Advisory Visit

River Leadon, Gloucestershire

October 2009

1.0 Introduction

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to the River Leadon, on 19th October, 2009. Comments in this report are based on observations on the day of the site visit and discussions with Richard Mander, George Gawler, John Hill and Trevor Hyde of Gloucester Angling Club (www.richmander.pwp.blueyonder.co.uk).

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 Fishery Overview

The River Leadon is a tributary of the River Severn, joining the tidal reaches of the latter in Gloucester. Gloucester AC have two stretches of the Leadon, the most downstream being near the village of Upleadon and the other stretch at Durbridge Farm near Redmarley.

An electric fishing survey was carried out by the Environment Agency at Upleadon in 2007 as part of an eel monitoring programme. The survey of a 100-m length revealed a low density (451 g/100 m^2) and biomass (13.5 /100 m^2) of fish. Species present include salmon parr (possibly as a result of EA stocking with fry), chub, dace, roach, perch, lamprey ammocoetes (juveniles), eels and a single brown trout; flounder have also been recorded in angling catches here.

An electric fishing survey was carried out at Durbridge in 2006 and recorded only 15 fish from a 100-m section (12 eels, 1 pike, 1 dace, 1 stone loach), although sampling conditions were poor (turbid water). The club occasionally stock the river, the last time being in 2007 with 100 brown trout.

A pollution incident affected the river earlier in 2009 and caused a fish kill. It originated above the club's stretches and the cause has not been determined, although it is thought to be an organic (deoxygenation) pollution.

3.0 Habitat Assessment

Upleadon

Upstream from the mill (National Grid Reference SO 7695 2700) and road bridge, the river lies within a channel which has been straightened and deepened for land drainage / flood defence, giving a trapezoidal cross-sectional profile (Photos 1 and 2). The river bed is comprised of hard, red clay with thin deposits of sand and fine gravel in places; this suggests retention of bed load material is poor, probably due to the straight and deep nature of the channel, combined with a flashy runoff regime.

The channel here is 4 – 5 metres wide at low water level, and is reported to rise quickly in response to rain and colour red with sediment. There is little depth variation present, with the water level consistently below knee depth. There are trees and bushes (hawthorn) present on the LHB, but mostly absent on the RHB.

There are odd areas of deeper gravel deposits, although these also have large amounts of fine sediment present. The occasional stand of water crowfoot (*Ranunculus* sp.) is present, and there are abundant clumps of green algae on the river bed. A brief inspection of larger stones revealed the presence of freshwater shrimp (*Gammarus pulex*), hog louse (*Asellus aquaticus*), olive nymphs (*Baetis* sp.), and various caddis, snails and leeches. Members fishing this stretch report catches of 1 – 3 trout per trip (up to about 8 ozs), plus chub and occasionally flounder.

With progress upstream (second field above the mill), the channel becomes more meandering and narrower and deeper (Photo 5). Although the influence of land drainage works is still very much apparent, the river has a much more variable depth profile, although shallow riffle areas are lacking.

Bankside trees and bushes are present, mostly on the LHB through this section; these include field maple, hawthorn, sallow, willow, alder, blackthorn and elder. The RHB has unfettered stock access, and although the steep banks limit access, there are some areas of severe bank poaching by cattle (Photo 3). By contrast there is a well designed and constructed cattle drink on the LHB (Photo 4).

There is abundant growth of nettles on the steep banks which makes angling access difficult, and present the club with a problem to control them cost effectively.

In the third field upstream of the mill, the river has a sluggish flow, and water lily “cabbages” are present (*Nuphar* sp.). This area is reported to have a good Mayfly (*Ephemera danica*) hatch.

Photo 1 Upstream from the mill at Upleadon

Photo 2 As above – a straightened, trapezoidal channel with steep banks and little variation in channel dimensions

Photo 3 Severe bank poaching by cattle

Photo 4 More formalised stock watering area on the LHB; the ramp is reinforced with concrete sleepers.

Photo 5 Better habitat where the river has built up some marginal vegetated berms, narrowing and deepening the channel.

Durbridge

There is a short section of excellent habitat alongside the farm, with a varied depth profile, pool-and-riffle sequence and good cover in the form of submerged alder roots (Photo 6). The river is lined with mature alder trees, most of which are multi-stemmed indicating they have been previously coppiced; some showed signs of the fungal alder disease *Phytophthora* (Photo 9).

The river bed is comprised of fine gravel (pea-sized) and sand, and there are some examples of large woody debris (LWD) present within the channel which have promoted local scour and sorting of the bed material.

Just upstream of the farm is the remains of an old weir which formerly diverted water to the mill at the farm (Photo 7). The mill building is still present, along with a metal water wheel which is thought to have been in use up to around the 1940s. Up until about 20 years ago, the weir had wooden boards which raised the crest and impounded a considerable depth of water.

Despite the lowering of the weir, the river upstream still has the characteristics of an impounded channel. The river is slow-flowing, wide and has a silty bed; it is relatively shallow (knee depth) and there is little depth variation. The channel is shaded by mature alders along most of its length.

There is another weir on this section and the channel upstream continues with the impounded characteristics described above. Long-standing members of the club report catching good-sized (1½ - 2lb) trout from this impounded section in the 1950/60s, but a marked deterioration in stocks since that time.

Photo 6 Good habitat near Durbridge Farm – pool-and-riffle, depth variation, LWD and submerged alder roots

Photo 7 Old weir structure above Durbridge Mill

Photo 8 Another weir further upstream, and typically poor habitat in this reach – wide, shallow, silty and heavily shaded.

Photo 9 Tarry spots - signs of *Phytophthora* disease on alders

Photo 10 Below the farm, a good example of LWD and its effects on the channel – scour and deposition, creating depth variation

The local Environment Agency Fisheries team have some improvement works planned for the river, including tree management to reduce channel shading, the installation of V-shaped groynes, and the introduction of gravel in the vicinity of the groynes.

Downstream of the farm there are some good examples of LWD and its effects in promoting localised scour, deposition and hence depth variation. The presence of LWD has been shown to be extremely important in several respects:

- An increase in the variety of flow patterns, depths and localised velocities.
- Development of high in-channel physical habitat diversity
- Significant benefits to the control of run-off at the catchment scale, as Woody Debris helps regulate the energy of running water by

decreasing the velocity. Thus the 'travel time' of water across the catchment is increased resulting in a less 'flashy' regime.

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. Therefore LWD is an essential component of a healthy stream's ecology and is beneficial by maintaining the 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: stream clearance can reduce the amount of organic material necessary to support the aquatic food web, remove vital in-stream habitats that fish will utilise for shelter and spawning and reduce the level of erosion resistance provided against high flows. In addition LWD improves the stream structure by enhancing the substrate and diverting the stream current in such a way that pools and spawning riffles are likely to develop. A stream with a heterogeneous substrate and pools and riffles is ideal for benthic (bottom dwelling) organisms as well as for fish species like wild trout.

4.0 Conclusions

The Leadon appears to have low densities of fish, particularly gravel-spawning species such as trout, chub, dace, etc. This is probably because of the general lack of suitable spawning substrate: a combination of the natural geology of the catchment and historic channel modifications for milling, land drainage and flood defence.

To improve fish stocks generally, and trout in particular, the priority should be to improve the availability of clean gravel spawning areas. There may be better areas within the catchment for gravel introduction in terms of retention and protection from sedimentation (e.g. on accessible tributaries), but from the areas seen on this visit, the upstream end of Durbridge section is most favourable.

5.0 Recommendations

The club should liaise with the Environment Agency regarding the planned habitat works and see where voluntary efforts can complement the EA works.

- Given the recent history of pollution on the Leadon it is recommended the club take part in the anglers' invertebrate monitoring initiative instigated by the Riverfly Partnership. Details of sampling strategies and training days can be obtained from the website at www.riverflies.org or by contacting Bridget Peacock at riverflies@salmon-trout.org .

- The dense stands of alder along the banks of the Durbridge section should be managed by rotational coppicing, as described in the *Wild Trout Survival Guide.* The aim should be to produce a mixture of trees at different stages of re-growth, giving a mixture of light and shade and cover. The coppicing should be carefully planned to minimise environmental impact, and a good practice guide is included in Appendix 1.

- The club should adopt a policy of retaining LWD in the river channel wherever possible. To achieve this liaison with landowners and the Environment Agency internal workforce may be required. The West Country Rivers Trust provides a useful guide to the management of natural LWD:

  1. Is the debris fixed, if yes then continue to 2, if not continue to 5.

  2. Is the debris causing excess erosion by redirecting the current into a vulnerable bank? If yes then go to 5 if not then go to 3.

  3. Would fish be able to migrate past it (take into account high river flows). If yes got to 4, if no go to 5.

  4. **Retain the woody debris in the river**.

  5. **Re-position or extract the debris.**

  Note: If the debris dam needs to be removed but there is still a significant amount of the root system attached to the bank then it is

recommended that the stump be retained for its wildlife habitat value and its stabilising effect on the bank.

- Woody debris should be introduced to the river channel to create variation in channel width and river bed topography. This can be achieved in a variety of ways including anchoring whole or parts of trees within the channel (Figure 1, Photos 11-13) and using brushwood to provide cover (Photo 14).

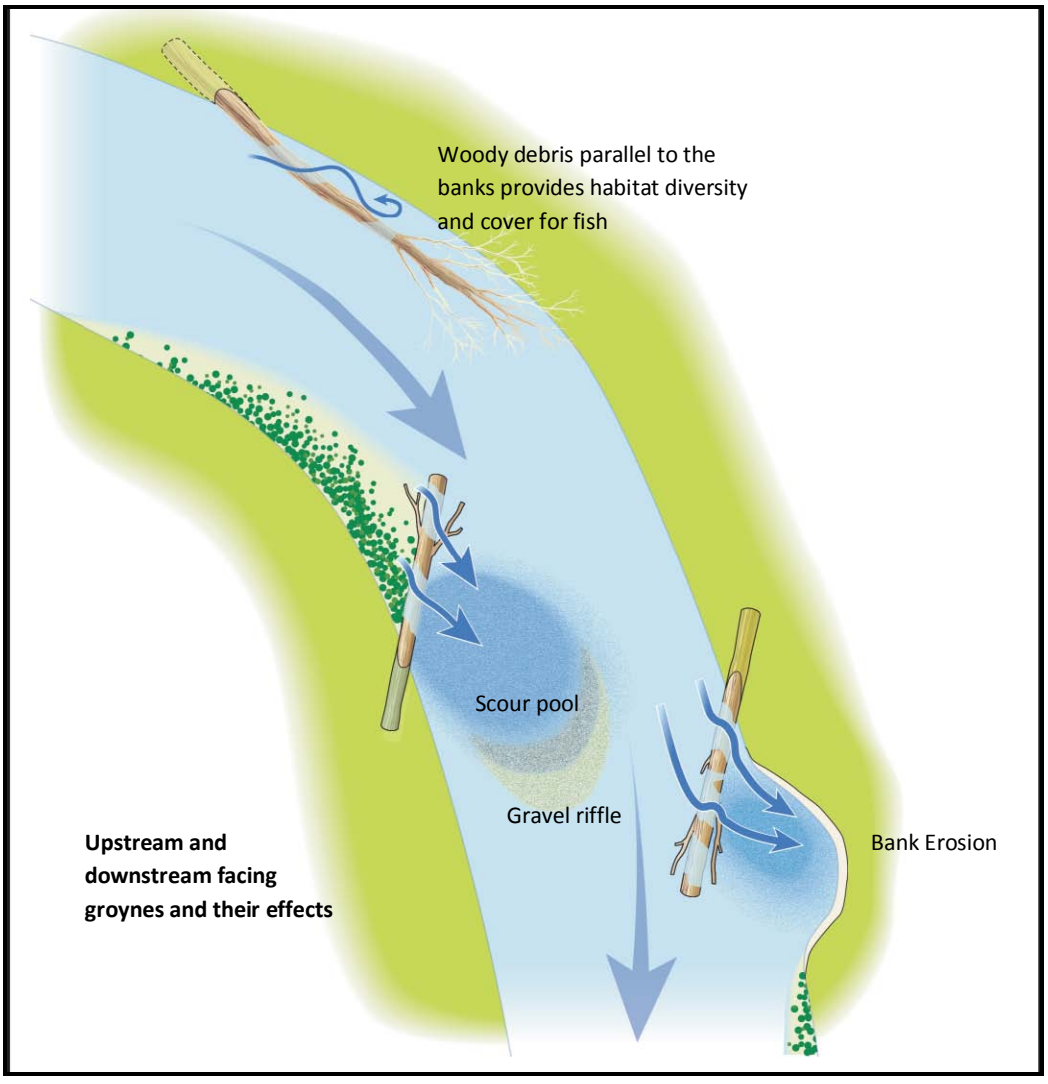

Figure 1 Examples of LWD positioned for channel narrowing, cover and bed scour. Downstream pointing groynes are generally best avoided to prevent bank erosion

Photo 11 Using a wood auger to bore holes in LWD

Photo 12 Fixing LWD in position with steel rebar

Photo 13 Whole tree anchored alongside the bank with steel cable to a standing tree (River Goyt, Cheshire)

Photo 14 Brushwood mattress constructed to narrow the channel, provide juvenile fish cover and promote depth variation

- The weirs on the Durbridge section should be removed to reduce the impoundment of water within this section, and gravel introduced to provide spawning areas. This should be done in conjunction with channel narrowing and LWD introduction, planned by the EA.
- Ideally, on the lower section of river (Upleadon), bank re-profiling should be carried out to create a two-stage channel. A low berm could be created alongside the river, allowing variation in width and depth of the low-flow channel, yet retaining flood-flow capacity.

  Cattle should be fenced out of the river on the RHB and formal cattle drinking areas created, like the one on the LHB.
- There are obviously a number of catchment-wide issues affecting the Leadon, for example the high sediment loads reported by club members (and evident on the river bed), and the recent pollution

incident. The Leadon catchment falls within the Catchment Sensitive Farming Initiative and has a dedicated officer (Sarah Olney, sarah.olney@naturalengland.org.uk , Tel: 01905 363430). There may be grants available for landowners via CSF towards riverside fencing and cattle drinks.

- The club should support the Severn Rivers Trust (www.severnriverstrust.org.uk), and its efforts to tackle catchment-wide issues affecting watercourses in the Severn catchment.

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.

6.0 Making it Happen

As stated previously, the Environment Agency is planning habitat improvement works on the Leadon and the club should keep in touch with EA staff running this project and assist where possible.

Further help is potentially available from the Wild Trout Trust in the form of preparation of detailed habitat improvement proposals, help with consent applications and practical demonstrations. Contact Tim Jacklin for further information.

7.0 Acknowledgement

The WTT would like to thank the Environment Agency for supporting the advisory and practical visit programmes.

8.0 Disclaimer

Appendix 1 – Good Practice Code for Coppicing

Coppicing of riparian trees during the winter is a traditional method of management. This can benefit the river, the farm and the whole catchment area. One of the aims is to increase the amount of light falling on the banks and bed of the river to promote the growth of bankside grasses and aquatic macrophytes and algae. Coppicing should be planned on a minimum of a five to nine year cycle.

1. Before carrying out any coppicing a plan should be drawn up. For this the presence of protected species (including bats and otters) should be determined (see below), and their habitat requirements taken into account.

2. In heavily shaded sections, coppicing should be concentrated in fast flowing shallow 'riffle' areas with lighter work around the glides and pools.

3. Try to leave most of the remaining shading on the south bank along glides.

4. Coppice trees only from October to March and, in any case, well before they come into leaf in the spring.

5. Avoid cutting right back to old growth. Aim to cut to knee height, retaining at least 200mm of new growth. This helps promote good re-growth of the coppice stool.

6. Preferentially leave ivy covered trunks.

7. Leave old and dead trees unless dangerous. Very old or "veteran" trees provide valuable habitat for a variety of wildlife and can contain a rich lichen flora. Some bat species are known to roost under loose bark and in tree holes.

8. Do not take mature timber. It does not coppice well. Any trees with good holes, cavities, splits, or loose bark should be retained.

9. Do not use machinery in the river. There are risks of pollution from fuel, oils and silt associated with use of machinery, which could result in prosecution.

10. Do not damage riverbanks or tree roots with machinery as this may lead to additional erosion. Avoid the use of machinery within 3m of the bank edge or tree stems.

11. Do not work **in** the river between 1 October and 31 March to prevent disturbance to spawning trout, trout eggs and newly hatched fry.

12. Coppiced timber and brash can form valuable habitat for a wide variety of wildlife. Where possible, it should be used to create LWD in the channel, or stacked and secured in such a way as to avoid it washing away and either endangering fences downstream or accumulating on obstructions (bridges etc) and causing a flood risk. If material cannot be securely stacked then it should be removed from the flood plain completely. Should any material be burnt then this should be done no nearer than 50m to any other tree. In no circumstance should burning take place in the river channel. Ash must not be allowed to enter the watercourse.

13. Leave the stumps in the bank as they help to protect the bank from erosion and provide valuable habitat for fish. Tree roots also provide lying up sites for otters and nest sites for riverine birds such as grey wagtail and dippers.

14. Coppicing should be fenced to prevent damage to new growth from browsing stock.

15. Before working in areas with wildlife designations - Natura 2000 sites, Sites of Special Scientific Interest, National and Local Nature Reserves – you must first consult the relevant authorities, to avoid breaching wildlife legislation.

PROTECTED SPECIES

Many of the animals associated with river corridors (including bats, otters and dormice) are protected under Schedule 5 of the Wildlife and Countryside Act (1981), as amended by the Countryside and Rights of Way Act (2000) (CROW 2000) and The Conservation (Natural Habitats, &c.) Regulations 1994. This now extends the offence in section 9(4) of the 1981 Act to 'subject to the provisions of this Part, if any person intentionally or recklessly kills, injures or takes any wild animal included in Schedule 5, he shall be guilty of an offence.

BATS

All work that may affect bats should be discussed in advance with Natural England as a bat licence is required to survey (licensed consultant/bat worker) or carry out work on roost sites (DEFRA license). Under the Bonn

Convention (Agreement on the Conservation of Bats in Europe) the UK is also required to protect their habitats, requiring the identification and protection from damage or disturbance of important feeding areas.

Bank side trees form important habitats for bats, as certain species are dependent on trees. Check trees for signs of bat roosts:

- obvious holes, cavities and splits in trunks and limbs
- dark staining on the tree below a hole
- staining around a hole caused by the natural oils in bats' fur
- tiny scratch marks around the hole from bats' claws
- droppings below a hole - they look similar to those of rodents but crumble to a powder of insect fragments
- noise (squeaking or chittering) coming from a hole
- check holes by inserting a mirror and watching the hole at dawn or dusk
- bats will also roost behind loose bark, which should be checked similarly.

If a roost is identified or suspected a more detailed inspection must be undertaken by someone with the relevant experience and correct license to assess, obtain and implement a DEFRA license where tree roosts will be damaged or lost. Whether bats are found or not, any trees with good holes, cavities, splits, or loose bark should be retained. An assessment should be made of the impact the work will have on bat roosts, feeding habitats and commuting routes before determining the final coppice plan, which may require alteration to accommodate the requirements of the bats.

OTTERS

Otter holts are found in cavities in large tree root systems, so any work on trees should be preceded by a root inspection. If a holt or lying-up place is *identified or suspected* a more detailed inspection must be undertaken by someone with relevant experience to ascertain whether otters are present. Coppicing should be carried out so that the coppice cut is taken some height above the stool, to allow for the protection of the cavity. Otter holts are protected by law and a licence may be required if disturbance is likely. All

such works should be discussed and agreed with Natural England before proceeding.