Advisory Visit

River Derwent, Cromford, Derbyshire

August, 2012

1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the River Derwent, Cromford, Derbyshire on, 23rd August, 2012. Comments in this report are based on observations on the day of the site visit and discussions with John Pass, Head Bailiff for Cromford Fly Fishing 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 Derbyshire Derwent rises in the southern Pennines between Manchester and Sheffield and flows south to join the River Trent just south-east of Derby. The upper reaches of the river are impounded by Derwent, Howden and Ladybower reservoirs and hence the river flow is influenced by compensation flows and water releases. The geology of the catchment comprises the Millstone Grit and shales of the Dark Peak and carboniferous limestone in the White Peak where tributaries such as the Wye arise.

The catchment is largely rural, with pastoral agriculture the predominant land use. The middle and lower river flows through towns such as Matlock, Cromford, Belper and Derby where pioneers of the Industrial Revolution such as Richard Arkwright harnessed the river's energy to power mills, something recognised by the World Heritage Site status of the Derwent Valley. The mill weirs, combined with historical pollution in the Trent, led to the extinction from the Derwent of migratory fish species such as salmon and river lamprey. The continued presence of these weirs prevents these species from re-establishing populations, although work driven by the Water Framework Directive is enabling the Environment Agency, Trent Rivers Trust and other organisations to improve fish passage.

The Water Framework Directive (WFD) classifies rivers (as high, good, moderate, poor or bad) based upon various measures of ecology, water chemistry, flow regime and physical condition of the channel. The measures of ecology include fish, invertebrates, macrophytes (plants) and phytobenthos (algae). WFD sets a target for achieving overall good

ecological status by certain dates; if there are overriding factors that prevent the achievement of good ecological status, the waterbody may be designated as a heavily modified or artificial waterbody, in which case the target is to achieve the best ecological potential possible within the constraints present. The latter is the case with this section of the Derwent (Waterbody ID GB104028052390, River Derwent, River Wye to River Amber), because of the regulated nature of the flow (Ladybower) and the presence of barriers to fish migration (weirs). The current ecological potential of this section of the Derwent is “poor”, with a target of reaching “moderate” (considered the best possible) by 2027. The fish element of the classification is described as “poor”, although this is because of the inefficiency of fish survey methods in large rivers like the Derwent, rather than truly poor fish stocks (Dr. Ian Firkins, EA Officer, pers. comm.).

Cromford Fly Fishing Club control approximately 2½ miles of mostly double bank fishing on the River Derwent, between Cromford Bridge (SK3001257195) downstream to Holmesford Cottage Meadows (SK3263455360). The river here is known to contain brown trout, grayling, chub, barbel, pike, perch, minnow, stone loach, bullhead and brook lamprey. The club have 76 members and stock the river annually in two batches with a total of approximately 1000 brown trout of a takeable size.

This section of the Derwent does not flow through any sites with statutory conservation designations (e.g. SAC, SSSI), but the Cromford Canal SSSI does follow the course of the valley here. This disused canal is designated for its rich aquatic and wetland flora and associated insect fauna (see www.sssi.naturalengland.org.uk/citation/citation_photo/1000209.pdf).

3.0 Habitat Assessment

The river was walked from the downstream limit up to Cromford Bridge. In general, the in-stream habitat quality within this section of the Derwent is very good. The river has a moderate to steep gradient and a good diversity of flow patterns and depths provided by the pool, riffle and glide sequence. The river bed substrate is also very varied, ranging from boulders down to sand, with a good proportion of gravel in the 5 – 100mm size range, which encompasses the spawning requirements of fish such as trout, grayling, barbel, chub and lamprey (Photos 1, 2).

Photo 1 A diversity of flow patterns and substrate size provides good habitat

Photo 2 Steady glide habitat. Managing overhanging trees in these areas should strike a balance between fishing access and cover. Leaving low and trailing branches in place provides excellent holding areas for fish.

Unfortunately there appears to be a large amount of fine sediment amongst the gravel, which can limit spawning success by suffocating eggs. The presence of the fine sediment may be because of the regulated nature of the flows within the Derwent (fewer spates to wash the sediment through the system); this is known to be a problem on the upper river, closer to Ladybower Reservoir, where the artificial flow regime has even greater influence. This year has however been unusually wet, with prolonged high river levels which might have been expected to flush out finer sediment. There is a possibility that the effects are still being felt of the pollution incident at Stoney Middleton in 2007, where thousands of tonnes of mine tailings (fine sediment) were released to the Derwent; recent untypically high flows could be mobilising sediments which have been settled behind impoundments since the incident (Photos 3, 4).

The banks are stable, with mature trees present for the majority of the length. Trees are important for river habitat on several counts:

- they bind the bank with their root structure (preventing over-widening and shallowing of the channel);
- They provide shade to the channel, keeping water temperatures within tolerable limits for cool-water species like trout;
- They provide an input of terrestrial invertebrates to the aquatic food chain;
- They provide low cover over the water which is an important habitat for adult fish;
- They provide a source of large woody debris (LWD) for the river channel.

Large Woody Debris (LWD) is a general term referring to all wood naturally occurring in rivers including fallen trees, branches, stumps and logs. Almost all LWD in rivers is derived from trees located within the riparian corridor. Streams with adequate LWD tend to have greater habitat diversity, a natural meandering shape and greater resistance to high water events. LWD is an essential component of a healthy stream's ecology and helps maintain a diversity of biological communities and physical habitat.

Photo 3 Fine sediment deposited in the margins of the river...

Photo 4...and across the channel in wider parts of the river.

Photo 5 Naturally occurring large woody debris (in this case a fallen tree) – note the trapped weed and leaf litter which will support invertebrate life and hence trout food

Photo 6 Water crowfoot growing only on the more open side of the channel

Often LWD is treated as a nuisance and removed from the river. This may be necessary in some cases (e.g. to reduce flood risk by removal of accumulations from bridges), but very often removal is unnecessary and harmful to stream habitat. Removal of LWD reduces the amount of organic material supporting the aquatic food web, removes vital in-stream habitats that fish will utilise for shelter and spawning and reduces the level of erosion resistance provided against high flows. In addition, LWD improves the stream structure by enhancing the substrate (scouring and sorting gravel) and diverts the stream current in such a way that pools and riffles are likely to develop. The best approach to managing LWD in a way that benefits river habitat is to adopt a default position of leaving it in place unless it poses an unacceptable risk (Photo 5).

The aquatic plant water crowfoot (*Ranunculus* sp.) was present in many areas of the river; these tended to be the faster-flowing, shallower, less shaded parts. Water crowfoot is a valuable component of in-stream habitat, providing cover for fish, flow and bed substrate diversity, and a habitat for invertebrates, including species of up-winged flies of angling interest. The club have made attempts to establish water crowfoot in other parts of the river but without success, probably because these areas are too shaded by steep, wooded banks.

The idea of “sky-lighting” heavily shaded areas to promote in-stream plant growth was discussed. It was evident that even in more open areas, the growth of water crowfoot was restricted to the side of the river closest to the lower profile, relatively treeless bank (Photo 6). This suggests that even if trees were felled, in some areas the steep valley sides may still limit light penetration and weed growth; careful site selection is therefore required.

It was mentioned that some of the woods on the right bank (Birch Wood) were within a SSSI, which could restrict the opportunity for thinning. Subsequent enquiries show that, other than the narrow corridor of the Cromford Canal SSSI, there is no statutory conservation designation in this area. Birch Wood is identified as ancient woodland (replanted) on the http://magic.defra.gov.uk website, but the corridor of trees alongside the river falls outside this. It may therefore be possible to selectively thin trees here, maybe targeting the less desirable species such as sycamore. A felling licence is required if more than five cubic metres of timber is to be felled and it is strongly recommended that the club contact Tristan Galletly, local

Woodland Officer for the Forestry Commission for further advice (see http://www.forestry.gov.uk/forestry/INFD-7BBFG8).

The felling of riparian trees gives rise to the opportunity to introduce large woody debris to the river channel using "tree kickers". This involves anchoring the felled trees closely to its stump using cabled wire and allowing the river flow to push the tree parallel to the bank. Such structures provide habitat advantages similar to naturally occurring woody debris and reduce the labour requirement of logging and removing felled trees. Written consent is required from the Environment Agency for introducing such structures (Photo 7).

Photo 7 "Tree kicker" installed on the River Ceiriog, near Chirk.

Cromford sewage works discharges its treated effluent into the river on the right bank, opposite Lea Wood. This is a known "hot spot", with fish gathering here to feed upon the concentrations of midge larvae and other invertebrates. No water quality problems have been experienced by the club, but it may be worth while keeping a watching brief by taking part in the Riverfly Partnership's Anglers' Monitoring Initiative (AMI). Regular sampling of invertebrates will help to check water quality and the AMI has the backing of the Environment Agency who will follow up problems detected

by appropriately trained samplers. Details can be obtained from www.riverflies.org.

4.0 Recommendations

- Investigate the possibility of felling selected riverside trees with the Forestry Commission.
- Consider introducing "tree kicker" structures to increase the amount of LWD in the channel
- Consider taking part in the Riverfly Partnership Anglers' Monitoring Initiative
- Continue to control Himalayan balsam and mink
- Review the club's stocking policy (see below)

The stocking policy of the club was discussed and catch returns were provided prior to the visit; these are summarised in Figures 1 and 2. The data show a rod average ranging from 2.11 to 4.04 fish per visit, with a mean value of 2.89. The proportion of fish killed and fish returned has changed significantly between 1985 and 2011. The percentage of fish returned has increased from approximately 50% to over 90% (Figure 2).

Given the large increase in catch-and-release, it would be sensible to reduce the number of fish stocked into the river, on both economic and ecological grounds. This could be done incrementally, reducing the numbers by around 25% each year and using the catch return system employed by the club to monitor changes in catch rate. A number of clubs which have reduced or ceased stocking (as catch-and-release has increased) have seen catch rates maintained or increased, probably as a result of reduced competition between stocked and wild fish and an increase in the numbers of the latter.

Many studies have shown that only a very small proportion of stocked fish survive their first winter in the river and the majority disappear within a few weeks of release. For practical purposes, stock fish are therefore only available to anglers during the season they are released, at best. It is therefore sensible to selectively harvest these fish if they can be reliably distinguished from wild fish (or marked before stocking). The released wild

fish have a much better chance of long term survival and growth, thus improving the quality of the fishery.

There is an increasing body of scientific evidence which shows that, even with their poor survival rates, stocked fish can interbreed with wild fish to the detriment of the overall population (by “diluting” adaptation to the local environment and reducing the numbers surviving to maturity). Environment Agency policy has been changed to reflect this and requires all brown trout stocked into rivers to be infertile triploids from 2015. The Wild Trout Trust supports this position and a full review of the evidence is available on our website.

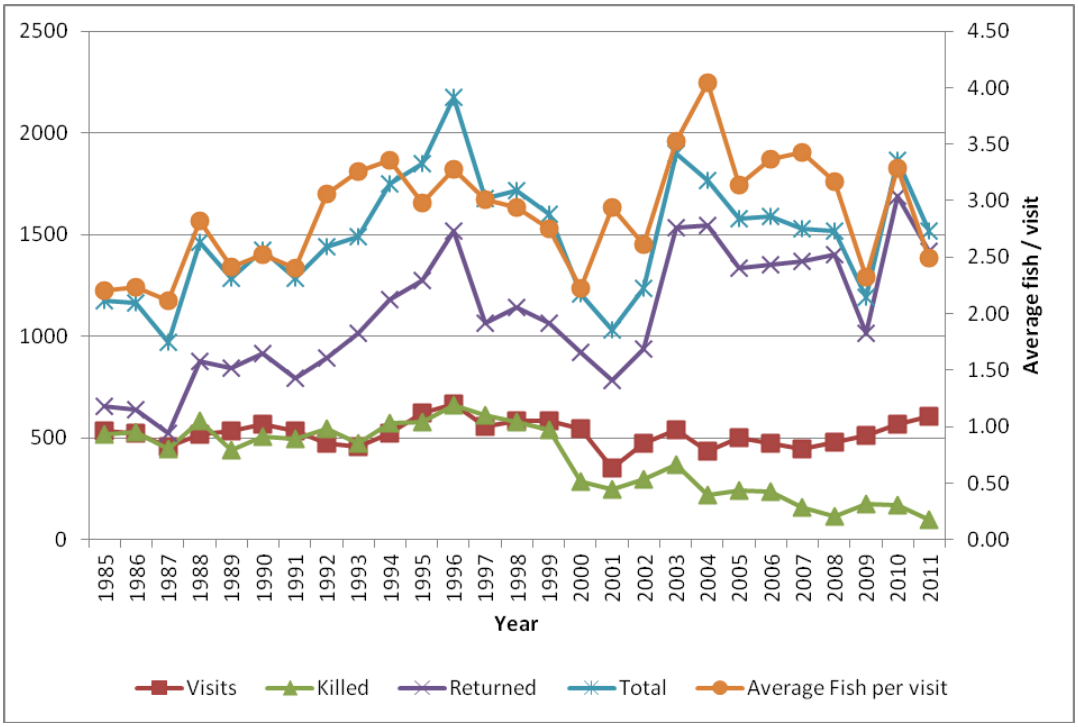

Figure 1 Catch return summary, Cromford Fly Fishing Club, 1985 – 2011.

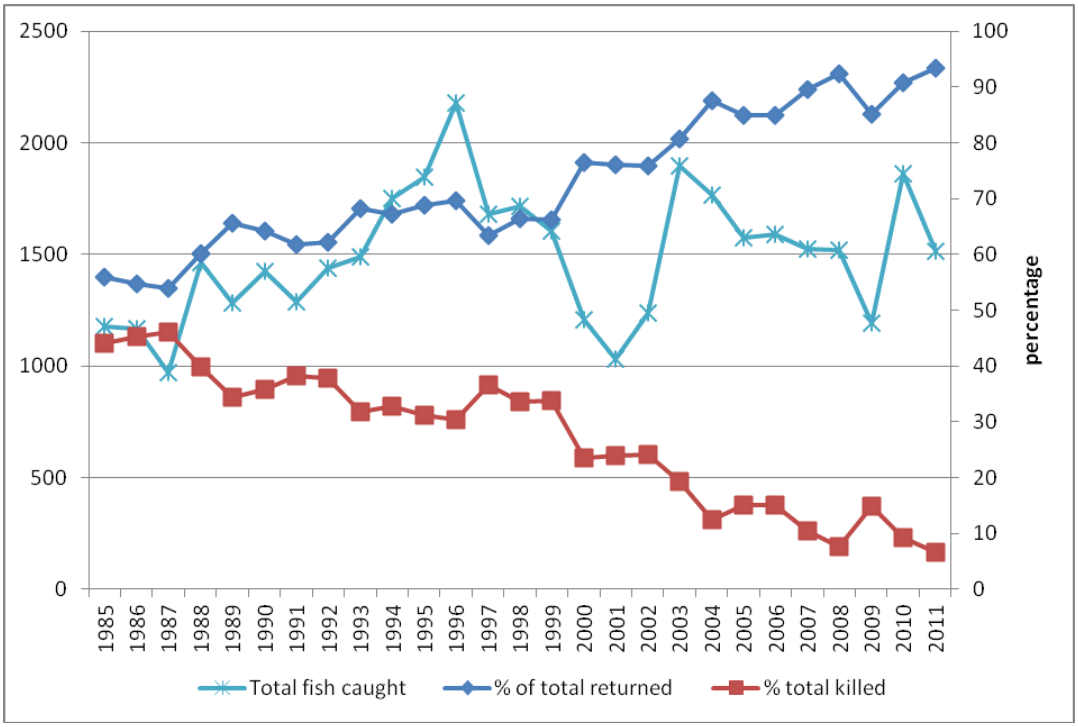

Figure 2 Proportion of total catch killed and returned by year.

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 Making it Happen

The WTT can provide further assistance to help implement the above recommendations. This includes help in preparing a project proposal with more detailed information on design, costs and information required for obtaining consents to carry out the works. If required, a practical visit can be arranged to demonstrate habitat improvement techniques. Demand for these services is currently high but WTT is able to provide further advice and information as required. The WTT may also be able to help with fundraising for habitat improvement projects via an Advisory Visit bursary or the Rods for Conservation scheme. Please contact tjacklin@wildtrout.org for more information. Further advice on fund-raising can be found at http://www.wildtrout.org/content/project-funding.

6.0 Acknowledgement

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

7.0 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.