



Advisory Visit
River Ecclesbourne
April 2019



1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the River Ecclesbourne, Derbyshire on 16th April, 2019. Comments in this report are based on observations on the day of the site visit and discussions with members of Ecclesbourne Fly Fishers Club.

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 / Fishery Overview

The River Ecclesbourne is a tributary of the River Derwent, rising near Wirksworth and flowing for approximately 18km in a south easterly direction to join the Derwent near Duffield. Ecclesbourne Fly Fishers Club (EFFC) control a section of approximately 4km from Duffield Meadows upstream to near Windley, although most fishing is carried out in the section downstream of the Puss in Boots pub.

This section of the Ecclesbourne contains brown trout and grayling, along with smaller species not of angling interest including bullhead and brook lamprey (the latter were observed spawning during this visit). EFFC stock their waters annually with around 100 triploid brown trout of 12 – 14" and this was taking place on the day of this visit.

The River Derwent has a recovering population of Atlantic salmon and in recent years, fish passage improvements at weirs on the lower Derwent have enabled adult salmon to reach the confluence of the Derwent and Ecclesbourne. The Ecclesbourne has the potential to provide spawning and nursery habitat for salmon and sea trout, but there are two sites that are significant barriers to fish accessing this river: Snake Lane (downstream of EFFC waters) and Postern Mill weir at Turnditch (upstream of EFFC waters). Those barriers also undoubtedly impact upon the resident fish species of the catchment (trout, grayling and riverine coarse fish) which do not go to sea but benefit greatly from the ability to migrate within-river and access different habitats.

Under the Water Framework Directive classification system, the overall status of the River Ecclesbourne is *moderate* (Table 1); however, of the individual elements making up the overall classification, the status for fish is rated *good*, despite the lack of access for migratory species (<https://environment.data.gov.uk/catchment-planning/WaterBody/GB104028052720>). This is somewhat incongruous as the absence of salmon would seem to constitute a reason for failure.

River	River Ecclesbourne
Waterbody Name	Ecclesborne Catchment (trib of Derwent)
Waterbody ID	GB104028052720
Management Catchment	Derbyshire Derwent – Derwent Middle (Derbyshire)
River Basin District	Humber
Current Ecological Quality	Overall status of Moderate ecological status
U/S Grid Ref inspected	SK3131345674
D/S Grid Ref inspected	SK3351143918
Length of river inspected	~4.3km in total (controlled by EFFC, approx. 2km inspected)

Table 1 Summary of Water Framework Directive data for the Ecclesbourne.

The River Ecclesbourne is the subject of an improvement plan developed by the Ecclesbourne Restoration Partnership which includes Environment Agency (EA), Derbyshire Wildlife Trust, Severn Trent Water, National Farmers Union, Derbyshire County Council, Natural England and the Ramblers Association. The plan is available on the internet here: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291415/LIT_8111_e7485e.pdf. There may be opportunities for EFFC to get involved in the improvement plan for the benefit of the fishery.

Native white-clawed crayfish (*Austropotamobius pallipes*) are present in the Ecclesbourne and were reported by EFFC as being present in large numbers on their waters about five years ago. This species is nationally threatened by

non-native crayfish and the fungal 'plague' they carry. Non-native signal crayfish are abundant in the nearby River Derwent and care should be taken to clean and dry angling equipment before using on the Ecclesbourne (www.wildtrout.org/content/biosecurity). Any stock fish used on the Ecclesbourne should also come from signal crayfish-free sources – consult the Environment Agency for further information.

3.0 Habitat Assessment

The section of the Ecclesbourne downstream of the Puss in Boot pub was inspected. The river here has a meandering course and a pool-and-riffle sequence which provide the basic building blocks for good habitat (Figure 1). Meanders are vital as they create deep pools on the outside of the bends (adult fish habitat) and shallow, steeper, gravel-bedded riffles on the straighter sections between bends (fish spawning and juvenile habitat). Many rivers in the UK have been straightened for drainage/flood defence purposes, which reduces the length of the river, homogenises its gradient and depth, and causes long-term detriment to the river habitat; fortunately, this section of the Ecclesbourne has escaped this.

The next 'layer' of habitat beyond the physical characteristics of the channel, is the structure provided by the vegetation alongside and within the river channel. Trees provide a number of benefits to river habitat including:

- Bank stability. Roots bind the bank and prevent accelerated rates of bank erosion which lead to a wider, shallower channel with less fish-holding capacity.
- Cover. Submerged tree roots, trailing and submerged branches provide vital cover and refuge (e.g. from fish-eating birds) for fish and can make the difference between an area holding fish or their absence. Anything within approximately 40cm of the water surface or submerged beneath it should be regarded as cover and retained (see Recommendations).
- Shade. Tree canopy shades the channel and has been shown to maintain significantly lower water temperatures compared with unshaded channels. This is important for cool-water species like trout and grayling (with upper lethal temperature tolerances in the low twenties Celsius), especially in the light of climate change.

- A source of 'Large Woody Habitat': fallen trees in the river channel. These are valuable habitat, providing refuge for fish, scouring effects which clean spawning gravels and create depth variation and habitats and food for invertebrates. Such features should be retained wherever possible.

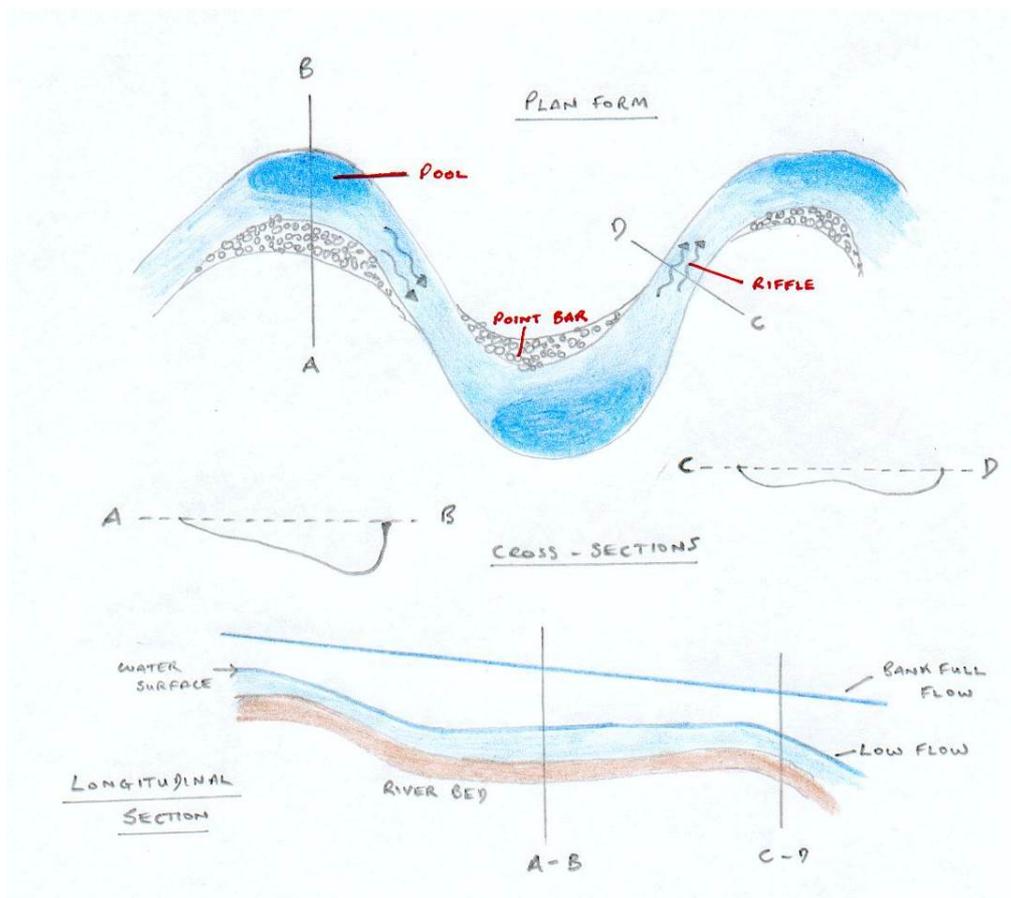


Figure 1 Natural channel morphology in alluvial rivers (adapted from Prof. Richard Hey, 2005).

In addition to trees, a diverse flora of understory plants is important for a healthy riparian (riverbank) zone, providing overhanging cover, bank stability, and playing an important role in the lifecycle of many aquatic insects. The input to the river of terrestrial invertebrates and leaf litter (food for aquatic invertebrates) also provide an important subsidy to the aquatic food chain.

The riparian habitat along the EFFC water is of mixed quality. There are good numbers of bankside trees, but they are dominated by aging alders which

are being lost with very little succession of younger trees to replace them, which is a concern for the medium to long term. Both banks of the section inspected are heavily grazed (by sheep at the time of the visit), which prevents the succession of trees and limits other vegetation to close-cropped grass, reducing bank stability, promoting erosion and greatly restricting habitat quality (cover photo, Photo 1). The grazing and livestock footfall is also contributing to the loss of trees by causing points of weakness in the bank around the rootballs which are eventually washed out by floods.



Photo 1 The sinuous channel and pool-riffle sequence is the basis of good in-stream habitat, but intensive grazing and its effect on riparian vegetation greatly restricts habitat quality. Note the lack of younger trees, other than in the occasional area inaccessible to livestock (arrow) where the tree is unlikely to survive.

Bankside fencing has been installed along some sections (a previous EA project), but this has not been maintained and has failed in many areas (Photo 2). EFFC report that when the fencing was intact, Himalayan balsam dominated the vegetation on the riverside of the fence. Lack of provision for maintenance of the fence and for management of vegetation re-growth are common pitfalls with riverside fencing projects. Fencing out livestock is undoubtedly one of the most beneficial and cost-effective habitat improvement techniques, but it cannot simply be installed and left.

The fencing should be repaired and reinstated and responsibility for ongoing maintenance assigned. Vegetation within the fence should be managed to control non-native plants such as Himalayan balsam. The aim should be to create a shaggy fringe of vegetation which overhangs the margins of the river and to allow tree regeneration. Access points for angling should be created to take account of this aim, for example to allow wading between access points rather than cutting paths. Although this may seem restrictive, it will greatly improve fish carrying capacity and is a deterrent to illegal fishing.



Photo 2 Existing fencing is not stockproof in most areas and therefore not achieving its aims. In some areas the fence is breached, in others livestock were crossing the river and grazing inside the fence; here livestock were getting trapped on the river side leading to more intensive grazing there than in the field.

At one point, EFFC have pruned the lower branches of trees to facilitate angling access. This has reduced the amount of low cover over the water and hence the fish-holding potential of this area. The area of pruning was inaccessible for angling previously, but a far better approach would be to 'hinge and lay' the low branches into the water; this would increase cover for fish whilst improving angling access (see Recommendations).



Photo 3 Pruning of low branches over the water has reduced fish-holding potential of this area. A much better approach is to hinge and lay the stems into the channel. Note the sheep tracks immediately behind the trees which contributes to their accelerated loss when the river erodes these unvegetated areas during floods. Coppicing one or two trees in areas such as this would be beneficial (to provide bushy re-growth and low cover), but livestock must be fully excluded to prevent browsing of the re-growth which would ultimately kill the tree.

Kick-samples for invertebrates were carried out at two locations during the visit. These were not timed (quantitative) samples, just a 'look-see' to get an indication of presence/absence of invertebrate groups. Stone-clinging mayflies (Heptageniidae) and olives (Baetidae) were abundant, along with smaller numbers of caseless caddis, Mayfly (*Ephemera danica*), and snails. The presence of numerous pollution-sensitive species is a sign of good water quality. Only two freshwater shrimps (*Gammarus pulex*) were observed, which warrants further, more detailed sampling. The Riverfly Partnership run training courses on invertebrate sampling for anglers and provide an agreed reporting framework with the EA. EFFC should check on the issue of treated timber storage as discussed on site.

4.0 Stocking

The reason EFFC requested this advisory visit was because of concerns over a perceived lack of trout within the fishery, with few rising fish observed. Notwithstanding the habitat issues described above, one of the main reasons contributing to this could well be the stocking of trout. Although it seems counter-intuitive, introducing stock fish leads to an overall reduction in the numbers of trout in a river fishery in the medium to long term.

Farmed trout are domesticated and selected to do well in an artificial environment (tanks and ponds). They are poorly adapted to survival in a wild environment and numerous studies have shown that they rarely persist in river fisheries more than a few weeks. This is not only because of emigration, but also through failure to find energy-efficient feeding positions (using up more energy than they obtain from feeding) and losing condition / starving.

During the short time the stocked fish are present in the fishery, they have a disruptive effect upon the wild fish population. The territorial nature of trout leads to greatly increased competition for favourable lies and the displacement of fish (with consequential poorer feeding and survival opportunities). Robert Bachman's classic study indicated that whilst the largest, wild fish survived (but exhibited considerable stress), the overall likelihood of whether a stocked fish or wild fish was displaced was equal (Bachman, 1984). The effect of stock fish on wild stocks is significant, ultimately leading to a reduced density of trout in the reach as a whole.

Consequently, many angling clubs report improved catches after ceasing stocking, as demonstrated by the case studies on the Wild Trout Trust website (www.wildtrout.org/content/trout-stocking). There is sometimes a lag period as the wild fish population recovers from the impacts of stocking, but increased catches of trout are often reported from year one. Anecdotal evidence from a number of fisheries suggests that grayling populations often proliferate too, once trout stocking ceases.

To further improve the river's wild trout populations, it is recommended that catch and release (C&R) is adopted. C&R is an excellent way of ensuring trout achieve their full size potential. This is well-demonstrated on numerous wild fisheries that now support many more large fish than have appeared in catches historically.

5.0 Recommendations

- Repair and maintain the existing fencing along the river and keep it stockproof (Photo 4). Extend the length of river fenced if possible, bearing in mind the requirements for maintenance. Manage the vegetation within the fence to promote a shaggy, overhanging fringe and allow tree regeneration. Control Himalayan balsam and make sure angling access points don't defeat the aim of more shaggy vegetation. Bear in mind that livestock can cross the river (sheep were observed doing this during the visit), so fencing of both banks is required to exclude livestock.



Photo 4 The result of well-maintained stockproof fencing – the same site in 2013, 2015 and 2017 (right to left).

- Retain woody material in the river channel to provide cover and refuge habitat / resting lies for trout. Good cover is critical in increasing the fish holding capacity of a small river like this.
- Think carefully about tree pruning for angling access and retain low cover and use 'hinging' (similar to hedge laying) rather than removal of low branches (Photo 5). Coppicing a small number of larger alders in selected locations would provide re-growth suitable for hinging in the future – it is essential however that the coppiced stools are protected from grazing.



Photo 5 Smaller trees and branches partially cut and laid to create good cover. Inset: example of steeply angled back-cut to create a hinge.

- Keep a watching brief on water quality using the Anglers' Riverfly Monitoring Initiative (Riverfly Partnership). <http://www.riverflies.org/rp-riverfly-monitoring-initiative>. A training course in the River Dove catchment is being considered during 2019 – contact Tina Bardill for further information tina@trentriverstrust.org.
- Cease stocking trout and adopt a catch-and-release policy. Use catch return information to monitor catches and compare with historical catch records; this is important to provide a collective and objective measure of the effect on catches, rather than individual, anecdotal experiences.
- Make sure EFFC members check, clean and dry equipment before fishing the river, to protect native crayfish.

Please note, it is a legal requirement that all the works to the river require written consent from the lead flood authority (usually either Environment Agency or County Council) prior to undertaking any works.

6.0 Making it Happen

There may be opportunities to implement some of the recommendations through the Ecclesbourne Restoration Partnership and/or Derwent Catchment Partnership (<https://www.derbyshirewildlifetrust.org.uk/derbyshire-derwent-catchment-partnership>), for example funding for fencing repairs, volunteer assistance with non-native plant control. Useful contacts are Scott McKenzie (smckenzie@derbyshirewt.co.uk) of Derbyshire Wildlife Trust (Derwent Catchment Partnership hosts) and Ryan Taylor (ryan.taylor@environment-agency.gov.uk), Derwent Catchment Coordinator for the Environment Agency.

Further assistance from the Wild Trout Trust is available in the form of:

- Helping obtain the necessary consents for carrying out in-stream works, from either the local authority or Environment Agency (depending upon whether the river is a designated Main River or not).
- A practical visit, which involves a visit from a WTT Conservation Officer to demonstrate the techniques described. This enables recipients to obtain on-the-ground training regarding the appropriate use of conservation techniques and materials, including Health & Safety, equipment. This will then give projects the strongest possible start leading to successful completion of aims and objectives. Recipients will be expected to cover travel expenses of the WTT attendees.

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/library>

The Wild Trout Trust has 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.

7.0 Reference

Bachman, R.A. (1984) Foraging Behaviour of Free-Ranging Wild and Hatchery Brown Trout in a Stream. *Transactions of the American Fisheries Society* 113: 1-32.

8.0 Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programme in England, through a partnership funded using rod licence income.

9.0 Disclaimer

This report is produced for guidance; 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.