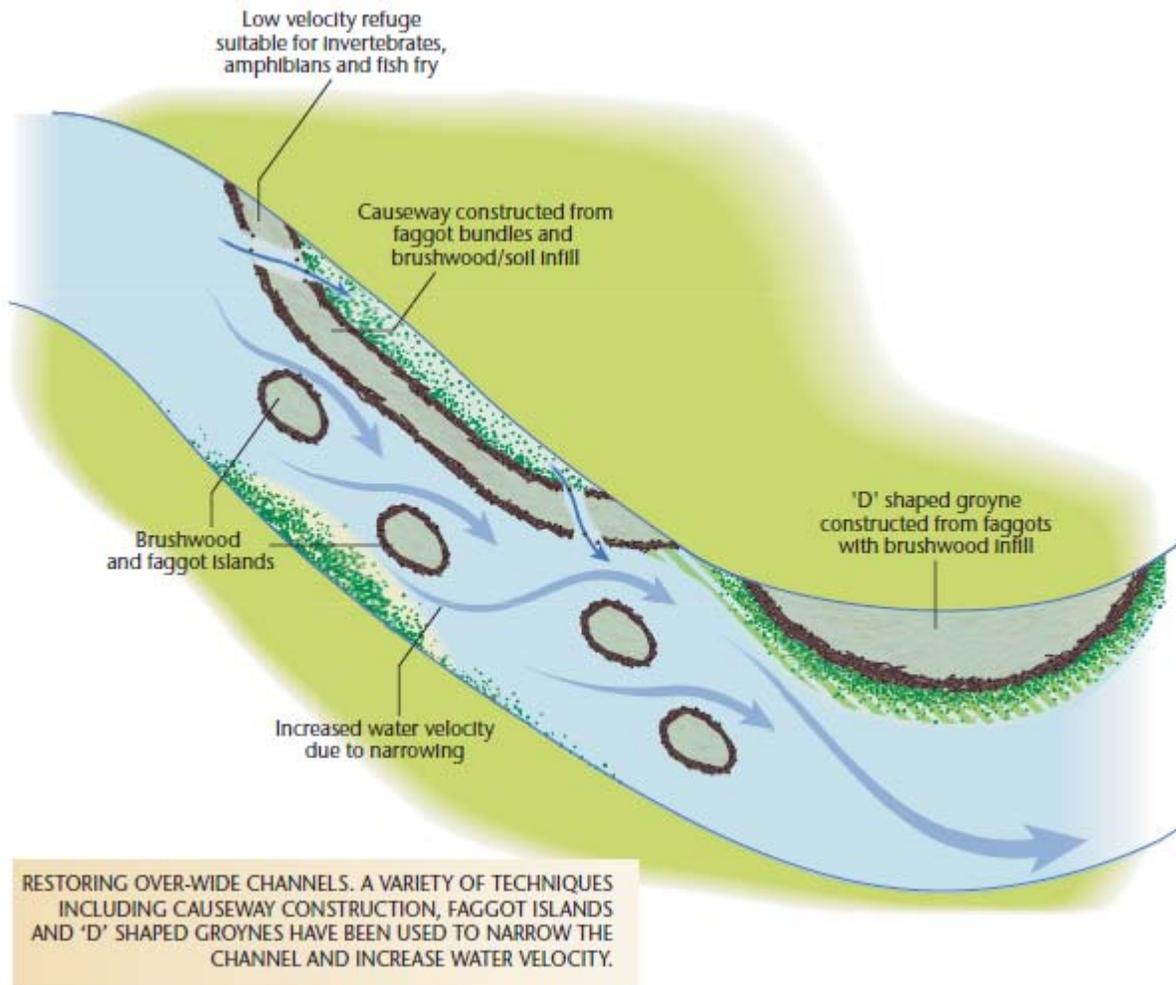


Figure 2

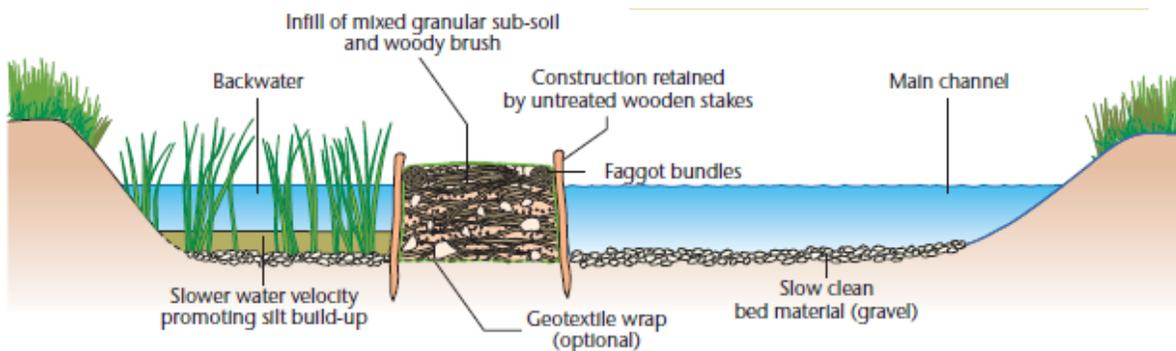


Figure 3 Cross-section of the causeway illustrated in Figure 2.

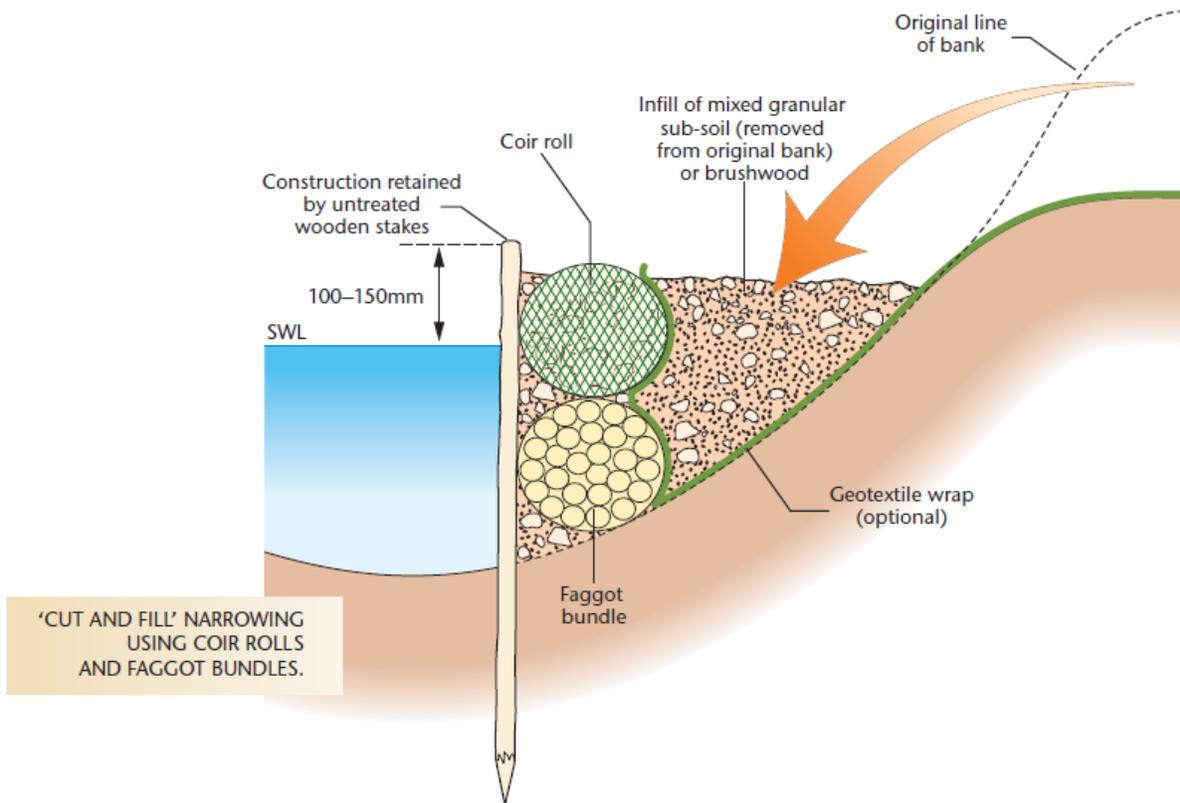


Figure 4

Introduction of Large Woody Debris (LWD)

The introduction of LWD is probably the most cost-effective and quickest way of improving the in-stream habitat on this section of the Idle. Figure 5 shows various ways of positioning LWD within the channel.

Written consent from the Environment Agency is required for the introduction of LWD (and any other in-channel works). An additional consideration is avoiding the removal of deliberately placed LWD during routine river maintenance carried out by the Environment Agency Operations Delivery team. It is strongly recommended that any works of this nature are carried out following close consultation with the Operations Delivery team

and a written memorandum of understanding agreed upon. A demonstration site (maybe forming part of the wider nature reserve) with interpretation boards may assist in achieving this.

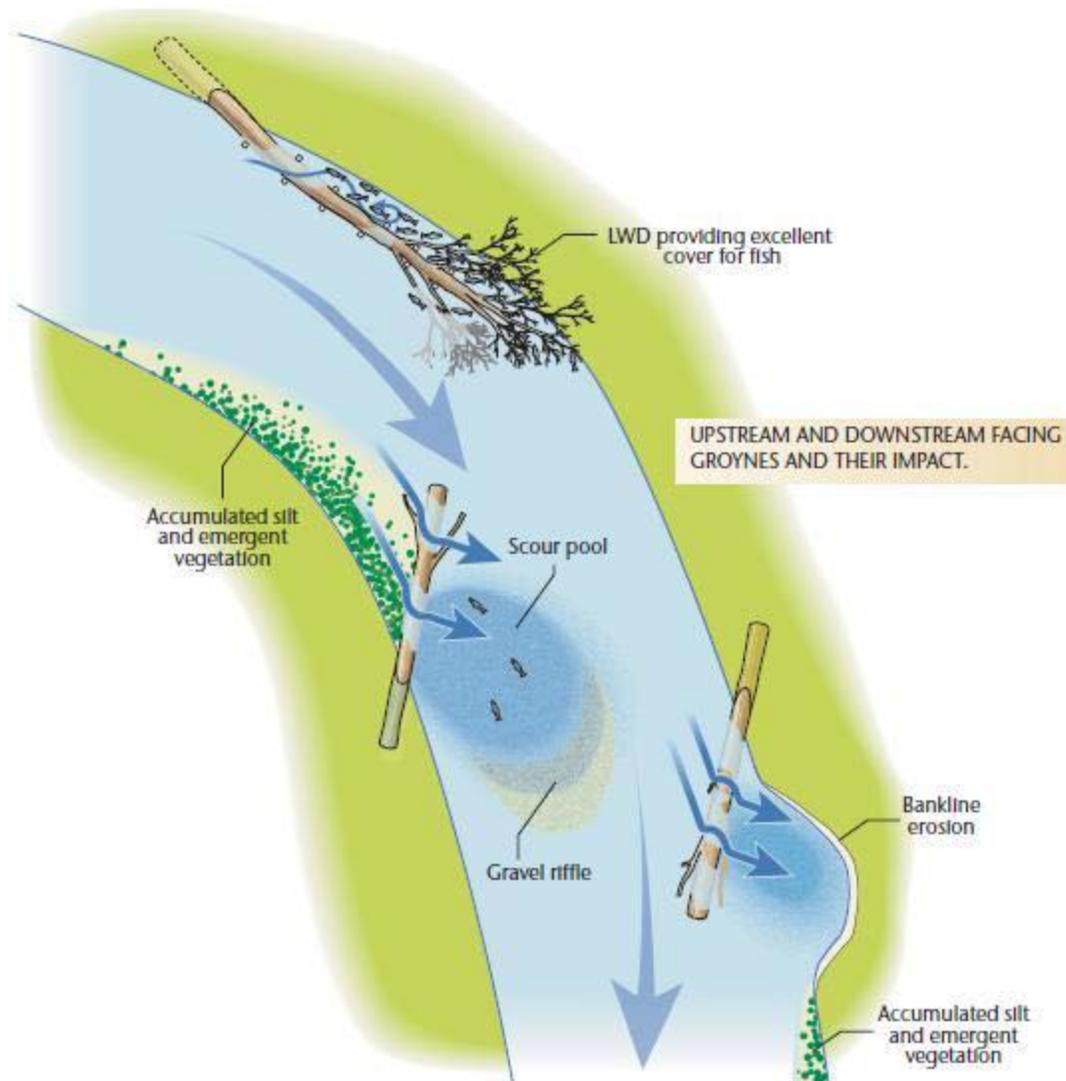


Figure 5 The downstream-pointing groyne structures are not recommended if bank erosion is undesirable.

The tree parallel to the bank shown in Figure 5 can be secured either by staking and wiring (with a failsafe deadman's anchor in the bank if required), or if the tree used is growing on the bank, it could be partially cut and "hinged" (Photo 9), and/or cabled to its own stump (Photo 10, Fig. 6). The latter technique has been consented and carried out on a number of rivers

elsewhere (e.g. Goyt, Derbyshire; Wharfe, Yorkshire) with 100% retention rate.



Photo 9 Hinged willow tree



Photo 10 Tree anchored to its stump by cabled wire



Figure 6 Schematic of tree anchored by cable to its stump

Bank reprofiling

Re-profiling of the river banks could be carried out in selected locations to provide a more extensive riparian zone, rather than the narrow strip of vegetation at the toe of a steep bank currently present. There are currently some areas where a berm exists alongside the channel (Photo 11) and these could be extended, or reproduced in other areas. The inside of bends would be favoured areas for re-profiling (Photo 2), but the location of flood banks may constrain locations. An additional advantage of re-profiling would be the creation of additional channel capacity, offsetting any lost through the introduction of woody debris, etc. The spoil arising would need to be disposed of off the floodplain, and could be placed into existing gravel pits to create shallows for planting with reeds.



Photo 11 Existing berm on the Idle upstream of Chainbridge Lane



Photo 12 Bank re-profiling on the inside of a bend

Tree planting

Tree planting with a wider variety of native species could be carried out. Currently the trees present are dominated by fast-growing willows. Bushier willows (*Salix caprea* and *S. cinerea*) would be more suitable along with alder, ash, oak, blackthorn, hawthorn and field maple. Blocks of trees on the outside of bends in the river are recommended.

Please note - 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.

5.0 Further works

The scope of the above recommendations is limited by the budget currently available, meaning the works are confined between the existing flood banks. There is only so much that can be done in-channel to improve riverine habitat and for a full restoration the disconnection between the river and the flood plain needs to be tackled. This would involve major earthworks to lower the level of the surrounding land, re-establish a functioning floodplain and re-define the boundaries of the flood banks (if necessary). The opportunity to do large and costly project of this nature does exist within this reach if it could be incorporated into plans for gravel extraction and subsequent restoration. A partnership approach involving Tarmac, Environment Agency, Nottinghamshire Wildlife Trust and Derbyshire County Angling Club and possibly Trent Rivers Trust could be a way forward.

A less ambitious project which would restore a degree of flood plain function would be to connect an existing or future gravel pit to the river channel. This has been carried out successfully at several locations on the River Trent and forms a link between lotic and lentic habitats with benefits to both, including:

- Allows the juveniles of riverine fish species access to static water habitat where they find refuge and planktonic food, hugely boosting growth rates and survival.

- Boosts the numbers of stillwater fish species such as roach, rudd and bream, by increasing productivity within the gravel pit.
- Increases habitat availability to eels, a species suffering a Europe-wide decline and the subject of recent legislation (Eel Regulations 2009) and funding to address this problem.
- Habitats within the connected gravel pit could be created to favour certain bird species, for example bittern. The increased production of fish would favour such piscivorous species.

Some concerns have been expressed over the impact upon water quality (algae blooms) within the connected gravel pit of allowing in river water with a high nutrient loading. This is valid given the high phosphate content within the River Idle but is something that could be easily managed by construction of earth bunds (or design of a future pit) to define where river water can reach. Even relatively small areas (say 1 acre) of still water connected to the river would have significant benefits as described above. This approach would protect existing relatively nutrient poor gravel pits with a clear water / rooted macrophyte ecology and leave the way open for making future connections should river water quality be improved.

6.0 Making it Happen

The next step would be to put together a detailed project proposal and consult with the Environment Agency. A pre-application meeting with the Environment Agency would allow any issues to be discussed and resolved prior to the Land Drainage Consent application being submitted. Given that the funding for these works is likely to come from the Environment Agency a partnership approach involving Environment Agency, Nottinghamshire Wildlife Trust and Derbyshire County Angling Club is recommended.

7.0 Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency for the support which made this visit possible.

8.0 Disclaimer

This report is produced for guidance only and should not be used as a substitute for full professional advice. Accordingly, 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 comments made in this report.