



**Advisory Visit**  
**River Arrow, Warwickshire**  
**May 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 Arrow, Ragley Hall Estate, Warwickshire on 8<sup>th</sup> May, 2012. Comments in this report are based on observations on the day of the site visit and discussions with Steve Lyon (Property Manager, Ragley Hall Estate), Giles Matthews (Environment Agency Biodiversity Officer) and Melissa Hoskins (Severn Rivers Trust).

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 Arrow is a tributary of the Warwickshire Avon, flowing south from Redditch, past Alcester and joining the Avon near Bidford-on-Avon. The catchment is within the low-lying areas of the Midlands Plateau natural area, the underlying geology being soft Mercia Mudstone of the Triassic period; this is overlain with significant glacial deposits of sands, gravels and clays.

Two sites were visited which are owned by Ragley Estate. Site 1 (from upstream SP08694 59670 to downstream SP08622 58805) is near King's Coughton, upstream of Alcester and site 2 is centred on SP082552, immediately east of Ragley Hall. Site 1 falls within the Water Framework Directive (WFD) waterbody *R Arrow - Sperrall Hall Farm, Studley to confluence of R Alne* and Site 2 falls within the waterbody *R Arrow - confluence R Alne to confluence R Avon*. Both waterbodies are moderate status (see table). The former is moderate status because of invertebrate sampling results (status for fish is high). The latter is moderate status because of phosphate levels (poor), but fish and invertebrates are rated as good. Giles Matthews reported that the fishery survey data informing these classifications are several years old and further surveys are planned for summer 2012.

Severn Rivers Trust are making a bid to the Catchment Restoration Fund (CRF) in partnership with Ragley Estate. This advisory visit was requested to see if any habitat improvements could be included as part of the project.

	<b>R Arrow - Spernall Hall Fm, Studley to conf R Alne</b>	<b>R Arrow - conf R Alne to conf R Avon</b>
<b>Waterbody ID</b>	GB109054043780	GB109054043680
<b>Waterbody Name</b>	R Arrow - Spernall Hall Fm, Studley to conf R Alne	R Arrow - conf R Alne to conf R Avon
<b>Management Catchment</b>	Warwickshire Avon	Warwickshire Avon
<b>River Basin District</b>	Severn	Severn
<b>Typology Description</b>	Low, Medium, Calcareous	Low, Medium, Calcareous
<b>Hydromorphological Status</b>	Not Designated A/HMWB	Not Designated A/HMWB
<b>Current Ecological Quality</b>	Moderate Status	Moderate Status
<b>Current Chemical Quality</b>	Does Not Require Assessment	Does Not Require Assessment
<b>2015 Predicted Ecological Quality</b>	Moderate Status	Moderate Status
<b>2015 Predicted Chemical Quality</b>	Does Not Require Assessment	Does Not Require Assessment
<b>Overall Risk</b>	At Risk	At Risk
<b>Protected Area</b>	Yes	Yes

The Environment Agency are carrying out improvements for fish passage on the Arrow and Alne and have removed a weir at Oversley Mill (south of Alcester) between the two sites visited. A rock ramp fish pass is planned for Arrow Mill, just upstream of Site 2.

### **3.0 Habitat Assessment**

Unfortunately river levels were high at the time of the visit which limited the observations of in-stream habitat.

#### **Site 1**

The river here has a meandering plan-form, but the bed level in relation to the floodplain and raised banks in some locations indicate river engineering works have taken place in the past (cover picture). However, the river appears to have a moderate gradient and energy, resulting in active erosion and deposition taking place; this has restored some natural channel morphology including river cliffs, side and mid-channel gravel bars and pools and riffles. The prolific gravel deposits in the superficial geology of the area are reflected in the composition of the river bed.

The rate of erosion of some banks appears to be accelerated because of adjacent land use. Arable agriculture is the predominant land use and where this occurs immediately adjacent to the river, the banks have less stability and are prone to increased erosion rates (Photo 1). By contrast, where woodland or a wide riparian zone with trees is present, the banks are more resistant (Photo 2).

This section of river is leased to a local angling club and is fished for coarse fish. It was difficult to assess the suitability of the habitat for trout because of high water levels, but there appears to be plentiful gravel of the right size for spawning.

A sheet-piling weir is present (Photo 4) near the industrial site on the left bank and a similar structure appears to be present (on aerial photography) a short distance upstream at SP086593. These were probably installed as bed level checks to stabilise the river following engineering works. They present obstacles to fish movement and fragment river habitat. Ideally, they should be removed, or if this is not possible, improved for fish passage, for example by installing a low-gradient rock ramp. A thorough assessment of the potential impact of weir removal on re-grading of the river bed, bank erosion

and the risk to upstream properties should be carried out by a suitably qualified person before the structures are removed.

Some large woody debris (LWD) was present in the river channel (Photo 5) where a willow tree had fallen across the channel. LWD has been shown to be extremely important in several respects:

- It increases variety in flow patterns, depth and velocity
- It promotes the development of in-channel physical habitat diversity
- It can have significant benefits to the control of run-off at the catchment scale. Woody Debris helps regulate the energy of running water by decreasing the velocity, thus the travel time of water across the catchment is increased.

Large Woody Debris (LWD) is a general term referring to all wood naturally occurring in streams including branches, stumps and logs. Almost all LWD in streams 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.

Traditionally, many land managers and riparian owners have treated LWD in streams as a nuisance and have removed it, often with uncertain consequences. This is often 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.

At the downstream end of Site 1, the right bank is eroding at an accelerated rate (Photo 6). Methods of bank protection were discussed, including pinning live willow trunks and brushwood bundles at the toe of the bank. This would reduce the rate of erosion in the short term, but for a more permanent reduction, the land use on the right bank needs to be changed to allow mature trees to develop.



**Photo 1**



**Photo 2**



**Photo 3 Trailing branches provide valuable low cover for fish**



**Photo 4 Sheet piling weir, approximate NGR SP085591**



**Photo 5 A fallen willow creating some valuable large woody debris within the river channel.**



**Photo 6 Downstream limit of Site 1. The eroding bank could be protected here, maybe by reveting the toe of the bank with willow logs or brushwood, but changing the land use on the right bank to woodland to increase bank resilience would be required for a longer term solution.**



**Photo 7 Site 2 – sheet pile weir**



**Photo 8 Site 2 – view downstream towards A46 bridge**

The Estate should consider the possibility of woodland creation in this vicinity under existing stewardship agreements or under woodland creation schemes. Strategically located blocks of woodland alongside the river could greatly assist in reducing erosion rates and loss of land.

## **Site 2**

The River Arrow here is a bigger river, having been joined by the River Alne in Alcester. A sheet-piling weir is present (Photo 7) although it was drowned by the high water levels at the time of the visit. Two similar weirs are located on this reach, upstream of the A46 (SP084550). As stated above, these structures were probably installed as bed level checks during river re-grading works. The same recommendations apply to these structures – remove in consultation with the EA and following an appropriate impact assessment, or improve fish passage.

A spinney is present on the right bank at SP080554 which appears to be a cut-off meander (possibly a re-routing of the river to protect the road). It may be possible to enhance this area by re-connecting and re-wetting the floodplain, or creating a backwater area. Such areas of still or slow-flowing water in the floodplain are important habitats for coarse fish species. The water in these areas warms quickly and produces algae and zooplankton which boosts recruitment of juvenile coarse fish. The opportunity to create such areas should be taken wherever possible.

Opportunities for in-stream habitat improvements benefiting trout are limited on the lower section of the Arrow because of the size and gradient of the river. However, the inclusion of smaller tributary streams within the overall improvement project was discussed; there may be more opportunities here and WTT would be happy to be involved in assessing and preparing proposals as part of a wider project.

## **4.0 Recommendations**

- Remove or modify the weirs present to improve fish passage, habitat connectivity and sediment transport. Consult with the Environment Agency and ensure proper consideration of the risks of removal.

- Consider land use changes adjacent to the river, namely woodland creation in order to increase bank stability and reduce rates of erosion.
- Retain large woody debris within the channel wherever possible.
- Create backwater areas connected to the river and within the floodplain to provide refuge areas and juvenile habitat for coarse fish species.

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.

## **5.0 Acknowledgement**

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

## **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.