Project Proposal

River Dove, Norbury

August 2015

1.0 Introduction

The River Dove was walked in a downstream direction between Norbury Bridge and Rocester on 24th August, 2015 by Tim Jacklin (Wild Trout Trust), Chris Grzesiok (Environment Agency), Mel Jackson, Jeff Body and Steve Hammond (Norbury Fishing Club). This report is based upon observations on the day describes options for habitat improvement to benefit the fishery. This section of the River Dove was the subject of a Wild Trout Trust (WTT) advisory visit in June 2008 and a WTT practical visit earlier this year to demonstrate habitat improvement techniques.

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. The abbreviation LWD is used to describe large woody debris, naturally occurring trunks and branches that have fallen into the river and stabilised.

2.0 Location

The proposals relate to the Norbury Fishing Club section of the River Dove, between National Grid References (NGR) SK12007 42415 (B5033 road bridge) and SK11254 39715 (Rocester Weir) (Figure 1).

Figure 1 Location map showing upstream and downstream limits of visit (red arrows). Image reproduced with permission of Ordnance Survey and Ordnance Survey of Northern Ireland. (Ordnance Survey Get-a-Map service)

3.0 Rationale for habitat improvement works

The three key requirements for a high quality river fishery are good water quality, good water quantity (flows), and good habitat. In the River Dove, water quality is good, as is the abundance and diversity of invertebrates, leading to good hatches of fly. The quantity of water (flows) within the river is also relatively good, as water abstraction takes place only in the lower reaches of the river (at Egginton), which greatly restricts the availability of abstraction licences elsewhere on the river. River habitat quality is moderate to good, but there is much scope for improvement which is well within the capabilities of angling clubs.

The trout life-cycle can be divided into four broad categories that require specific types of habitat:

- The egg stage – trout lay their eggs in fast-flowing, gravelly areas during the autumn and winter. The eggs are buried in a depression in the gravel (a redd) made by the female fish and spend several weeks within the gravel incubating and in an embryonic stage (alevin) absorbing their yolk sac. In spring they emerge from the gravel as fry. In good quality spawning habitat, the survival rate for eggs to emerging fry can be as high as 80 – 90% (Figure 2) but this relies on well-sorted gravel with little fine sediment filling the gaps between the gravel. Fallen woody debris helps to create localised scour which sorts gravel and produces patches of suitable spawning habitat which adult trout seek out.

- The fry stage – the trout fry spread out and occupy shallow water, establishing territories which they defend from each other. Mortality rates are very high at this stage. Complex habitat which contains lots of rocks, weed, overhanging vegetation, etc., (which visually isolates fry from one another) reduces competition and increases survival rates.

- The juvenile stage – as fry grow they become known as parr with the distinctive “fingerprint” marks on their flanks. These occupy relatively shallow water, such as riffles and glides, and depend upon cover from rocks, marginal vegetation and fallen woody material. The survival rate over the first winter of life, from fry to one-year-old, is typically very low (around 5% even in excellent habitat) and heavily influenced by the availability of cover habitat. Predation by fish-eating birds like goosanders and cormorants (common on the Dove) probably plays a large part in this.

- The adult stage – once beyond their first year, the survival rate of trout increases to around 30% to 50% annually. Adult trout habitat is well-known to anglers, being deeper pools and glides and areas associated with submerged and low cover in/over the water. The availability of cover is still very important in influencing survival rates and even relatively large adult trout (and grayling) are vulnerable to predation.

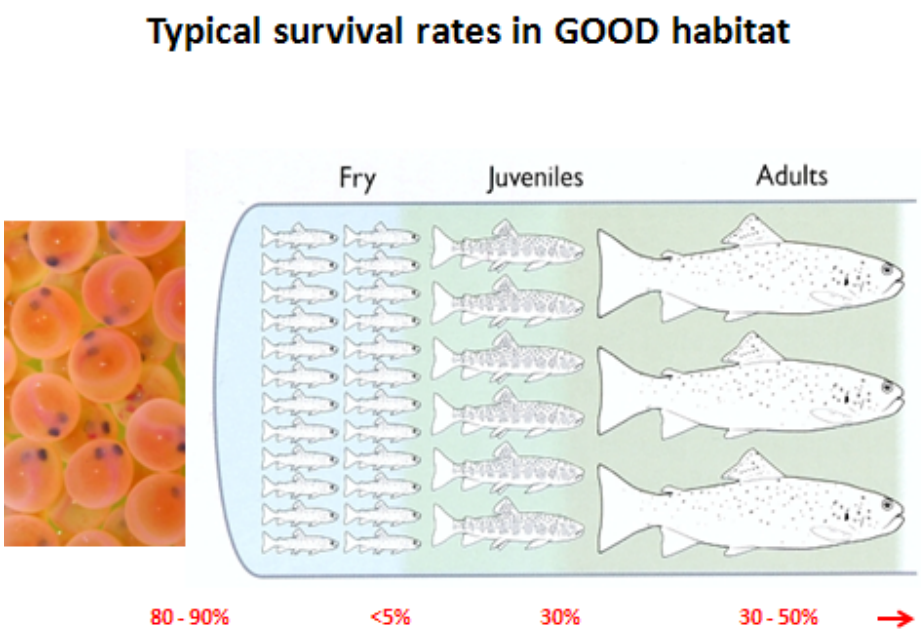


Figure 2

Because trout lay large numbers of eggs, the younger life stages are relatively abundant, with numbers decreasing with age depending upon mortality rates. Hence reducing mortality rates by even a small percentage during the early life stages can make a big difference to the abundance of fish in the subsequent life stage. For example, work to improve over-wintering habitat for parr can lead to very large increases in the numbers of one-year-old fish in the population the following year (and in larger fish in subsequent years). The example below is from work carried out by the Wye and Usk Foundation (Figure 3). Dense brushwood cover was provided in the margins of a river and before-and-after monitoring recorded large increases in the abundance of juvenile salmonids. More detail on this is available in short video presentations on the Wild Trout Trust website here www.wildtrout.org/content/case-study-videos (second and third videos down on the page).

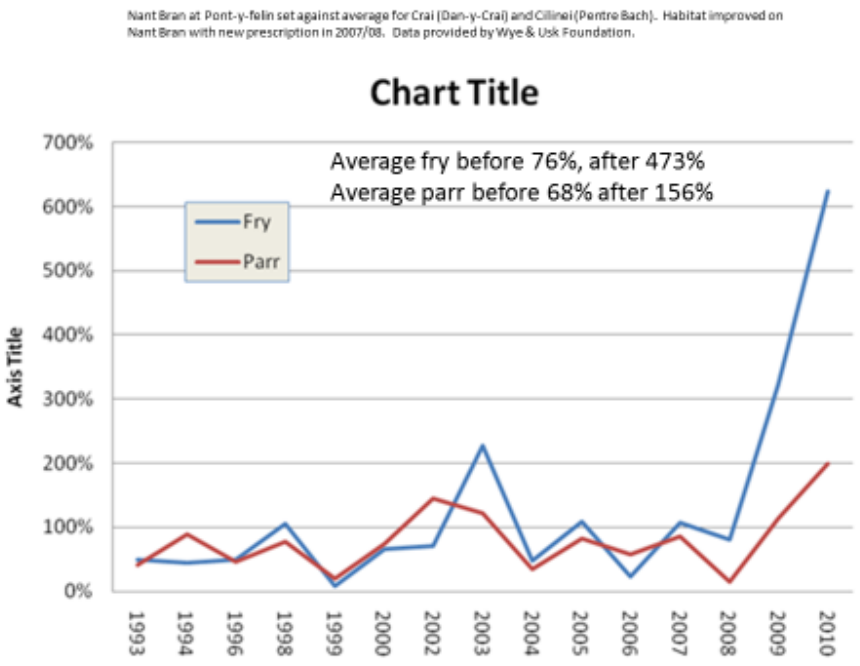


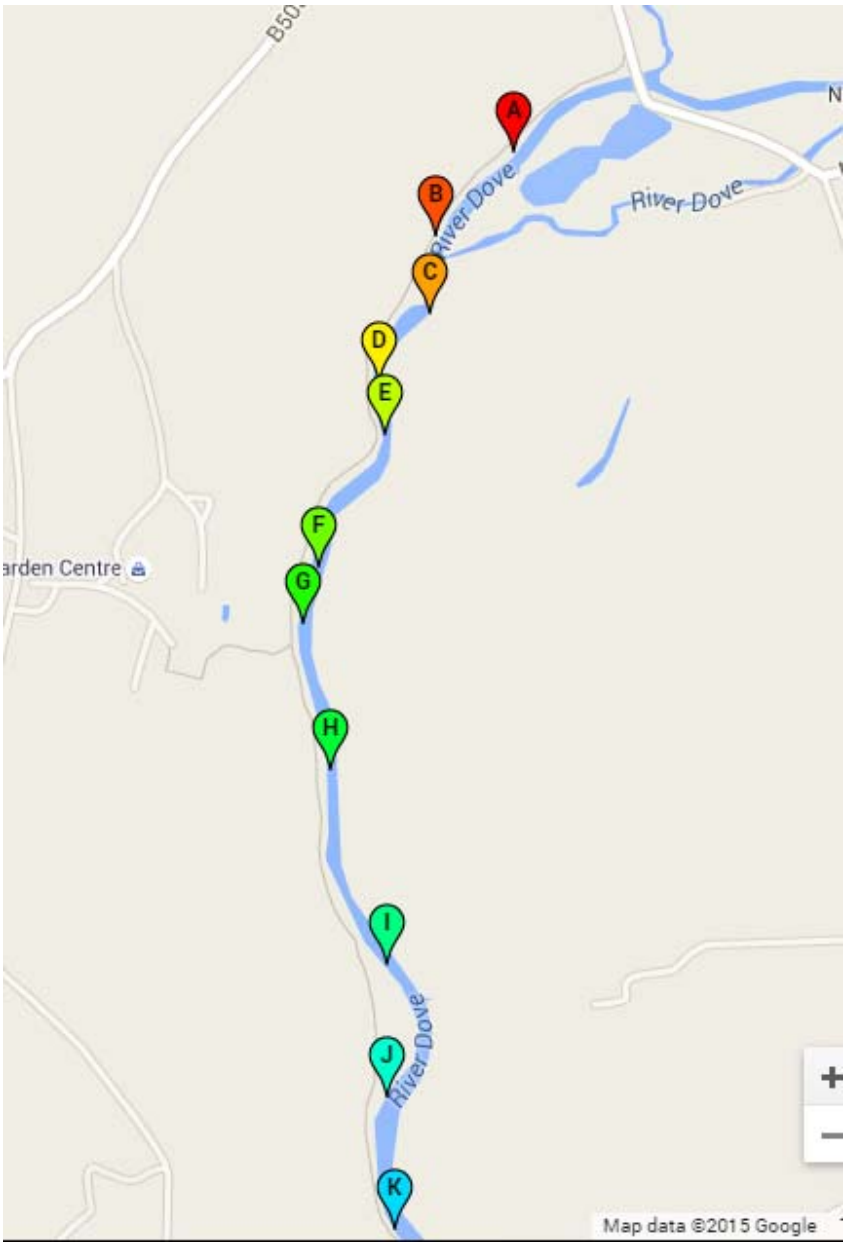
Figure 3 Increases in salmonid fry and parr at one site on the Nant Bran river following improvement in over-wintering habitat. (100% represents a baseline average of all electric fishing sites surveyed by WUF).

4.0 Options for habitat improvement works

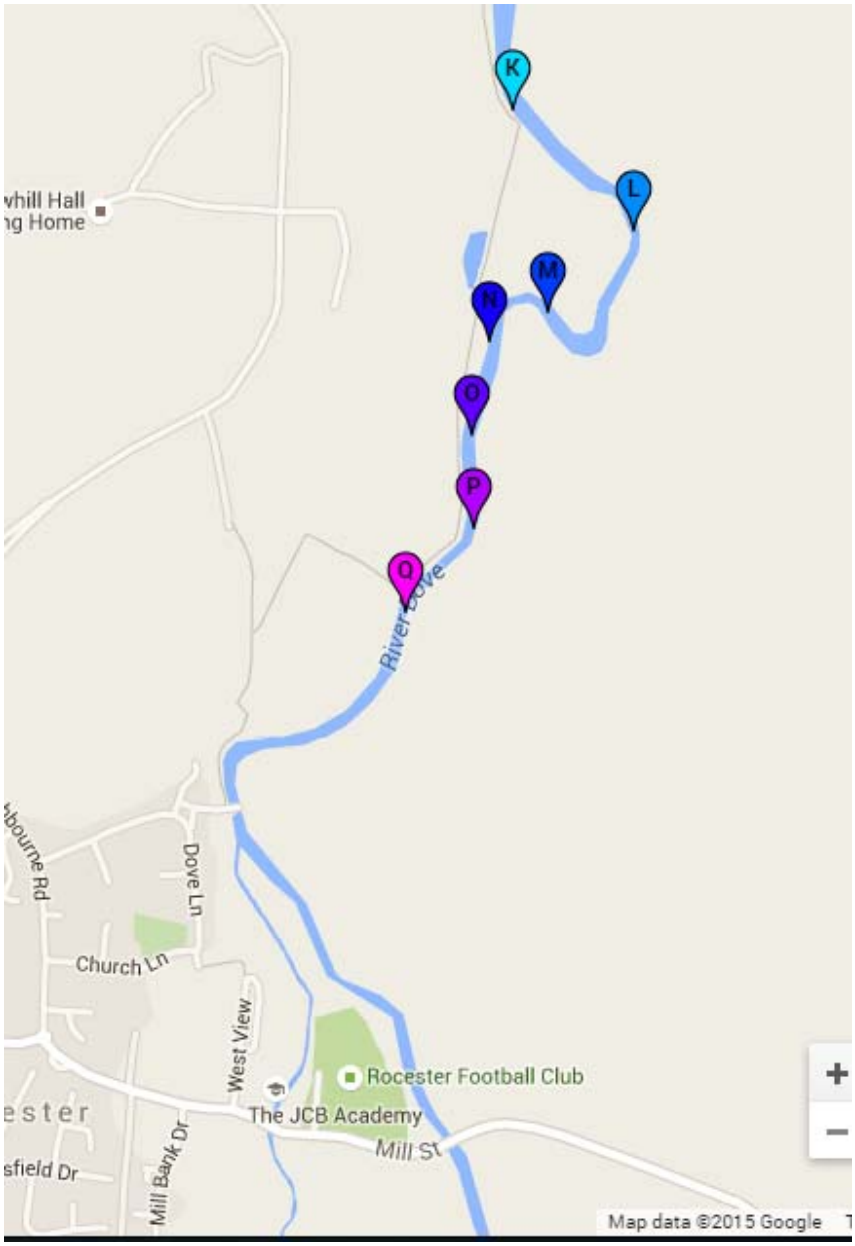
Maps 1 and 2 show the locations where river habitat improvement works might be carried out. The locations are labelled alphabetically A to Q and correspond to the locations in the Google maps link provided alongside this report.

Table 1 details the potential habitat improvement works at each location and refers to photographs of each location.

Map 1: Upstream section



Map 2: Downstream section



Location	Potential Habitat Works	Photo Reference
Point A	* Hinge trees LHB * Improve livestock drinking points RHB * Anchor brushwood to existing LWD (LHB)	1 - 3
Point B	* Hinge alder RHB	4
Point C	* Pull Himalayan balsam at toe of river cliff on LHB to allow native vegetation to colonise. * Numerous medium sized ash trees RHB suitable for hinging or cabling into the margins	5
Point D	* Hinge/cable sycamore LHB * Hinge small alders RHB	6
Point E	* Existing hinged trees against LHB - opportunity to do similar in this area.	7 - 9
Point F	* Trees on LHB suitable for hinging * Create mid-stream boulder clusters in shallow glide using existing boulders from margins	10 -13
Point G	* Polluting discharge noted from pipe entering RHB. Sewage fungus present.	14
Point H	* Large alder LHB - hinge/cable into river	15
Point I	* Suitable trees for hinging LHB * Existing natural LWD present against RHB Install more LWD in this area sourced further upstream in wooded area. * Attach brushwood to existing LWD	16 - 20
Point J	* Living willow revetment against RHB has taken well and been extended downstream. * Extend willow revetment in middle section to join existing lengths. * After one/two growing seasons, lay the willow to thicken and reinforce the revetement.	21
Point K	* Some good existing cover on RHB here from planted willow. Duplicate on LHB (see below). * Plant willow whips or short sections of revetment (similar to upstream) against LHB to establish trees and cover on this relatively bare bank.	22
Point L	* Existing hinged tree on LHB here. A number of others could be treated in a similar manner to improve cover.	23-24
Point M	* Hinge trees on the LHB on the glide running out of the large pool.	25
Point N	* Numerous hawthorn bushes present here, some of which could be cut and used whole to create tree kickers in the immediate vicinity, anchored against both banks to create cover and fish lies.	26
Point O	* Wide, shallow channel here. * Hinge/cable sycamores on LHB.	27
Point P	* Use large rocks from LHB area to create mid-stream boulder clusters on shallow glides	28
Point Q	* Start of impounding effect from Rocester weir * Winch partially fallen willow against the LHB to retain cover.	29

5.0 Photographs

Photo 1 Smaller trees on the far bank (LHB) could be hinged and layed.

Photo 2 Brushwood could be cabled to existing stable LWD to improve cover.

Photo 3 Livestock drinking areas could be improved to reduce fine sediment input.

Photo 4 Hinge and lay alder on the near bank.

Photo 5 Pull balsam from the toe of far bank

Photo 6 Hinge and lay sycamore (far bank) and small alders (near bank)

Photo 7 Opportunity to lay small alders as per Photo 8

Photo 8 Previously laid alder creating good cover.

Photo 9 As above – more opportunities for laying smaller trees into margins.

Photo 10

Photo 11 Shallow, pacy glide suitable for boulder clusters plus hinging of trees on far bank.

Photo 12 Large stones in the margins suitable for relocation as boulder clusters.

Photo 13 Another suitable area for boulder clusters.

Photo 14 Polluting discharge entering the river.

Photo 15 Dying alder tree on LHB suitable for hinging or cabling into the river.

Photo 16 Existing LWD which could be used as an anchor point for brushwood.

Photo 17 Trees suitable for hinging on the far bank.

Photo 18 LWD fixing point for brushwood.

Photo 19

Photo 20

Photo 21 Previously installed live willow revetment. Fill in the gap between the two lengths. Lay willow growth after one or two more growing seasons.

Photo 22 Area for planting willow whips/bundles on the far bank (LHB) to emulate same on the near bank (RHB) as indicated.

Photo 23 Hinge trees on far bank as per Photo 24 below.

Photo 24 Excellent cover created by a small tree hinged over into the margins.

Photo 25 Area for hinging trees on far bank.

Photo 26 Hawthorns like these could be cut and anchored in the river margins as cover and refuge for fish from piscivorous birds.

Photo 27 Area for hinging trees on far bank.

Photo 28 Stone that could be relocated to mid-channel as boulder clusters.

Photo 29 Collapsed willow stem to be winched into the river margins.

6.0 Methods

- Tree kickers or sweepers are whole trees which are placed parallel to the bank in the margins of the river. The trees are partially or wholly cut through at their base and laid into the river. The trees are fixed to their stumps by drilling holes and securing with steel cable. The cable is kept short to prevent the tree sweeper from being lifted onto the bank during high water events. Figure 4 illustrate a tree sweeper and its method of fixing. The cable used is 8-mm galvanised steel cable. Trees are selected according to criteria of safety, biodiversity impact assessment (section 5.0) and desired effect on in-stream habitat. Trees are felled and base of tree and anchor point drilled using 2-stroke auger, then winched into place with Tirfor hand winch. Steel cable to be threaded and fixed by hand. No heavy machinery in the river. Biodegradable oil used in power tools. No refuelling close to the river.

- Hinging trees is a very similar technique to hedge-laying (Figure 5). The tree trunk is partially cut through leaving a flexible hinge of wood, allowing the tree to be folded over into the river margins.

- Willow revetment involves driving a line of stakes into the river bed parallel to the river bank, packing the area between the bank and the stakes with cut willow and securing it with fencing wire and staples. Such work has already been successfully carried out in this reach (Photo 21).

Figure 4 Tree sweeper in position within the river.

Figure 5 Trees being hinged into the river margins – a very similar technique to hedge-laying.

7.0 Environmental Impact

- Work will take place outside the bird nesting season.
- Trees will be inspected before felling and those with cavities or ivy cover which could harbour bats will be avoided. Standing dead wood will not be felled.
- Installation will be carried out outside the season for fish spawning for salmonids, coarse fish and grayling.
- Only hand tools will be used adjacent to and within the river channel.

8.0 Flood Risk Assessment

The work is spread over a length of river of approximately 3 km and will be parallel to the bank and partially submerged at low water. The amount of channel capacity occupied by the structures will be extremely small and the no increased risk of flooding is anticipated. Adjacent land use in the floodplain is arable, predominantly grazing for livestock.