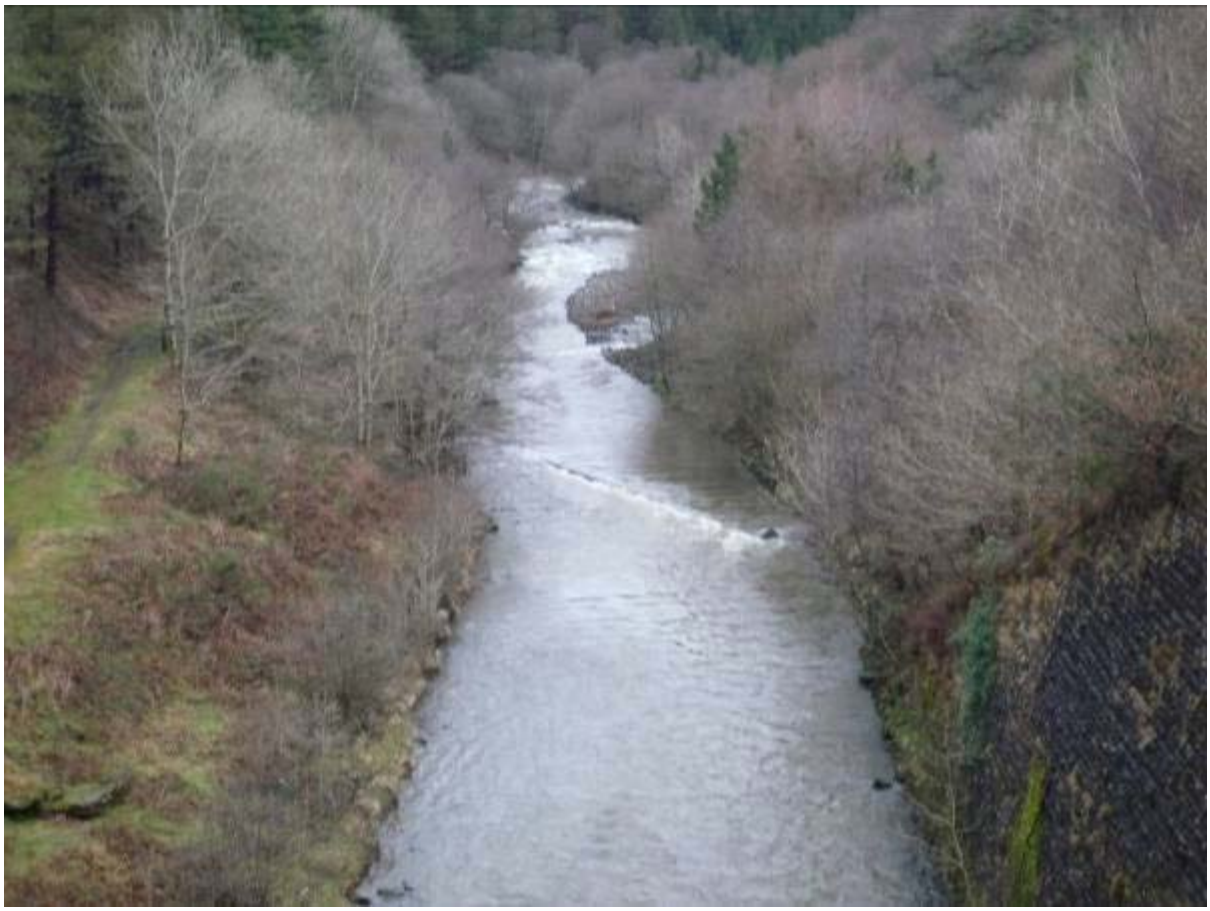
River Afan – Afan Valley Angling Club



An advisory visit carried out by the Wild Trout Trust – February 2010

1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on the River Afan lying principally in the county borough of Neath Port Talbot. The advisory visit was undertaken at the request of the Afan Valley Angling Club; comments in this report are based on observations on the day of the site visit and discussions principally with Mr Gereint Mortimer, Mr Stuart Mears and Mr Nals Earnshaw from the AVAC.

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. Catchment overview

The Afan is one of several South Wales rivers that have significantly recovered following a hundred years of pollution resulting from the local mining and iron industries. In the headwaters of the catchment, large plantations of coniferous forest have also exacerbated the already flashy nature of the river and added to concerns over acidification historically caused by the sulpher-rich mine water entering the system and discharges from the local iron and steel foundries. A significant tributary of the Afan, the Afan Pelena, continued to drag water quality down until comparatively recently. Initiatives to mitigate mine water discharges via reed bed treatment lagoons have lead to significant improvements in water quality. Further water quality concerns remain however, particularly those potentially caused by cooling water abstracted right at the bottom of the system and used to cool blast furnaces in Port Talbot which is then discharged into the freshwater Port Talbot docks. It is understood that mortalities of migrating smolts have been recorded in this area in the past.

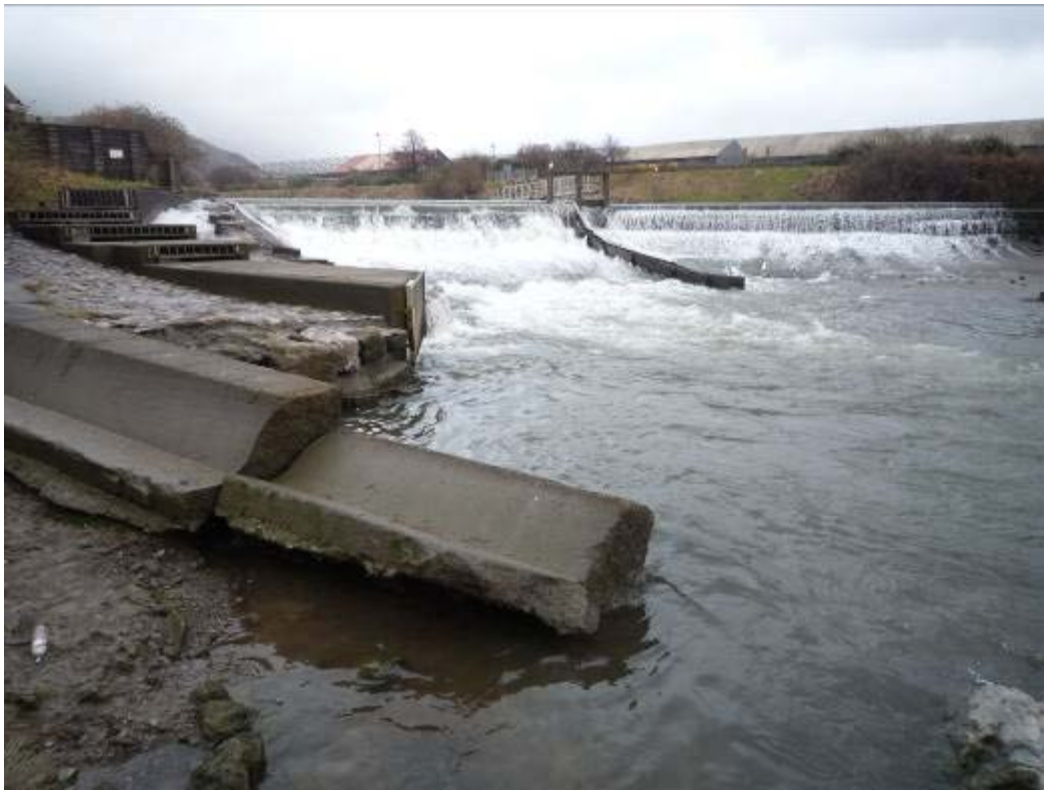
Following the demise of some the local heavy industry and better regulation of discharges in the 1960s and 70s, water quality improved significantly and with it came improvements to fish stocks. Effective lobbying by the angling club and improvements carried out by successive regulators, including the water company, the National Rivers Authority and latterly the Environment Agency Wales have seen both gains to water quality and crucially enhanced access for migratory fish.

3. Fishery overview

The Afan Valley AC control approximately 17miles of river. The club currently has approximately 330 members and provides day ticket opportunities for visiting anglers. The fishery supports a run of Atlantic salmon with a declared rod catch averaging between 10 and 50 fish per season in recent years. Small wild brown trout are taken throughout the fishery but it is the sea trout which run the river from May onwards that are considered to be the primary target for most anglers fishing the Afan. Like several other south Wales rivers, the Afan is stocked with hatchery derived trout early in the season to provide sport before

the bulk of the sea trout run arrives in midsummer. The club currently stocks with 2000 adult brown trout and also introduces salmon parr as part of a local brood stock programme. The club's stocking programme is discussed in more detail in the conclusions and recommendations section of this report.

The club has expressed a number of concerns relating to water and habitat quality, development pressures and perceived increased levels of bird predation by mainly cormorants and goosanders. These and other issues are explored further in this report.



The large tidal pool at the bottom of the Afan.

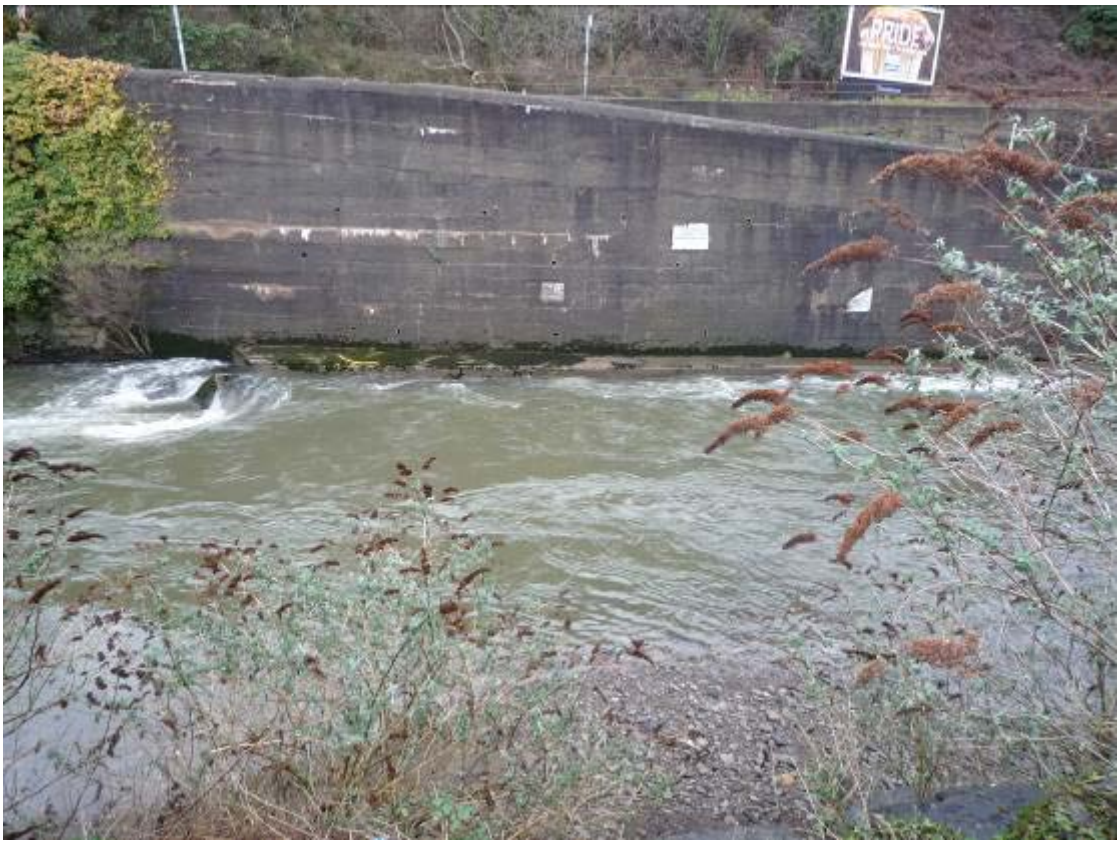
4. Habitat Assessment

Looking upstream from the very bottom of the system, it is evident that the river has been severely constrained by the urban development. The tidal pool which demarks the end of the fluvial river does not form part of the fishery but it is evident that this area will attract significant numbers of migratory salmonids to settle prior to upstream migration. The weir does have a fish pass, constructed at least 20 years ago, which is located adjacent to the RB margin. There was some discussion as to the efficacy of this pass, due to its location on the weir and also the levels of attractant flow; the structure also periodically blocks with assorted trash.

As a registered fish pass the Environment Agency (EA) is responsible for its maintenance but some concerns were expressed over the difficulties involved in clearing blockages because of the enclosed design, possibly leading to some

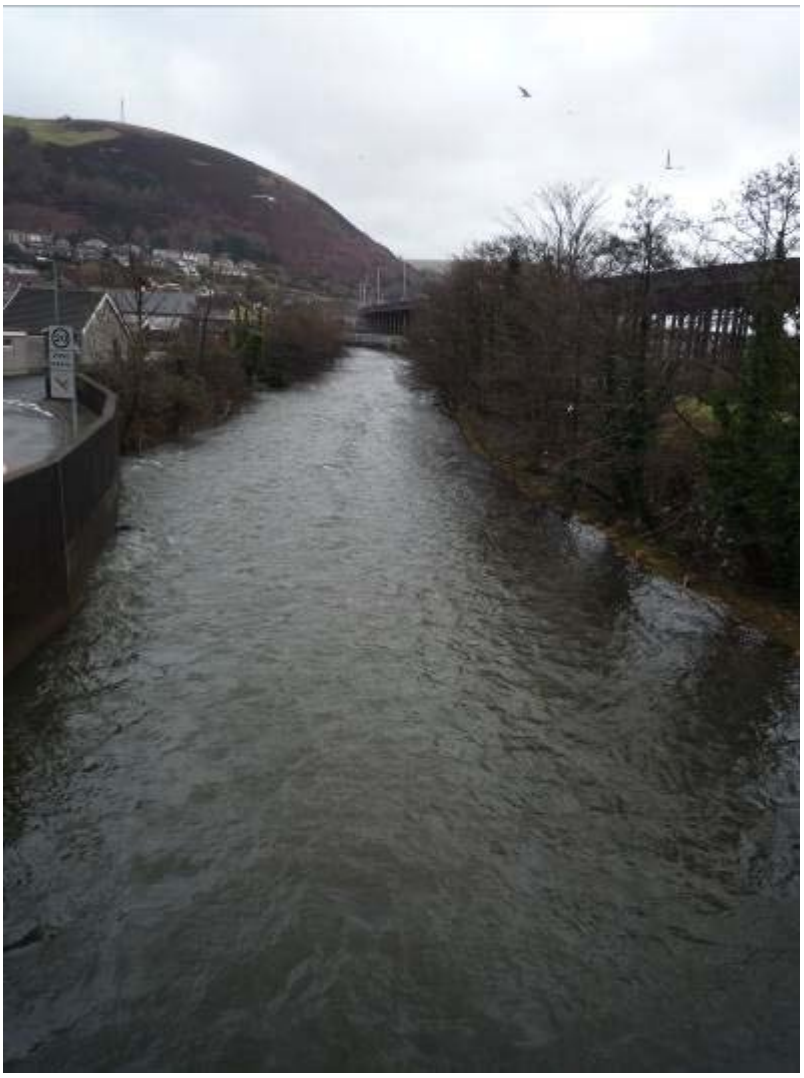
downtime when migrating fish could be delayed from ascending into the club's waters.

Further upstream the river was inspected north of the M4 crossing. Here it was evident how constrained the river channel is in places, flowing down a very steep gradient and often reveted with brick and concrete walls. Despite the obvious lack of natural marginal cover, the active morphology of the channel has created some excellent pool and riffle habitat ideal for both holding adult trout but also potentially good for spawning as well.



The Afan just above Port Talbot where the channel is reveted with steep sided brick and concrete walls.

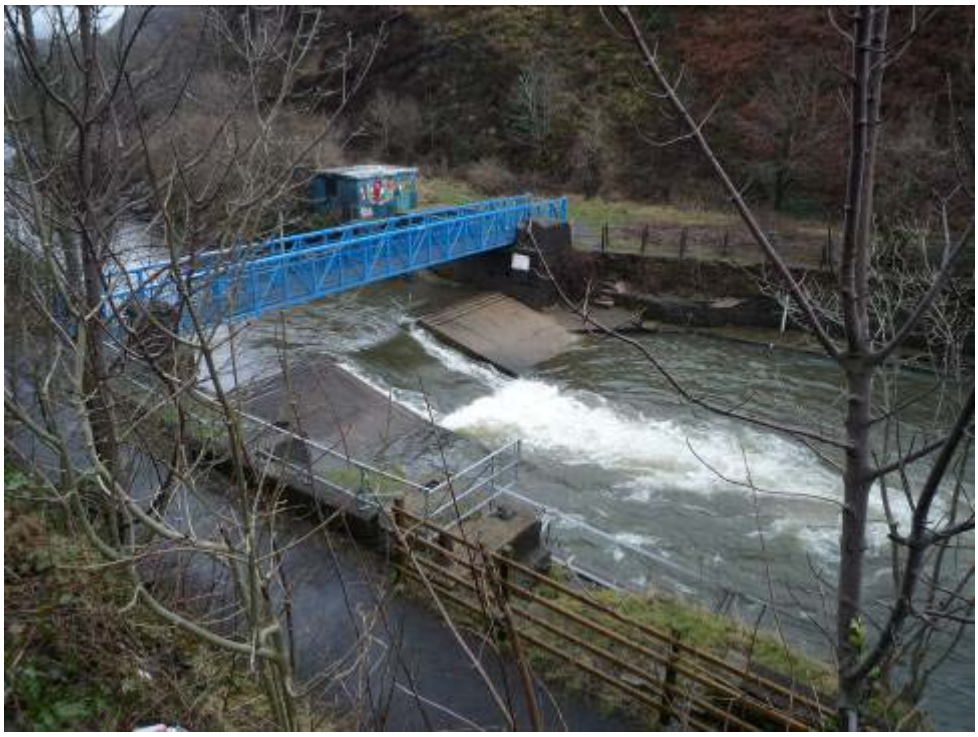
Some sections of channel within this lower urban corridor were much more natural, with tree line margins and sufficient channel width to allow decent shingle banks and side bars to form. The 500m section of channel running parallel with the elevated M4 appears to have some particularly good stands of marginal tree cover (mainly alder) which will provide good bank protection via the root systems as well as a source of food items in the form of invertebrates dropping from overhanging branches. These trees were not inspected closely but some may well benefit from coppicing to extend their life and to provide valuable low bushy cover so important for good holding lies for adult brown and sea trout. Improved marginal cover adjacent to shallow nursery habitats will also help to reduce bird predation pressures.



The Afan just north of the M4. Good marginal tree cover on both banks yet still in the urban environment. Coppicing some of the alders to preserve the trees and promote low growth will improve and protect the river margins.

Further upstream between Port Talbot and Cwmafan two sites were inspected. The first was the site of what looked to be a flow gauging crump weir. It is not known if this site is still being actively used by the EA for measuring river flows.

Crump weirs can be a problem for free and easy fish passage. It may well be that during spate conditions, when the head loss at this site is reduced with increasing tail water levels, sea trout can easily navigate their way through. During long periods of low flow, however, structures like this may limit upstream progress, especially for smaller sea trout. It is recommended that the club opens a dialogue with the EA over this structure to ascertain if it is still an important asset in regular use and if there are any plans to remove or modify it to improve access for migratory fish species, including eels.

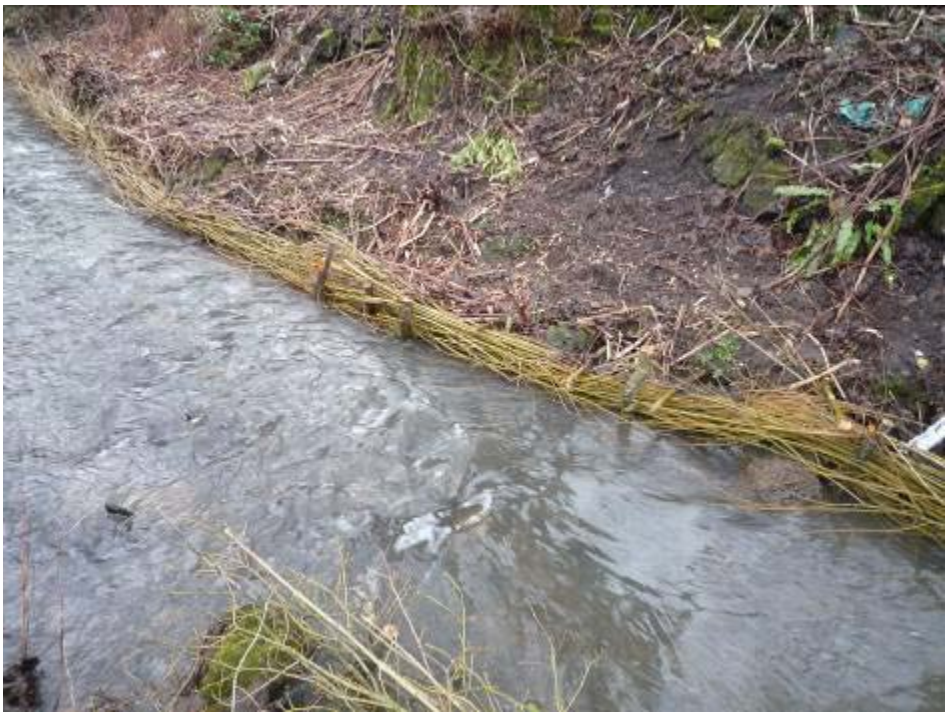


A crump-style flow-gauging weir. Is this an issue for sea trout migration during a low flow summer?

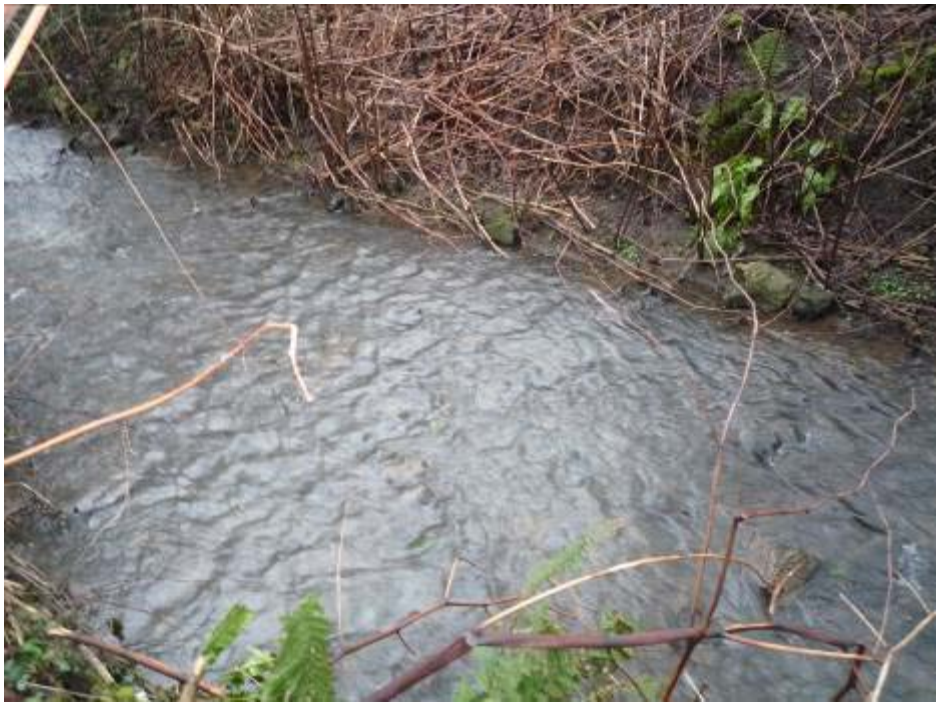
A few hundred metres above the weir a small tributary enters the river from the RB. This stream runs parallel with the Cwmafan road for a distance of approximately 500m. Small tributaries and side streams like this one are potentially of critical importance as spawning and nursery areas. This stream, as the first significant tributary above Port Talbot may well be even more important as a spawning site for late running fish; sea trout in particular are often known to favour side streams or tributaries rather than utilising main stem habitats. The stable flow regimes and shallow water provide an excellent food-rich habitat and refuge from predators for juvenile fish. When these side streams are coupled with good quality gravels, clean water and an abundance of scrubby, overhead cover they can provide a significant contribution towards trout populations running the main river.

The value of this little stream has not been lost on members of the AVAC and they have been engaged in a programme of habitat improvements, aimed at pinching the channel using woven willow revetment to keep central channel gravels clean and silt free. In addition the club has attempted to eradicate the problem of invasive non native plants, in particular Japanese Knotweed, *Fallopia japonica* . This plant, along with Himalayan Balsam (*Impatiens glandulifera)* can be responsible for exacerbating erosion problems by shading out ground flora which leaves soft soils vulnerable to erosion.

This programme of improvements should continue and will be even more effective with the addition of more in-channel large woody debris (LWD), discussed below.



An excellent spawning and nursery stream where the margins have been defended with live willow weave.

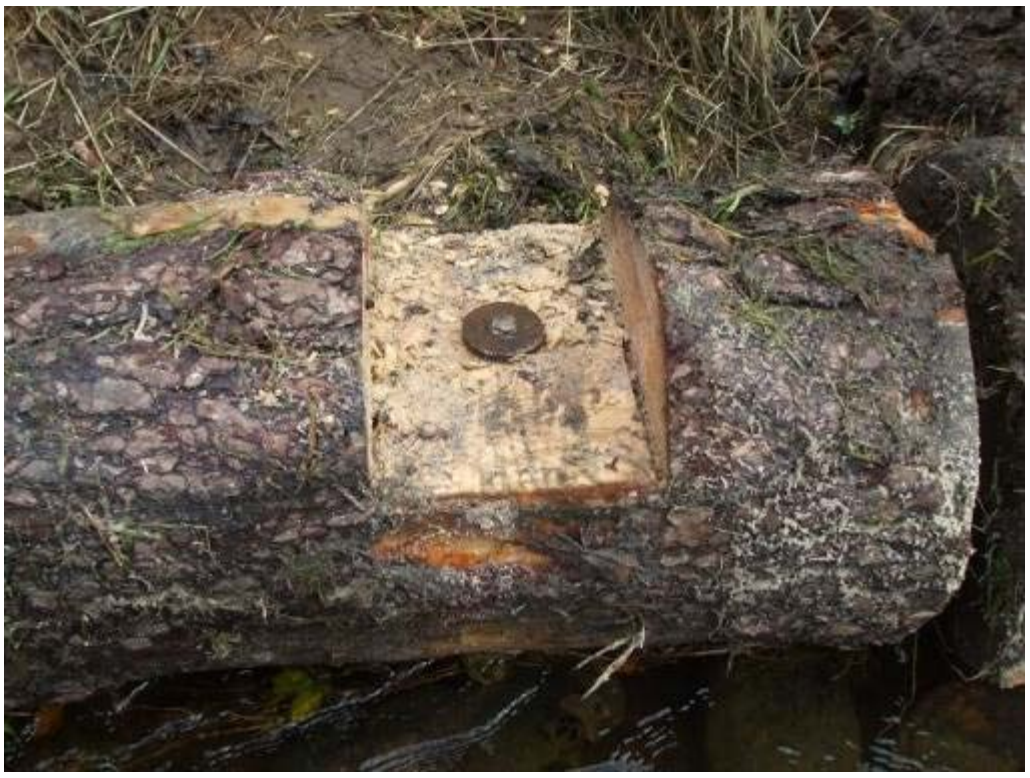


Another section of the tributary lined with Japanese knotweed. Eradicating this plant from the marginal zones should be a priority action

Rivers and streams with LWD have greater habitat diversity, as it promotes localised scour, depth variation and a natural meandering shape. LWD is an essential component of a healthy stream's ecology and is beneficial by

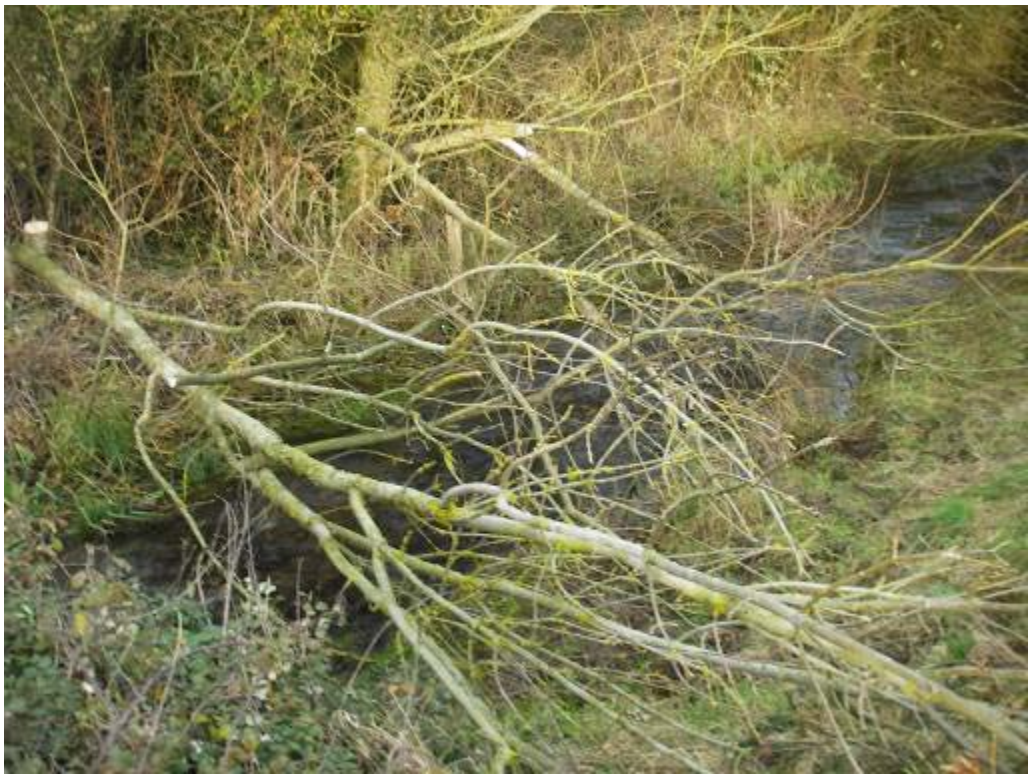
maintaining the diversity of biological communities and physical habitat. Stream clearance reduces the amount of organic material which supports the aquatic food web, removes vital in-stream habitats that fish will utilise for shelter and spawning and reduces the level of erosion resistance provided against high flows. A relaxed approach to managing LWD is far easier and cheaper than installing flow deflectors and groynes, and usually achieves similar or better results.

If little or no woody material is available to fall into the channel then importing trunks or large branches and securing them to the river bed is a tried and tested method for cleaning existing river bed gravels and promoting improved holding habitats for pre and post spawners. It should be remembered that poorly secured LWD can break away and potentially cause blockages to small bridge apertures or culverts. If this work is planned on any section of water course designated as a "main river" for flood defence purposes then a written Land Drainage Consent will be required from the EA.



A piece of LWD secured to a stream bed with 2m of 22mm steel reinforcing bar with a welded steel retaining washer

To ensure that those areas that are potentially good for spawning are given the best possible chance of being selected it might be worth providing some temporary overhead fish cover with imported brashings. This is a technique that can be used where bird predation is an issue and where fish feel nervous about cutting redds in open areas. Smooth laminar flows over a ramp of clean loose gravel will almost certainly be used by a combination of resident browns and migratory sea trout for spawning provided there is overhead cover and access to plenty of shallow water to provide suitable nursery environments.

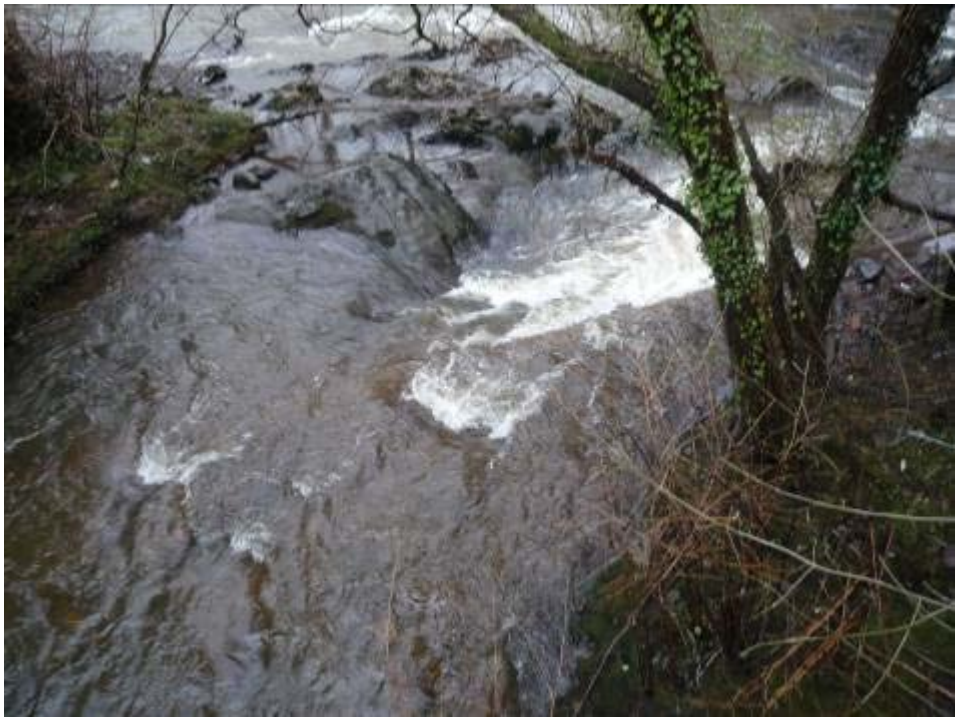


Temporary brashings cut and pegged over a likely trout spawning site.

A small upstream V made up of 1m sections of LWD in a spawning stream

Further up river another small side stream entering form the RB was inspected. Access to decent quality habitat was severely restricted due to a culvert and an old milling impoundment. Downstream of this point the stream passed through an area of recent housing development. The opportunity to enhance the lower section of this stream looks to have been missed in the planning process.

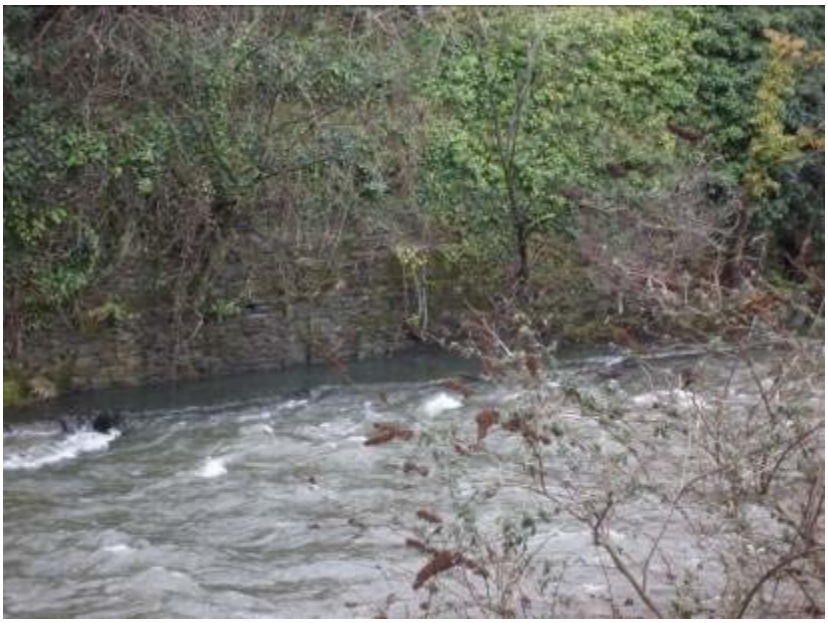
At Pontrhydyfen the confluence the main river with the Afan Pelena tributary was inspected. Apparently this stream has been severely polluted in the recent past but appears to have recovered following works to remediate mine water discharges.



Confluence of the Afan Pelena with the main Afan.

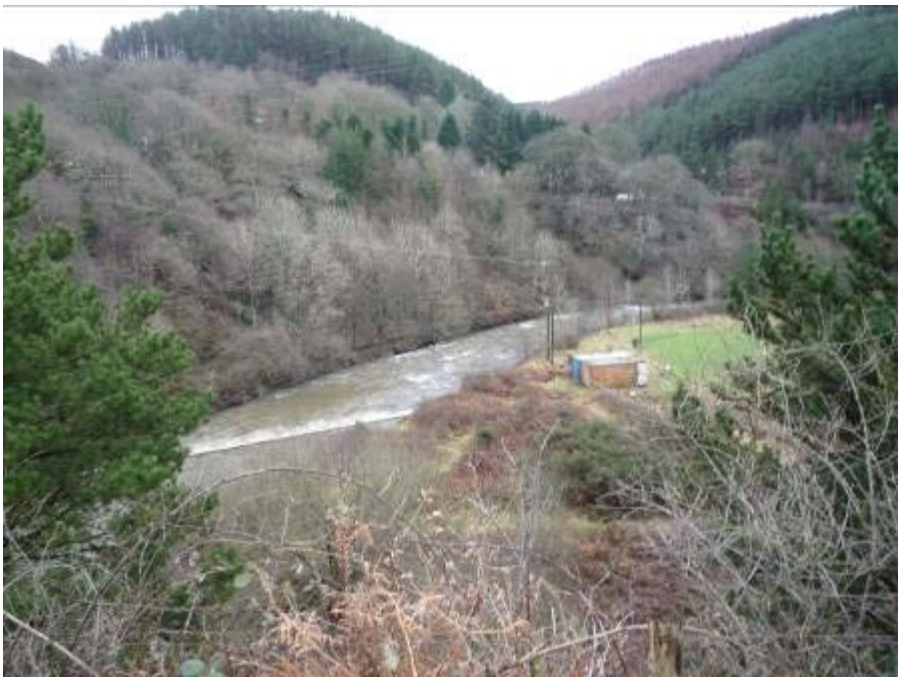
The section immediately above the B4286 road bridge looks to provide first class habitat for trout, although it is believed that this section of the Pelena does not form part of the AVAC fishery.

It was noted that throughout most of the length of main river inspected, a major trunk sewer (believed to be a foul water sewer) runs over and next to the river channel. In places the pipe is half buried, in others it crosses the channel. It is hoped that the owners and users of this service are fully aware of the vulnerability of this pipe to damage and although this is most likely to occur during spate conditions, when increased dilution might mitigate against any adverse effects of leakage, there is always the worry that complete failure might occur during high summer, low flow conditions. It is recommended that the angling club asks the water company for reassurance that all necessary precautions are in place to protect the river against the risk of serious pollution.



Exposed major sewer pipe running within the river channel

The last site inspection was made at Cymer where the river divides into two upper arms. In-channel habitats on both arms appeared to be excellent with a variety of habitats available for all life stages of the trout. Land use, and particularly the large areas of coniferous forestry are likely to have the biggest impact on habitat quality through this section of river. The well drained soils below coniferous plantations and lack of ground vegetation exacerbates run-off with the net result that rivers suffer from flash flooding events, acid flushes and periods of chronically low flow following even modest periods without rainfall.



Large blocks of coniferous forestry carpet the steep sides of the Afan Valley

These large scale, catchment-related issues are obviously outside of the control of the angling club but it should lobby hard for changes to land management practices through local forums and via opportunities like the River Basin District Management Plans, which are formulated by the Environment Agency as part of the Water Framework Directive. Upland rivers like the Afan cannot reach their full potential unless the issues relating to catchment land use are addressed through a more sympathetic programme of sustainable forestry and landcare. Changes will not happen overnight but the AVAC is a major stakeholder and must fight hard to influence local politicians and decision makers for a better future for the river. Further information on sustainable forestry can be obtain from Coed Cymru at www.coedcymru.org .

5. Conclusions

There is much to celebrate in the recovery of the Afan following a century or more of severe pollution. Habitat quality for all life stages of trout appear to be excellent within long sections of the main river.

Small side streams and tributaries usually play a vitally important role in providing some of the best opportunities for spawning and juvenile habitat. The Afan is not blessed with a multitude of opportunities for side stream spawning. Those that do exist should be given extra attention from the club and efforts made to protect and improve them. Some good work has already been carried out and further efforts made to improve gravel quality and provide enhanced cover should be made. There were concerns expressed over an apparent increase in visits from fish eating birds so the provision of low scrubby cover on spawning and nursery sites is of crucial importance. With so few opportunities for side stream spawning, good access for migratory fish to the headwater areas is critical, as is the quality of spawning and nursery habitats within those reaches. The same prescriptions apply to the upper reaches of the main river as already described for the lower tributaries.

Upstream access for migratory trout is obviously of critical importance. Delays in being able to navigate upstream can lead to stress related problems and increased predation pressures. It is recommended that the AVAC asks the EA to carry out a re-evaluation of the fish pass maintenance programme on the bottom tidal pool to see if there is any scope to avoid frequent blockages to the pass. In addition enquiries should be made as to the current use of the gauging weir and whether there is any long term plans to improve access for fish at this important site.

Engaging in discussions with the EA and the local land owners over long term plans for land use in the upper part of the Afan catchment is also of critical importance. There has been much talk about changes in forestry practice towards sustainable hardwood plantations. Is this going to happen in the Afan valley?

The club's own maintenance regimes are very important. Habitats for fish must come before convenience for anglers. Leaving some low trailing tree cover will provide cooling shade during warm, low flow periods and provide improved refuge areas from avian predators. Leaving as much large woody debris (LWD)

within the channel as possible is recommended. 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. Woody Debris helps regulate the energy of running water by decreasing the velocity. Thus the 'travel time' of water across the catchment is increased.
- Provides organic material which acts as food and habitat for invertebrates

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.

It is recommended that the fishing club reconsiders its trout stocking programme. The stocking of large numbers of hatchery-derived, fertile brown trout may well increase pressure on wild stocks (brown, sea trout and salmon) through increased competition and predation. It must be remembered that these fish will also put pressure on juvenile trout destined to become smolts with the added concern that any stocked fish that do survive to the winter may spawn with wild browns and sea trout leading to a loss of fitness in the population as a whole. Any mating that occurs between a wild fish and a stock fish pair will result in very poor survival of offspring (especially compared to wild x wild matings); and the resultant contribution of well-adapted wild genes to the next generation will be lost.

If additional stock is required to augment the rod catch then it is recommended to stock with modest numbers of sterile (triploid) fish in selected pools near the bottom of the system. All hatchery derived stocks will struggle to find niches in a spate river like the Afan and stocking with too many individuals will result in most fish simply running downstream to the estuary. Stocking any trout prior to the sea trout and salmon smolt run is not considered to be good practice but it is understood that the stocking is carried out to provide early sport. Leaving the stocking as late as possible is a sensible precaution to try to protect the emigrating smolts.

Seeding out hatchery derived parr into known juvenile habitats is going to result in a net loss of trout and sea trout production for the river as a whole. Even with the natural selection pressures that will weed out some of the weaker stocked fish, there will still be intense completion for space and food with wild born parr.

As already described, domesticated hatchery derived stocks will not produce as many fit offspring as true wild stocks so increasing the potential rates of survival of stocked parr through to maturity is only going to result in a net loss of production. Doubling the amount of good quality spawning and nursery habitat through a programme of habitat enhancements will produce much better results in the long run.

It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking any works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require a land drainage consent on any river designated as "main river". Advice can be obtained from the EA's Development Control Officer.

6. Recommendations

- Open a dialogue with the EA over the design and maintenance of the fish pass on the tidal pool.
- Ask the EA for their plans on the long term future of the flow-gauging crump weir.
- Build on the work already started to improve habitat on the small tributaries and side streams, with an emphasis on providing more bank-side, scrubby cover and improved spawning gravels.
- Continue the programme to eradicate non native plants.
- Make contact with the land owners and authorities responsible for owning and managing the blocks of coniferous forest in the upper catchment. There is no quick solution but many of these trees will be ready for harvest and influencing future plans now may safe guard against a new generation of soft woods being planted.
- Ask the local water company for some reassurances regarding the condition and maintenance checks that are made on the trunk sewer running down the river bed.
- Stop introducing juvenile hatchery derived trout into habitat that may well already contain good numbers of wild fish. The WTT is happy to discuss this issue further with the clubs committee
- If stocking is absolutely necessary then stock with lower densities of takeable sized triploids into the lower pool habitats and if possible wait until after the spring smolt run has finished.

7. Making it happen

There is the possibility that the WTT could help to start an enhancement programme. Physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). PV's typically comprise a 1-3 day visit where approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams to obtain on the ground training regarding the appropriate use of conservation techniques and materials, including Health & Safety equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

The WTT can provide some support with cost of labour. Recipients will be expected to cover travel and accommodation expenses of the contractor.

There is currently a big demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources. The Trust is always available to provide free advice and help to clubs, syndicates and landowners through guidance and linking them up with others that have had experience in improving trout fisheries.

Acknowledgement

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

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