Advisory Visit

River Avonmore, Co. Wicklow, Ireland

5th July, 2010

1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin and Shaun Leonard of the Wild Trout Trust to the River Avonmore, Co. Wicklow, on 5th July, 2010. Comments in this report are based on observations on the day of the site visit and discussions with Alan Whines, David (Snr) and David (Jnr) Armstrong, Fran Bass and Pat Cullen of Rathdrum Trout Angling & Environmental Club (RTAEC).

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 Avonmore River flows from Lough Dan in the Wicklow Mountains in a generally southerly direction for approximately 20 miles before joining the Avonbeg about 1.5 miles upstream of Avoca at the Meeting of the Waters (*Cumar an dá Uisce*) to form the River Avoca, which in turn discharges into the Irish Sea at Arklow.

The Avonmore has retained its natural characteristics and has not been affected by drainage works. The Eastern Regional Fisheries Board website describes the river as "*made up of stretches which alternate between deep, slow flowing glides to areas of fast flowing riffle and run areas culminating in deep pools. This beautiful river contains good stocks of wild brown trout to 8ozs, which is complimented by a stock of fish from 1lb to 1.5lbs in weight. The Avonmore also produces a number of larger fish annually and fish of 5lbs to 6lbs are recorded annually. The best of the fishing takes place in the early season from March to May or in the late summer and early Autumn period from August to September. The sections at Avondale Estate and Clara Vale produce good angling*".

The Avoca River, into which the Avonmore flows, has an ongoing problem with pollution from former copper and sulphur mines which ceased to be worked in 1982. Acidic mine water laden with heavy metals discharges from the site and severely impacts upon water quality in the river. This affects runs of migratory fish, although adult salmon are known to get past the site (probably under high water conditions) because they are caught upstream

by anglers and salmon parr are relatively common in the Avonmore. Each spring the Eastern Regional Fisheries Board run a smolt trap upstream of the mine site and transport fish to a point well downstream. Sea trout run the Avoca but its other tributaries (e.g. Aughrim river) are better known for sea trout angling. The Avoca system is closed to angling for salmon and sea trout for 2010 to protect stocks.

The Avonmore was subject to a very large flood in January 2010 which reached levels rarely seen before. This followed an exceptional rainfall event over the catchment coinciding with a large snowmelt. It is rare to get acute flood events on the Avonmore because the bogs and loughs in its upper catchment generally buffer runoff and moderate flows. The January event has caused some large changes to the river channel, although the wooded banks along much of the section inspected have been resilient to erosion.

RTAEC have around 160 members plus free junior membership, with a policy of encouraging young people to join the club. Day ticket fishing is also available for visiting anglers. RTAEC requested a visit from the Wild Trout Trust because of its concerns regarding the small size of the brown trout within the river, and to see if this could be attributed to any problems with water or habitat quality.

3.0 Habitat Assessment

RTAEC control around 10 miles of river so representative sections of the river were visited. Generally the in-stream habitat of the Avonmore was excellent with a range of natural features characteristic of an upland river in good condition. There is the full range of habitat requirements for trout and salmon to complete their lifecycle, and in most places could be described as exemplary for a river of this type.

Land use in the surrounding catchment, which is crucial to the health of upland river systems, appears to be relatively low intensity; a mixture of livestock agriculture, forestry and mixed woodland with little impact upon the river valley itself.

In Rathdrum, the river was walked downstream from the main road bridge to a footbridge. In-stream habitat was excellent with a variety of pools, riffles and glides and gravel point bars (Photo 1). A kick-sample for

invertebrates was taken which revealed a good variety of species indicating good water quality, but relatively low numbers overall indicating a naturally unproductive system. The types of invertebrates caught were cased caddis (<10), caseless caddis (<100), blue-winged olives (<100), olives (Baetidae, <100), stoneflies (<10) and freshwater shrimp (<10). A small eel was also caught in the sample. Turning stones revealed good numbers of egg masses from upwinged flies (Photo 2).

There was some aquatic vegetation within the river channel in the form of moss (*Fontinalis* sp.) and odd clumps of water crowfoot (*Ranunculus* sp.) (Photo 3). Compared with other river systems however, the weed growth is sparse and productivity within the river channel is low. Inputs from outside the river channel (e.g. leaf litter) probably provide a lot of the nutrients which support the food chain and are therefore very important.

There were some good examples of stable large woody debris (LWD) in the river (Photo 4). LWD has been shown to be very important to the ecology of river systems for a number of reasons. These include:

- Helping to shape the river channel by promoting localised scour of the bed and banks; this produces a variety of depths and flow patterns which means good habitat.
- Helping to scour and grade river bed gravel to make it suitable for fish spawning.
- Providing cover for a range of species including trout and salmon; this can be very important for the survival of fish as it protects then from predators and gives a refuge from high flows.
- Trapping organic material such as aquatic weeds and leaf litter which are used by certain invertebrate species as food (so-called 'shredders'). These invertebrates form food for fish, so the more organic material that is retained in the channel, the more productive the system will be. This is particularly important in a system like the Avonmore which runs off the granite and peat bogs of the Wicklow Mountains and does not have much productivity within the river channel itself.

Upstream of the road bridge at Rathdrum the river runs through a holiday park camp site. This area was impacted by the January flood and the river

broke through the bank here and followed the course of an old mill leat, bypassing a meander and the main road bridge. Since then the owner of the camp site has completed extensive works to build up the bank here and fill in the pathway the flood waters followed.

In addition to these works, a large weir has been repaired and the broken sill has been replaced with new concrete (Photo 7). It is reported that there are plans to install a hydropower turbine on the weir to generate power for the campsite. Whilst this is to be applauded for creating renewable energy, there are a number of points that need to be considered to ensure that the project does not create problems for fish stocks and the ecology of the river generally. These include:

- Fish passage upstream past the weir. Both salmon and trout migrate upstream to spawn, and eels also colonise rivers from the sea. The rebuilding of the weir will hinder this unless provision is made for a suitable fish pass. Ideally the downstream entrance to this needs to be located close to the discharge from the hydropower turbine so fish are attracted to that location.

- Fish passage downstream. Salmon and sea trout smolts and silver eels migrate downstream to the sea. Certain types of turbine (propeller types) cause heavy mortality rates to fish passing through them and need to be screened and an alternative route provided to bypass the turbine. The Archimedes screw turbine is far less damaging to downstream migrating fish and can be used with much coarser (or no) screening, reducing the screen maintenance requirement.

- Location of the turbine. The preferred location for the turbine would be within the weir itself, rather than any bypass channel (e.g. old mill channels) which would leave a stretch of river depleted of water.

The Water Framework Directive requires EU member states to achieve Good Ecological Status (GES) for their watercourses by certain dates, by implementing a Programme of Measures. This includes ensuring connectivity for fish migration. Information on the Programme of Measures for the Avoca Water Management Unit can be found at www.erbd.ie/Docs/YourArea_Final/RiversLakes/2%20Avoca.pdf . Page 17 of this document describes facilitating fish passage, and it is recommended that

RTAEC raise a formal query with the relevant authority regarding the provision of fish passage at this site; it would be far cheaper to construct a fish pass during the installation of hydropower facilities rather than trying to retrofit something afterwards.

Upstream of Rathdrum Rugby Club the river had more areas of deep slow glide habitat separated by gravel shoal areas with some excellent habitat for juvenile trout and salmon and for salmon spawning. There were some good examples of large woody debris and many fish were seen rising in the glides.(Photos 8, 9).

The river was visited at Dan Morrissey's quarry and the habitat here is spectacularly good. Set in a steep-sided, wooded valley the river has a steep gradient and is studded with large boulders (Photo 10).

Upstream of Rathdrum the site of a discharge from a factory manufacturing chemicals was visited (Schering Plough). RTAEC had expressed concerns over water quality at this site. A kick sample of invertebrates was taken and a visual inspection of the river bed carried out. Whilst the number of invertebrates was typically sparse, the species present included pollution sensitive groups. There was no evidence to suggest water quality is a problem here.

Photo 1

Photo 2

Photo 3 Water crowfoot (*Ranunculus* sp.) and moss growing on stones

Photo 4 Stable large woody debris – a very valuable habitat

Photo 5 Low cover over the water provided by a sallow tree – valuable fish habitat, particularly if combined with deeper water than shown in this photo.

Photo 6 Low intensity land use alongside the river – very important in protecting water quality and regulating run-off.

Photo 7 Weir repairs at the camp site

Photo 8 Gravel shoals upstream of the rugby club

Photo 9 Large woody debris and glide habitat upstream of the rugby club

Photo 10 The Avonmore alongside Dan Morrissey's – habitat heaven!

4.0 Conclusions and Recommendations

The habitat within the Rathdrum section of the Avonmore is generally excellent, and water quality also seems to be very good. The current ecological status of the Avonmore is described as High or Good in the Eastern River Basin District : *Avoca - River and Lake Programme of Measures* document (August, 2009). The system is relatively unproductive, originating on the hard insoluble granite geology of the Wicklow mountains; this is reflected in the low numbers of invertebrates caught during kick-samples.

The naturally unproductive nature of the river combined with its excellent habitat is likely to account for the abundance but small average size of the trout population. There were conflicting reports from RTAEC members about whether the river had produced larger fish in the past; some attributed these to specific areas of the river which were enriched, for example by waste from grain milling or sewage discharges. Indeed there have been recent attempts to replicate these conditions by introducing sacks of barley grain to the river. This is an uncertain and expensive way of increasing the productivity of the river and, if successful, would only have a localised effect.

A better way to try and increase productivity would be to introduce structures which would retain organic material which occurs naturally (leaf litter). Some suggestions are described below. It is also very important to retain naturally occurring large woody debris within the river channel for the same reason.

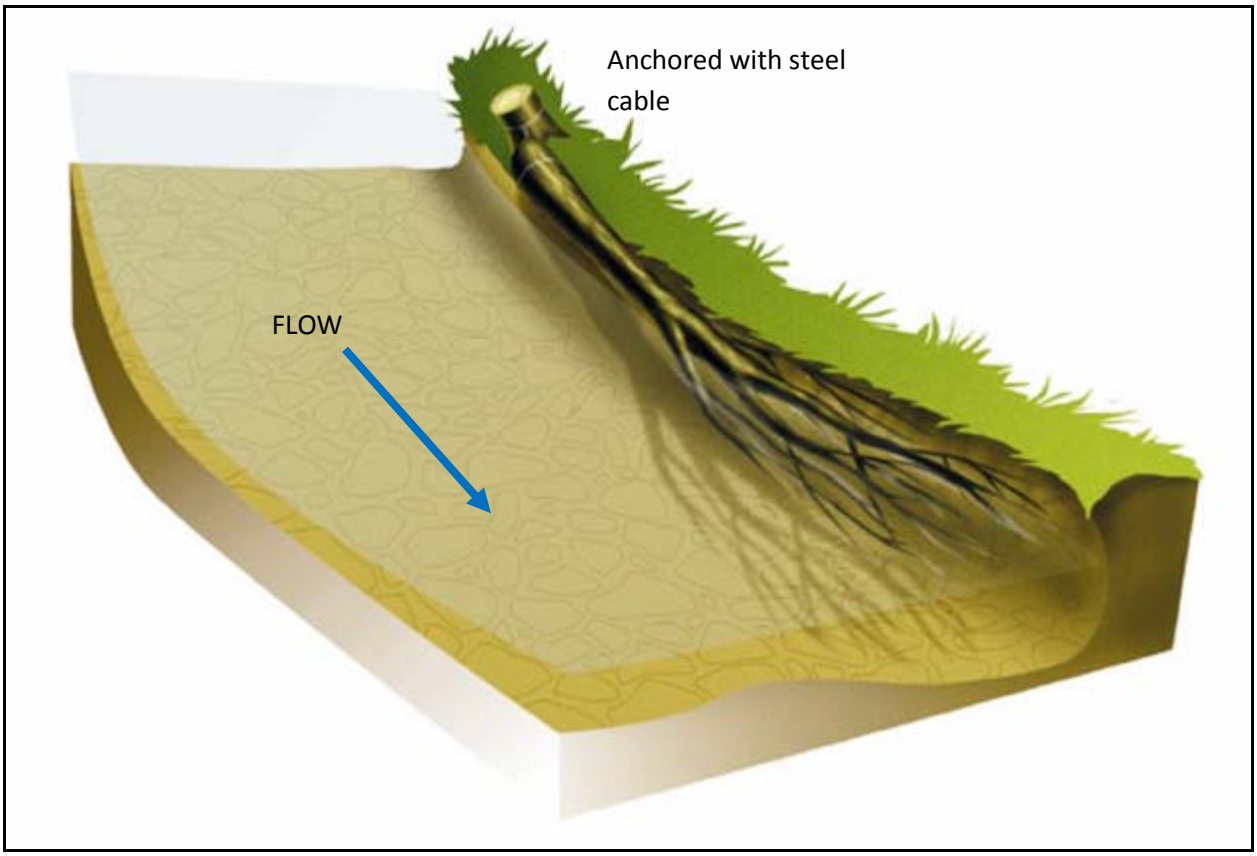
One hypothesis which could account for the presence of larger fish in days gone by is that there was a larger component of migratory trout (sea trout, slob trout) in the population, which are now prevented from accessing the river because of the mine pollution in the Avoca. The factors that influence migratory behaviour in trout are approximately 50% genetic (nature) and 50% environmental (nurture); that is, a given population of trout may be genetically disposed to migrate, but an environmental trigger is required to make this happen. The environmental trigger is normally competition for limited resources and many unproductive river systems support sea trout populations (for example the Towy in south west Wales).

It could be that the trout population of the Avonmore are genetically inclined to migrate, becoming smolts and leaving the system upon reaching a certain

size. This may continue even if no adult fish manage to return to spawn; for example on the Kielder Burn, Northumberland, many trout smolts continue to leave the system each spring despite adult access having been cut off in the 1980s by the construction Kielder Reservoir (the smolts are trapped and trucked around the reservoir). It would be interesting to investigate the genetics of the Avonmore population and see if there is any similarity to known migratory trout populations.

Angling pressure was considered to be low by RTAEC members and few fish are killed during competitions (less than 20 last year). It is recommended that some scale samples from fish are collected (Appendix 1; check these data are not already available from ERFB) and sent to Shaun Leonard of WTT to determine fish age at size; this would inform a review of size and bag limits by RTAEC, and whether cropping fish or reducing angling mortality is the right course of action for the Avonmore

Structures known as “tree sweepers” are the best bet for introducing cover and trapping leaf litter on the Avonmore.



These are introduced by felling trees and fixing them parallel to the river banks as shown in the above diagram. The sites for installation can be on the outside of a meander or along a straight section of channel; a suggested location is on some of the straight glide habitats where there is currently little in-stream cover (Photo 11, 12).

Photo 11 Possible location for tree sweeper

Photo 12 Possible location for tree sweeper

The trees can be fixed by hinging (partially cutting through the trunk to retain a hinge fixing it to the stump – Photo 13); this is suited to tree species like willow. An alternative is drilling and fixing to the stump with steel cable (Photo 14); this should be done at a level between low flow and bank-full water levels to prevent the sweeper being lifted onto the bank by flood waters. By preference, the sweepers should be positioned so a good proportion of them are submerged at low water levels.

Conifer trees would be well-suited for tree sweepers because of their dense network of branches which would provide good cover and trap plenty of organic material. There are many such trees along the banks of the Avonmore but RTAEC should make sure they have permission from the landowners and the relevant authorities responsible for the management of land alongside the river. Statutory conservation designations (such as Special Area of Conservation) could apply to these areas and it is a legal requirement that formal consent for any works is obtained in these areas.

Photo 13 Tree sweeper formed by hinging

Photo 14 Cable attachements – these can be largely concealed from view by drilling holes with an auger and keeping the cable as short as possible.

5.0 Making it Happen

The Wild Trout Trust is always available to provide further advice if required, including further technical details on the suggestions made above. Assistance with fund-raising to implement projects is also available through the Advisory Visit Bursary scheme (up to £1500 to assist with obtaining matched funding) and the Rods for Conservation Scheme (a Sage or Hardy rod for raffle or auction to raise funds for habitat schemes). See www.wildtrout.org for further details.

6.0 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.

Appendix 1 – Scale sampling

1. Take the scales from between the lateral line and the dorsal fin (see bottom left diagram below) by gently scraping with the flat of a knife blade or using tweezers. Take at least six scales from each fish.
2. Transfer the scales to a paper envelope (not plastic – the scales must dry out to be preserved).
3. Record on each envelope the fish species, size (measured from tip of snout to fork of tail, in mm), date, river and location.