



**HABITAT ADVISORY VISIT TO THE RIVER
SEVERN, CAERSWS, WALES**

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1.0 Introduction

This report is the output of a site visit undertaken by Vaughan Lewis, Windrush AEC Ltd to the River Severn, Caersws, Wales on behalf of the Caersws Angling Association on 21 March 2006. The club had around 100 members, with a number of day tickets also sold annually to visiting anglers. They leased the fishing rights on some 6 km of the River Severn.

Comments in the report are based on observations on the day of the site visit, and discussions with members of the club. Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

2.0 Habitat Assessment

The river downstream of Caersws bridge was severely damaged by the impact of grazing sheep. Large numbers of animals on both banks had grazed the vegetation leaving only very short-cropped grass. As a consequence, there was no coarse vegetation remaining to protect the banks from erosion, whilst the root structure of the riparian grass was weak. Extensive erosion of the banks had taken place, with large block failures of the bank resulting in rapid movement of the river channel laterally across the flood plain. Very extensive areas of bare gravel were also present along this reach. Whilst these were of undoubted value for breeding waders and specialised invertebrate species, the extent of the exposed shingle banks had been increased to an artificially high level by the impact of grazing sheep.



Heavily grazed vegetation and resultant erosion

The river channel was very mobile with club members indicating where dramatic changes in its footprint over the floodplain had taken place in recent years. As a result of these movements, the channel was braided in several places.

There was a short section of willow *Salix* trees on the LB. These were providing an element of bank protection. However, sheep grazing pressure was threatening to isolate the trees, with subsequent erosion likely to topple them into the river.



Line of willow trees on LB providing limited protection from erosion

The water clarity was excellent, allowing a clear view of the dense coating of fine sediment overlying gravels in marginal areas. Despite this, there was an ample supply of apparently good quality spawning gravel within the river, with a very well developed pool-riffle sequence providing abundant habitat for all lifestages of salmonid species.

Upstream of Caersws bridge, the banks were again heavily sheep grazed, with erosion problems similar to the downstream reach. The rate of erosion was being monitored by a research institution, with erosion marker pegs visible along this reach of the river.



Erosion markers upstream of Caersws bridge

Small isolated stands of largely willow trees were present along the LB bank. Where sheep had been excluded by fencing on the LB, a strong growth of scrubby vegetation

and trees was apparent. This short section of river highlighted the benefits of excluding grazing stock.



Strong growth of coarse vegetation and trees in area from which sheep had been excluded

There were small stands of water crowfoot *Ranunculus* spp present in the river channel.

Instream habitat again appeared good, with plenty of gravel riffles, shallow glides and deeper pools providing habitat for spawning, juvenile and adult grayling, trout and salmon. The River Carnow entered on the LB of the Severn. This is a known salmon and trout spawning tributary. The survival rate of juvenile fish was not known, with some concerns regarding the fact that the river regularly goes very low and even dries up during low flow years.

The erosive power of the river on the sheep grazed banks was well illustrated by the loss of stone pitching protection installed around a newly laid gas main. This was torn out during a subsequent flood event and needed rapid replacement. Trees planted to provide a degree of bank protection as part of the scheme were grazed by sheep and rapidly killed.



**Re-instated section of stone pitching adjacent to a new gas main.
The initial bank protection was eroded during a large flood event**

Downstream of Llandinam bridge, the composition of the river banks was dominated by larger gravel and stone. There was a significant volume of Large Woody Debris (LWD) in the channel. Club policy was to leave this in place, merely trimming the ends of large branches in order to allow access for angling. Instream habitat was excellent, with good sections of riffle, pool and shallow glide. Water crowfoot was abundant during the summer months, perhaps benefiting from the buffering effect of the liming of the Clewedog catchment above the reservoir. Small numbers of large grayling were noted in some of the pools.

Sheep grazing appeared to be slightly less intensive in this reach. Coupled with the more stony nature of the banks, this had helped to reduce the overall level of erosion.



Large Woody Debris in the channel downstream of Llandinam Bridge

The river was subject to the impact of abstraction from boreholes into floodplain gravels at Llandinam.

Fly hatches remained good with strong hatches of stoneflies, caddis and upwinged flies, including mayfly noted throughout the fishing season.

The top of the fishery was located adjacent to the Llandinam Gravels nature reserve. The Montgomeryshire Wildlife Trust was managing the grazing pressure on the land in order to restrict erosion of the river's banks. This had resulted in areas of increase vegetation growth, with strong stands of gorse *Ulex europaeus* present. There was also a well-developed band of alder and other trees on lengths of the far bank, from which sheep had been excluded.



Extensive growth of gorse on the LB of the river at Llandinam

In-channel habitat was excellent, with extensive gravel riffles and shallow glides, interspersed with deeper pools. Strong stands of weed (probably hemlock water dropwort *Oenanthe crocata*) were present in the channel. There were a number of pieces of LWD within the channel providing valuable mid-channel sorting of the substrate.



LWD in the channel at Llandinam Gravels reserve

The club operates a mink *Mustela vison* trapping programme. Their view is that mink numbers have declined, perhaps as result of increasing numbers of otter *Lutra lutra* moving into the valley. This is a pattern that has been repeated elsewhere in the British Isles and is supported by research studies.

3.0 Fish stocks

The club's fishery on the Severn contained stocks of wild brown trout *Salmo trutta*, Atlantic salmon *Salmo salar*, grayling *Thymallus thymallus* and chub *Leuciscus cephalus*. In addition, approximately 100 25cm –30cm hatchery origin brown trout were introduced to the river on a monthly basis between the months of April and September.

The grayling fishing can be excellent, with individual fish caught in excess of 1kg. The club does have concerns regarding an apparent decline in the numbers of small to medium sized grayling present. One suggestion was that the increasing numbers of pisciverous birds present in the river, particularly cormorants *Phalacrocorax carbo* and goosander *Mergus merganser* were exerting an increased predation pressure on fish stocks.

4.0 Recommendations.

- Erosion is a natural process. It is responsible for supplying coarse sediment to the river, which is essential for spawning salmonids. It also results in the creation of instream habitat diversity for all lifestages of fish, invertebrates and aquatic plants. However, the impact of grazing sheep on the River Severn at Caersws is totally unnatural, and has resulted in a dramatic and damaging increase in the rate of bank erosion. This had resulted in a very over-wide, relatively shallow, very mobile channel, with limited bed differentiation and heavy fine sediment burden of important spawning gravels.

The solution to this problem is straightforward. The number of sheep having access to the river banks must be significantly reduced, either by an overall reduction in

numbers of animals in the flood meadows or by the erection of fencing to keep them away from the river bank.

Fencing is likely to be problematical as large flood events may sweep away sections of any new fence line. Erection of fencing parallel to the river will reduce the impact of flood damage. This issue has been addressed in details on Cumbrian rivers with similarly fierce floods. For instance, in some reaches of the River Derwent, sections of 'sacrificial' fence are provided in areas known to be vulnerable to damage. Short sections of fencing are thus regularly lost and replaced, rather than having to replace a whole length of fence. In addition, any fencing erected would need to be 40m-50m from the river to enable the growth of protective vegetation before erosion threatened the fence line.

- Under the new farm payment schemes, an element of cross-compliance is required by farming interests. Part of the cross-compliance includes the requirement for a soil management self-assessment form to be submitted to the Welsh Assembly by 28 February 2005. The form should contain a time-scale by which soil conservation issues will be addressed. The guidelines also specifically state that 'stock should not be allowed unrestricted access to watercourses where this causes erosion'. The benefits of excluding stock from floodplain meadows were well demonstrated by the small enclosure upstream of Caersws bridge within which coarse vegetation and trees were flourishing, and the growth of gorse in areas subject to reduced grazing pressure in the Llandinam Gravels nature reserve.

The club should contact the Welsh Assembly's Department for the Environment Planning and the Countryside, and ask what progress has been made with soil management on the Severn floodplain at Caersws. It should be possible to monitor progress against stated targets. Failure to achieve these targets could in theory result in loss of some of the relevant farm's Single Farm Payment.

In addition, cross-compliance requires that feeding of stock should not take place within 10m of a watercourse. Details of the new Single Farm payment scheme for Wales and associated cross-compliance requirements can be found on http://www.countryside.wales.gov.uk/fe_news/news_details.asp?newsid=66.

The Environment Agency should be encouraged to engage in a dialogue with the Welsh Assembly regarding the erosion problem. It is likely that the Agency has a dedicated agricultural officer on its staff who may be able to provide specialist input.

- If it proves possible to prevent unrestricted access of stock to the river, then tree planting offers the potential for speeding up restoration of the eroded river. Sacrificial bands of fast growing trees such as alder *Alnus glutinosa* and goat willow *Salix caprea* can be used to slow down erosion rates across the floodplain. The Welsh woodland charity Coed Cymru, based at Tregynon, has undertaken studies in conjunction with research institutions of the benefits of floodplain tree planting. Contact their director David Jenkins 01686 650777 or <http://www.coedcymru.org.uk/staff.htm> for further information.

- The reduction in structural habitat diversity in the channel may be increasing the potential for damaging predation pressure by piscivorous birds. Addressing the

excessive erosion of the channel should increase habitat diversity and thus lessen the impact of bird predation. Goosander and cormorant are fully protected species under the Wildlife and Countryside Act 1981 (as amended). However, in circumstances where predation can be shown to be having an impact on fish stocks, some licensed culling of these species may be permitted. Details can be obtained from the Welsh Assembly's Department for the Environment, Planning and the Countryside.

- It may be that changes in land use and climate change have resulted in an increasingly 'peaky' hydrograph, with spate flows more extreme and of shorter duration. There is very little the club can do about this possibility, other than to offer its support to any catchment wide land use initiatives promoted by the Welsh Assembly and the Environment Agency. These may provide a mechanism whereby any damaging land use changes can be highlighted and addressed.
- The club's policy of retaining LWD where possible is supported. . The benefits for retaining it are clearly laid out in the recent Environment Agency 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 that the tree can be stabilised in the river channel, there appeared to be little risk of increased local flooding. Stable LWD of this sort is of particular long term value, allowing the build up of weed/debris rafts and associated beneficial macroinvertebrates that are vital components of the energy cycle of river systems. There is no problem with continued cutting of small overhanging branches for angling access.

- It is important that the EA is made aware of any adopted policy to retain LWD in the channel, both in order to prevent its removal during routine management operations undertaken by the Agency and to gain assurance that this policy does not compromise the Agency's flood management of the river.

- The club was interested in the possible use of deep substrate incubation boxes. These could be of potential use in one of the tributary streams. Basically, they are gravel filled boxes, approximately 0.6m in each dimension, which are filled with suitably sized gravel and seeded with 10,000 - 20,000 trout eggs. A feed of water to 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 or in Volume 2 of the Trust's magazine, *Salmo trutta*.

If such a box were to be used, it would need to be set up on one of the main tributary streams which had an adequate supply of juvenile habitat. If shown to be successful the club might, over time, be able to reduce its reliance on hatchery reared stock fish.



Deep substrate incubation box running. Note the fine mesh boxes for trapping emerging fry

- 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.
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