



Habitat Advisory visit to the Beresford  
Fishery, on the River Dove Derbyshire.  
Undertaken by Vaughan Lewis, Windrush  
AEC  
May 2002

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## 1.0 Introduction

This report is the output of a site visit undertaken by Vaughan Lewis, Windrush AEC to Michael Collins' fishery on the River Dove, Derbyshire on 24 May 2002. The visit was sponsored by Orvis, as part of its commitment to support habitat enhancement schemes through the offices of the Wild Trout Trust.

Comments in the report are based on observations on the day of the site visit, discussions with Michael Collins, Nick Fuge, Richard Ward and Robert Hawley, and additional information provided by Michael Collins. Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Hand Bank (LHB) or Right Hand Bank (RHB) whilst looking downstream.

## 2.0 Background

The Beresford fishery covers approximately 5km within Beresford Dale and the top of Wolfscote Dale. The fishery is owned by Michael Collins, who lets the fishing to a number of individual rods. The fishery has strong historic associations, with Isaac Walton's fishing temple located towards its centre.

The River Dove is designated a Site of Special Scientific Interest (SSSI) and a candidate Special Area of Conservation (cSAC) under the EU Habitats Directive, in recognition of its conservation importance in a European context.

## 3.0 Habitat

On the day of the visit, the river was walked upstream from the confluence of a small RHB tributary stream near Barracks Farm (SK128587). The stream may be a small but important spawning/nursery area for brown trout *Salmo trutta*, although the gravel quality was poor with significant fine sediment loading. Large amounts of surface foam were evident on the day of the site visit, with the foam smelling of agricultural effluent.

The river was heavily shaded by a number of large horse chestnut *Aesculus hippocastanum* on the LHB. Further upstream, the LHB was shaded by alder *Alnus glutinosa*, elm *Ulmus spp.* and sycamore *Acer pseudoplatanus*. The banks became increasingly steep, with sheer cliffs of >15m present. These effectively shade the channel during much of the day.

A public footpath ran along the RHB with only a narrow (1m+ wide) buffer of grass present. In places the path was badly eroded leading to preferential run-off pathways.

The channel of the River Dove was dominated by a large number of weirs constructed from stone. Protective stone pitching had been installed to the banks adjacent to the weirs. Each of the weirs impounded the watercourse by between 0.3m and 0.6m. The backwater effect of each of these weirs was responsible for an accumulation of fine sediment upstream of the structure.

Below each weir, there were short sections of free flowing channel. The bed was dominated by large cobbles and boulders, although limited sections of gravel suitable for trout were present. This gravel was relatively unimbedded but had a high loading of entrained sand and fine silt. In these short sections of faster water, small stands of water crowfoot *Ranunculus spp.* were noted.

The Dove was very coloured due to recent rainfall. A light foaming was present over sections of the channel.

Large woody debris (LWD) originating from fallen trees and branches was present in the channel.

Extensive stands of snowberry *Symphoricarpos rivularis* and dogwood *Cornus sanguinea* were present, especially along the LHB. A large number of the alder *Alnus glutinosa* trees present showed evidence of *Phytophthora* infection.

An old fish farm was present on the LHB. The site could not be accessed on the day of the site visit due to very heavy riparian growth. It is understood that this was formerly used to rear fish for stocking into the Dove.

Upstream of the fishing temple, some bank damage due to stock grazing was noted, especially at drinking sites for cattle. The habitat in this section was significantly different, becoming deeper, with no weirs present. There was little heterogeneity in either channel form or flow. Trout spawning and juvenile habitat were absent from this section. Heavy shading was present particularly on the LHB, with grazing having reduced both tree and low fringing cover on the RHB.

The Lower Hurst Stream joins the Dove on the RHB upstream of the fishing temple. It is understood that this was probably a trout spawning stream in the past. It has been dredged, leaving it overdeep and devoid of a gravel bed.

Towards the top of the fishery, short sections of fine, black gravel were noted. This was heavily laden with fine silt, probably precluding any successfully trout or grayling spawning.

The Mill immediately upstream of the Hartington road bridge provided an impassable barrier to migrating fish in two of its three channels. Access via the third channel may be possible, although its location in a private garden meant that this could not be confirmed.

### 2.3 Water Quality

River Water Quality in the River Dove was generally excellent, meeting the criteria for the highest River Ecosystem classification, RE1.

However, a number of chronic and acute water quality issues have affected the Beresford Dale reach of the River Dove. These include:

- At least one discharge of Synthetic Pyrethroid (SP) sheep dip, during 1997.
- Leaching in of poly-aromatic hydrocarbons (PAH) following fly tipping of diesel waste near to the River Dove.
- Periodic poor quality effluent from the Dairy Crest plant at Hartington.

The SP discharge significantly reduced the abundance and diversity of macro-invertebrates through Beresford Dale, with the Biological Monitoring Working Party (BMWP) score falling to between 60 and 80 during 1997. The macroinvertebrate fauna subsequently recovered, with a BMWP figure of 162 recorded in spring 2002 being the highest of 7 samples taken between Crowdecote and Dovedale. The presence of dippers *Cinclus cinclus* on shallow riffle areas of Beresford Dale during the site visit reinforces this recovery.

The EA have investigated the discharge of PAH in some detail. Sediment samples have been taken in Beresford. The results of these are pending following analysis.

The issue of the Dairy Crest discharge is complicated and the subject of substantial correspondence between the EA, Dairy Crest, the Angler's Conservation Association (ACA), the Beresford fishery and English Nature (EN). In essence, Beresford fishery has been concerned regarding the impact of the discharge on the Dove. The river has regularly been reported as being variously a blue, grey and green colour, whilst the number of fish present in the river has declined. The fishery and other local groups are further concerned regarding an application by Dairy Crest to significantly increase its volumetric discharge (from 212 m<sup>3</sup> to 350m<sup>3</sup>) albeit with a significantly tightened chemical standard.

For its part, the EA has responded that despite "responding to about 30 reports from yourself (*Mr A Shipley, bailiff to the fishery - my italics.*) since May 2001" (letter from Mrs S.Bowen, EA Team Leader, Environment Protection 17 January 2002) only one of these showed a "source of minor pollution (which) was traced and quickly stopped". This reply does not detail the occasions (believed to be at least 4) when the EA recorded significant breaches of a discharge consent from the works, with on at least one occasion a Biochemical Oxygen Demand believed to be >200 mg/l (data from the EA public register have not been obtained to check these details due the time taken for the EA to process requests through their customer contact department).

A separate letter sent to Michael Collins on 13 February 2002 by Mr R Matthews, EA Team Leader, Water Quality Consenting states that ""the existing consent has little in way (sic) for monitoring and recording of performance of the works for either flow or quality (although the company provide continuous flow measurement and some continuous monitoring." This letter was sent in response to concerns regarding the application for an increased volumetric discharge to the Dove by Dairy Crest and appears to highlights inadequacies in the monitoring of the existing consent.

Concerns have been expressed by Beresford fishery that aluminium sulphate used as a flocculent by Dairy Crest may be entering the Dove and having a toxic effect on fish. The peak figure for aluminium recorded in the River Dove at Hartington during the period 1991-2001 was >1200 micrograms/litre (18/10/2000). The peak figure recorded for the River Glutton during the same period was >600 micrograms/litre. Concerns regarding possible aluminium toxicity are being investigated in more detail by the EA who are taking sediment samples from Beresford Dale for analysis.

## 2.4 Fish stocks

Approximately 100 11" hatchery reared brown trout have been stocked annually. No fish were stocked during season 2001 due to FMD and none had been stocked in 2002 up to the time of the site visit. Anglers report that catches of brown trout and grayling *Thymallus thymallus* have declined rapidly over the past few seasons. No catch data have been presented to quantify this decline.

A recent EA electrofishing survey (April 2002) indicated a very low stock of brown trout (11), with a biomass figure of 109g/100m<sup>2</sup> and poor recruitment. These poor results were mirrored at the site at Hartington Road Bridge (13 trout, biomass 154.6g/100m<sup>2</sup>). Results from the downstream site, Wolfescote Dale produced a biomass of 376 g/100m<sup>2</sup> with evidence of good recruitment.

No grayling were captured at the Beresford Dale site during the survey. Two grayling were caught d/s and u/s of the Hartington creamery site.

## 4.0 Key issues and recommendations

Following the site visit and brief review of the data provided, a number of issues have been identified. These are detailed below, along with recommendations of actions to optimise the performance of the fishery.

### HABITAT

- The availability and quality of spawning and juvenile habitat for brown trout is poor. In the lower and middle fishery, the presence of the large number of small weirs significantly affects the natural geomorphology of the channel. The weirs impound water upstream, resulting in drowning out of shallow riffles, deposition of fine sediment and a loss of potential spawning habitat. Adjacent to and upstream of the fishing temple, the geology of the river changes, with a natural dearth of gravel riffles suitable for spawning. Recruitment of fish to this section of the fishery is totally reliant on immigration of juveniles from other sections of the river or its tributaries. The Mill at Hartington road bridge reduces the possibility of migration occurring from upstream.

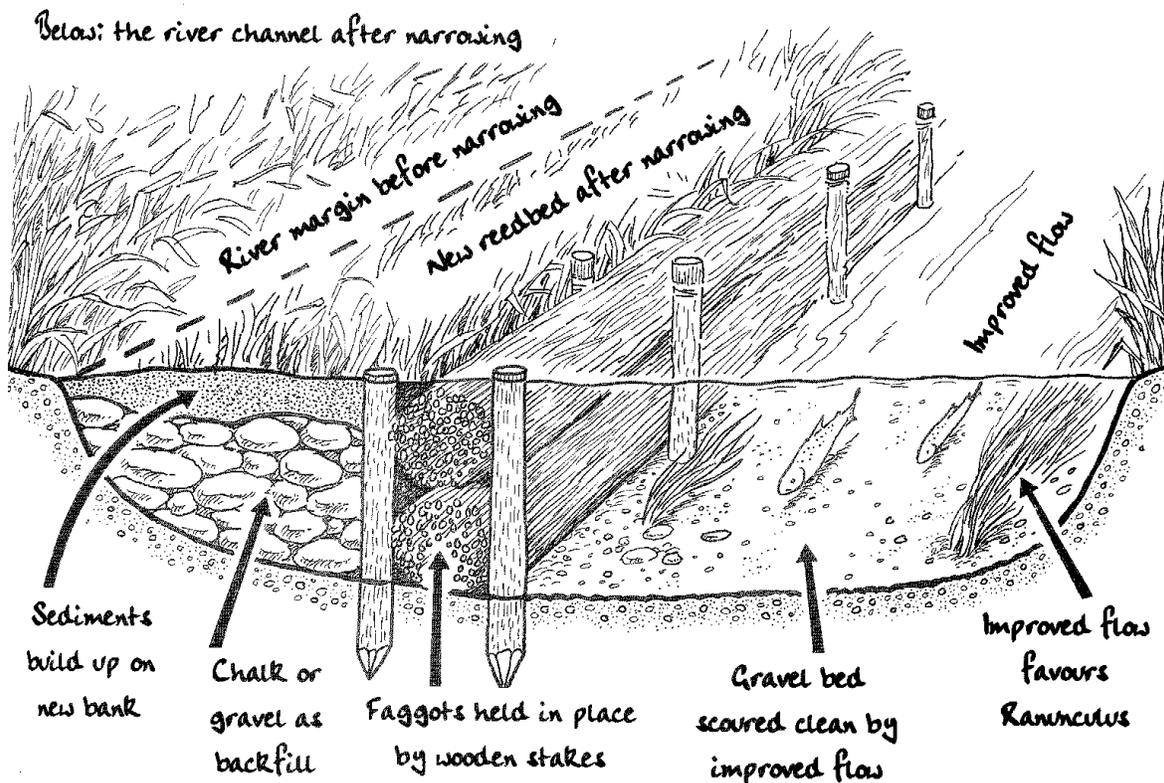
In order to improve the recruitment of brown trout and grayling, the following actions are recommended:

- Some of the existing weirs should be modified or removed. Modification could be effected by removing the central section of the weir, leaving paired stub groynes that would train flow, thus creating scour without impounding water upstream. Alternatively, the existing weir head could be run-out via a length of constructed gravel riffle. The latter option would retain the current water level whilst providing an additional length of trout spawning habitat. This is an operation that is relatively expensive and requires careful planning. It is recommended that the EA is contacted, both for technical advice and as a possible source of partnership funding.
- Improvements to the tributary stream at the lower end of the fishery and the Hurst Stream should be considered. Suitable enhancements could include importation of gravel to create spawning riffles and cleaning of any existing gravel during September using high pressure jet-washing or manual raking.
- The springs within the old hatchery site should be utilised to run a deep substrate incubation box. Basically, these are gravel filled boxes, approximately 0.6m in each dimension, that are filled with suitably sized gravel and seeded with 10,000 - 20,000 trout eggs. A water feed at the bottom of the box allows the eggs to incubate and hatch. Once they reach the swim-up fry stage, they leave the box via the overspill pipes, stocking themselves into the river. In effect, they are naturally reared fish without the unhelpful behavioural modifications associated with hatcheries. More details on incubation boxes can be found on the Wild Trout Trust web site [www.wildtrout.org](http://www.wildtrout.org) or in Volume 2 of the Trust's magazine, *Salmo trutta*.
- Sections of the fishery are heavily shaded. Some of this shading is due to the deeply incised nature of the gorge through which the river flows and cannot be addressed. However, shading caused by riparian trees can be reduced by implementing a regime of rotational coppicing. This shade is restricting the growth of marginal vegetation, with associated damaging impacts on the rate of erosion, the provision of marginal cover for fry, and water flow velocity. In order to address overshading, the establishment of a regime of limited, rotational coppicing would be of great benefit. Increasing light penetration into presently overshadowed river sections would be of benefit to instream vegetation and valuable fringing marginal vegetation. The conservation value of the

existing trees should not be under-estimated and great care should be exercised in the selection of trees to be cut. A felling licence is required from the Forestry Authority.

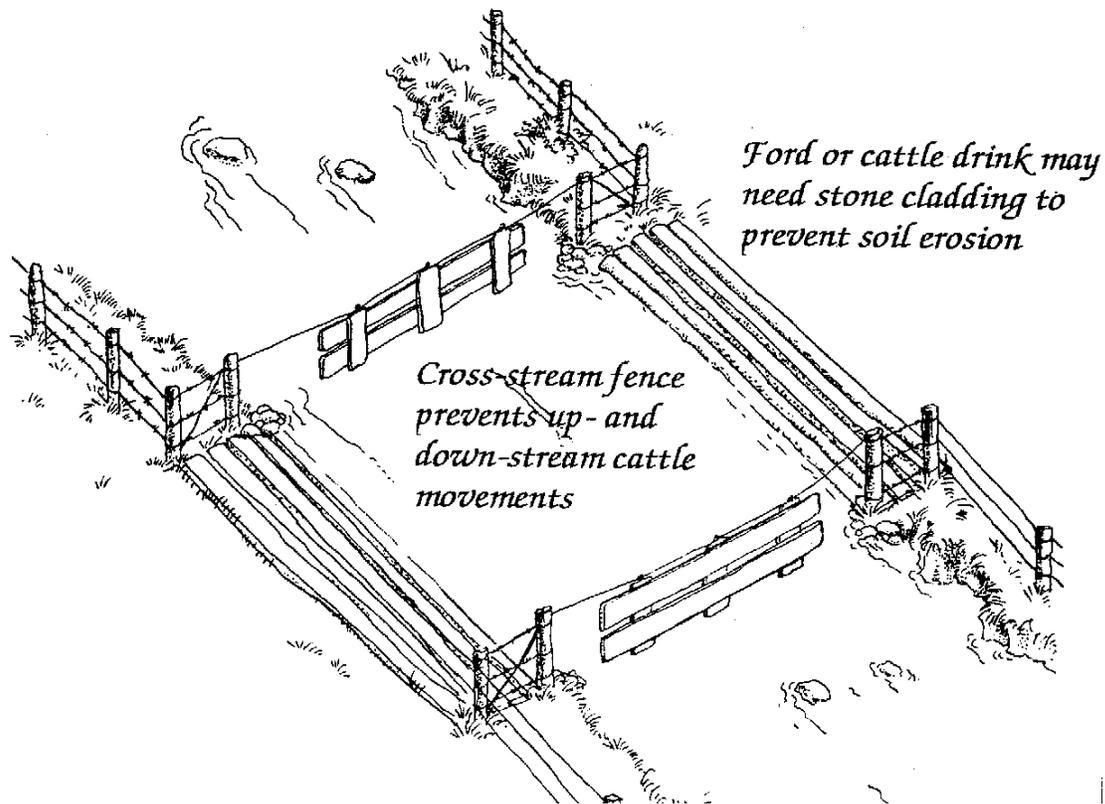
- The dense stands of snowberry and dogwood are also shading out valuable marginal vegetation. They should be cut back heavily. Stump treatment with a herbicide approved for use near water such as fosamine ammonium may then be appropriate. Note that this operation requires the written consent of the EA.
- *Phytophthora* infection of alders will mean that many of these will be lost in the next few years. Consideration should be given to replacing them with an alternative suitable species such as ash *Fraxinus excelsior*.
- Once overhanging vegetation has been cut back, marginal growth can be established. This will require the creation of low level planting shelves. These are best constructed using faggot bundles formed from arisings from coppicing (see below).

## Narrowing the river channel with hazel and brushwood faggots



The shelf created should be no more than 1m in width, with the top of the faggots set at approximately 100mm above summer water level.

- The public footpath at the lower end of the fishery should be repaired to prevent sediment run-off and undercutting of the RHB.
- Fencing should be considered where farm stock is causing bank erosion. Suitably designed cattle drinks should be installed where required (see below).



- Where possible, large woody debris (LWD) should be allowed to remain in the channel. Large woody debris is an integral component of stream ecology. The benefits for retaining it are clearly laid out in the recent EA R&D document, “Large Woody Debris in British Headwater Rivers”. Key conclusions of the report include:
  - An increase in both mean flow depth and velocity and variability of both parameters.
  - The development of high physical habitat diversity both in-channel and in the floodplain. Removal of LWD reduces both habitat quality and availability for juvenile and adult brown trout.
  - Although active LWD dams may impair upstream migration of fish at low flows, they rarely do so at high flows.
  - LWD have significant benefits to the control of run-off at the catchment scale.
  - River and riparian management has important effects on the distribution and character of dead wood accumulation within the river system.

The report also provides recommendations for the management of LWD; the most important of which is “although there are certain situations that may require wood removal to eliminate stream blockage, the wisest management is no management”. Building on this simple truism, it is recommended that before any future work to remove LWD from river channels is undertaken, the wider implications of the proposal on the whole river system are considered, rather than just the potential (in many cases unproven) benefits to salmonid populations. In addition, the impact of planned riparian tree work on the supply of LWD to the river should be considered. In some circumstances, it may be beneficial to allow trees to fall into the channel, provided the risk of increased flooding is acceptable.

## **WATER QUALITY**

- The source of the foaming in the small RHB tributary at the lower end of the fishery should be investigated in conjunction with the EA.

- There is little doubt that the Beresford fishery has suffered significant water quality impacts in the past years. Recent BMWP results are indicative of a considerable recovery in the river's macroinvertebrate fauna, suggesting an improvement in long term river water quality. The presence of dippers tends to support these data.
- The ongoing upgrade of the Dairy Crest creamery should reduce the risk of organic pollution from this source. However, possible impacts from aluminium from this source should continue to be investigated in conjunction with the EA. Discharge results from the creamery and Hartington STW should be checked annually for compliance with their discharge consents.

## **FISH STOCKS**

- The lack of suitable spawning sites for both brown trout and grayling, particularly in the upper and middle fishery, is limiting recruitment of these species.
- In order to improve recruitment it is recommended that:
  - The existing weirs are modified (see Habitat section)
  - Habitat within the tributary streams is modified (see Habitat section)
  - A deep substrate spawning box should be installed at the site of the old hatchery. The forthcoming EA Trout and Grayling strategy, and concerns regarding introduction of crayfish plague *Aphanomyces astaci* may result in severe restrictions on the introduction of hatchery reared trout to the Dove. Eyed ova used in the hatchery box have the advantage of being able to be disinfected, thus reducing the risk of crayfish plague being introduced.
- Detailed catch records should be maintained by rods. This will enable the fishery to produce detailed supportive data in the event of any future episodes of poor water quality.

## **LEGAL CONSIDERATIONS**

- Any works to the bed or banks within 8m of a river require the previous written consent of the Environment Agency. In addition, the Agency's consent is required under Section 30 of the Salmon and Freshwater Fisheries Act 1975, for the introduction of any fish or eggs to any inland water.