Grayling Society

Advisory Visit for Tanfield Angling Club

River Ure - West Tanfield

Date 09/01/2012

1. Introduction

This report is the output of a site visit undertaken by Gareth Pedley of the Wild Trout Trust to the River Ure on 9 January 2012. Comments in this report are based on observations on the day of the site visit and discussions with David Griffiths, Cliff Beddows and John Watson of Tanfield Angling Club.

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. Location coordinates are given using the Ordnance Survey National Grid Reference system.

2. Catchment / Fishery Overview

Tanfield Angling Club (TAC) preside over the fishing on approximately 8km of the middle River Ure, from a point just upstream of the confluence with Black Robin Beck (SE2386177708), known to the club as Hell Hole; to a point around 1.2km downstream of West Tanfield (approx. SE2787178446). A map of TAC waters and locations are included in appendices 5 & 6 (courtesy of C. Beddows).

Most of the fishing rights are double bank, excluding a few short sections, where the riparian owners have retained the rights. This is a long section of river for a club of around 55 anglers, especially when considered that some do not live locally and fish infrequently. The bag limit for the fishing is 10 brace/day which is a remnant from the old club rules of the 1930s when an even larger proportion of the club members used to travel from locations such as London, for a only a few days fishing per year.

The club waters lie within the **Ure from Thornton Steward Beck to River Skell waterbody** (Waterbody Id: GB104027069461), as classified under the Water Framework Directive (WFD). This waterbody is classed as ‘Good’ for fish, meaning that the fish densities observed from electrofishing surveys were as would be expected for a river of that type. All other aspects were classed as high, excluding macrophytes, which were classed as moderate.

Catch records for the club show good returns for trout (*Salmo trutta*) in most years, which will be a combination of wild and stocked fish. Grayling (*Thymallus thymallus*) also feature in returns but numbers are low and concerns have been raised within the club regarding their current population status. Numbers of grayling caught have slightly increased over recent years, yet remain of concern to members.

The club currently stocks between 800 and 1000 diploid brown trout per season, ranging from under 500 g (approx. 1lb) to 900 g (approx. 2lbs). These fish are bought in and grown-on in the club's own rearing unit, then introduced in one stocking which usually takes place around the middle to end of April. The exact timing is dependent on weather conditions and adjusted to coincide with the increased invertebrate activity of spring. This is aimed to ensure a good food supply is available. The fish are spread throughout the TAC waters, excluding the very upper section, where little or no stocking takes place to provide a refuge area for wild fish.

Historically around 2500 grown-on fish were stocked early season, with a further 1000 fish purchased from Welham Park Trout Farm stocked in June; this practice continued until June 2007.

A long section of the LHB around the upper boundary of TAC's water is designated as a Site of Special Scientific Interest (Hack Fall Wood SSSI) for several species of flora and fauna. If any works are intended in that area they may require additional permissions from Natural England, which the EA should be able to assist with through the land drainage consenting process.

TAC waters border two Natural Areas, as designated by Natural England. The upper section of the river falls within the Pennine Dales Fringe Natural Area, with the lower end lying in the Southern Magnesian Limestone Natural Area. (http://www.magic.gov.uk/website/magic/)

The underlying rock types of the upper section are predominantly Millstone Grit, Sandstone and to a much lesser extent Coal Measures, with much of the exposed bedrock along TAC waters consisting of this sandstone. The lower section crosses the Southern Magnesian Limestone Area, where the bedrock varies from thin crumbly layers mixed with clay and marl to thicker layers, deposited over 255 million years ago in a geological era known as the Permian.

Much of the land adjacent to the river is overlain with boulder clay, and sands and gravels of both glacial and riverine origin. The boulder clay gives rise to slowly permeable, and therefore sometimes seasonally waterlogged, soils suited to pastoral farming. The sands and gravels on the other hand give well-drained soils more suitable for arable crop production. (http://www.naturalareas.naturalengland.org.uk/Science/natural/NA_search.asp)

Water quality is generally thought to be good on the river, although discussion with club representatives suggests there may be evidence of high nutrient levels on occasion, particularly on Black Robin Burn. This could link to higher than usual algal growth observed on the river bed in recent years. This is likely to have become increasingly apparent during low flows periods when less scouring of the bed occurs and more nutrients are deposited.

Protected species known to be present in the area include native White Clawed Crayfish, *Austropotamobius pallipes*. It is an offence to handle them without a licence from Natural England. Trapping of the non-native Signal Crayfish, which are also present in the river, would require consent from the Environment Agency (EA), but is unlikely to be granted due to the presence of native crayfish.

Otters (*Lutra lutra*) are known to be present, with evidence of spraint and paw prints notable on the river bank. Bats and nesting birds will also be present at certain times of the year and protection to them afforded by the Wildlife and Countryside Act 1981 should be respected. This means that the resting places of bats and otters must not be disturbed, with the same true of birds' nests. Brook lamprey (Lampetra planieri), river lamprey (*Lampetra fluviatilis*), and sea lamprey (*Petromyzon marinus*) are also protected and may be present in the river, which needs to be a further consideration for in-channel work.

For these reasons, and the requirement to comply with land drainage regulations, it is recommended that the EA is consulted before tree felling or any other work in, or within 8m of the watercourse is undertaken.

3. Habitat and Fishery Assessment

The river was walked from the top boundary progressing downstream. The first point of note was the healthy array of aerial cover along the river margins, which the adjacent woodland provided (Picture 1).

Picture 1. Good marginal tree growth that will provide shade and bank stability (SE2385477703).

The habitat has been maintained through a minimal management approach on the bankside trees. This is an optimal scenario and is commended, as it allows beneficial cover, shade, and security for trout, increasing the number of fish an area can support. The trees also provide a valuable source of terrestrial insects to the river for the trout and grayling to feed on. Branches trailing into the water complement this, adding small flow diversions and improving fish lies through creation of food lanes where natural prey items accumulate.

Limited coppicing and pollarding may be beneficial in places to increase light penetration to the river bank, and to prolong tree life through re-growth and increase low level cover. This technique would be beneficial in places throughout TAC waters, but should be undertaken sparingly. The width of the river alone means that shading is not likely to be a great issue, naturally allowing light penetration over at least 1/3 of the channel in most locations.

This situation was not the case on Black Robin Beck (SE2386177708), which is a much smaller tributary (0.5-3.5m wide), where heavy shading has restricted productivity. A large area of woodland at the lower end of the Beck (LHB) had recently been sympathetically felled, retaining some of the bank side trees and shrubs, but allowing greater light penetration into the steep sided valley (Picture 2). This should benefit the Beck, as although unlikely to produce aquatic plants due to its character, the banks should now produce better vegetation to bind them together and reduce erosion.

Picture 2. Tree thinning on Black Robin Beck to the right of the picture (SE2390477778).

Black Robin Beck appeared to be the only tributary with significant potential for trout spawning on TAC's water, and as such is a valuable asset. The bottom 20-30m above the confluence with the Ure is unsuitable for spawning due to a bedrock bed, which retains no gravel spawning substrate. Above this point substrate was of a suitable size and volume for spawning to occur.

Excessive sediment loading was present on the bed (Picture 3), which limits the potential of the Beck for spawning, but this may be rectifiable. A walkover of the Black Robin Beck should be undertaken to identify any fine sediment sources, as a first step in their control. It may be that the sediment input is resulting from surface run-off associated with a lack of herbaceous vegetation on the Beck's banks as might occur with excessive shading, or perhaps more likely, live stock access to the banks and associated over-grazing.

Picture 3. Sediment deposition on graves and silt plume mobilised from the bed by wellington boot (SE2388977787).

The size of the Beck channel in relation to the flow observed would also suggest that it is subject to high volume flow events, leaving the channel over-wide in places, particularly where bedrock prevents natural incision to the bed. Over-widening of a channel can also exacerbate sediment deposition issues through reduced flow velocity. When investigating the causes of the sedimentation issues it would be worth also trying to identify whether there are factors likely to be increasing the amount of surface run-off entering the Beck, both as a source of sediment and high flow. This could shed some light as to where excess nutrients could be entering the system.

Below Black Robin Beck the width, averaging 35m (range c.25-40m), and relatively steep gradient of the Ure mean that the river is very dynamic and moves with a considerable force, regularly transporting large substrate. This may also be exacerbated by historic land drainage and gripping activity, as is common to upland catchments, which potentially increases the rate and volume of run-off entering the rivers. Consequently, in several areas the river has exposed bedrock, which remains clear of any other substrate type. The dynamic nature of the rivers means that the majority of other substrate is cobbles and boulders.

Much of the finer gravel is transported through the reach, only accumulating around obstructions like woody debris or trailing branches, and on inside bends usually towards the tail of pools. This material was more common in the lower 2/3 of TAC's waters where the river gradient was lower.

The sandy nature of much of the river banks and adjacent land means that a large proportion of the finer bed material is sand, as can be seen from large deposits on the bank. This is interspersed with some smaller gravels and silt. There is a general scarcity of medium-sized substrate (5-50mm), and the in-stream features described above must be preserved to retain valuable gravel areas. There is also potential for enhancement and creation of this habitat in some areas.

Throughout the river there was a general lack of in-stream vegetation. This can be attributed in part to the lack of suitable substrate, comprising predominantly large, mobile cobbles and boulders. This low stability bed, coupled with significant areas of bedrock, and shading from the steep sided valley in the upper reaches provides little opportunity for plants to become established. Therefore, the presence of only a few restricted weed beds was not a significant departure from what would be expected.

Below Magdalen Wood the flood plain opened and consequently the river gradient drops slightly, facilitating increased retention of gravel and cobble substrate. A short distance further downstream the river becomes impounded by Mickley Weir.

Picture 4. Mickley Weir (SE2503376850).

The weir will retain mobile substrate above, but will provide little benefit as the slower flow of the deeper impounded water will also increase deposition of finer sediments. This reduces the habitat suitability for many of the species native to the area and also renders it unsuitable for spawning. The retention of bed material will also starve the reach immediately downstream. In an ideal scenario the weir would be removed but as the weir supports a hydropower installation its removal is not possible.

The weir also poses a significant obstacle to fish passage and is likely to be difficult for trout, and impassable to grayling at most flows. Larger migratory salmonids will pass it at higher flows, with some difficulty, but it will pose a significant behavioural barrier that is only passable in certain flows. A barrier of this size will undoubtedly be on the EA's prioritised list for fish passage improvement, but it is unlikely to be tackled before other obstructions further downstream.

One of the other obstructions is Tanfield Weir, downstream of Tanfield Bridge (Picture 5). This poses an even greater barrier to fish migration, but again supplies hydropower and also provides bank stability to houses upstream, so unfortunately cannot be removed. The weir is high on the EA's regional prioritisation list for fish passage improvement and so should hopefully be altered within the next few years as funding becomes available.

Picture 5. Tanfield Weir (SE2751678741).

River bank stability was good overall as a healthy array of marginal vegetation, or trees (in the wooded areas) was present in most areas. These bind the soil together with their root network and reduce the velocity of flow hitting the bank, reducing erosion. The notable exceptions to this were the areas in which livestock had access to the river bank (Pictures 6 and 7). In these areas it was immediately apparent that grazing and trampling had led to increased bank erosion in high flows. This in turn will lead to over-widening of the channel and increased sediment input to the river. The problem should be addressed by greatly reduced grazing pressure on fields adjacent to watercourses, or buffer fencing to exclude livestock from the river margin. There are many potential designs for buffer fencing but a possible layout can be seen in appendix 2. Tree kickers or brash could also be employed to direct flows away from the bank.

Picture 6. Erosion caused by over grazing of the riverbank, leading to loss of land and increased sediment input to the river (SE2577377247).

Picture 7. Erosion problems. Here stone has been placed on the damaged bank but the problem could be prevented by livestock exclusion (SE2669377603).

There was a general lack of large woody debris (LWD), observed on the river, but this is probably due to the dynamic river type transporting the material downstream rather than a lack of supply or mismanagement. With this in mind in may be beneficial to increase the retention of such structure by felling a few selected trees into the river and securing them in place with steel cable attached between the trunk and stump. This would be particularly beneficial in areas where there is a monoculture of mature alder trees along the bank as seen in picture 8. Here the multiple trunks and close set trees mean that the work will result in minimal impact on the overall tree canopy.

Picture 8. Suitable area for selective tree felling into the channel to increase LWD. Buffer fencing would also be beneficial (SE2587777298).

More detail on this and other habitat improvement techniques can be found on the Wild Trout Trust Website (http://www.wildtrout.org/images/PDFs/Upland_Manual/uplands_section5.pdf) in the physical enhancements section.

Picture 9. Tree felled into the river to increase LWD which provides fish cover and flow deflection (SE2631478232).

In addition to the cover such structures provide, redirection of flow resulting from this kind of work is likely to create new lies and increase scour, producing new pools and more varied habitats. Areas around the structure and associated reduced flow velocities may also provide shelter and protection for smaller juvenile trout that may otherwise struggle to remain within the reach in high flow events. These areas may also provide areas for deposition of smaller gravel suitable for trout and grayling spawning.

Another method that would complement woody debris is hinging/laying. The stem of smaller more supple trees and shrubs can be partially cut through, allowing them to be laid into the channel in a downstream direction. This should be done at 45^{o} or less to the flow so that high flows are deflected off the branches and excessive amounts of debris does not collect around them. This method is particularly effective with willow, sallow and hawthorn but can also be used on smaller alders and hazel. The method works like laying a hedge, keeping the tree alive and well anchored to the stump in the ground. (See appendix 1 for photos of hinged willow)

This technique would be particularly beneficial for the small willow beneath the electricity cables near Lowside Deep (Picture 9, SE2675277720). This would greatly delay the requirement for maintenance to prevent the tree from interfering with the cables.

Picture 9. Willow that would benefit from hinging near Lowside Deep (SE2675277720).

Overall, areas of suitable spawning and fry habitat were limited on the reach for both trout and grayling, as described by the coarse mobile substrate and lack of 5-50mm gravels in many areas. There was however sufficient present for some wild spawning and recruitment to occur. This assessment is supported by trout spawning observed in several areas by riverkeeper David Griffiths. Concerns were raised over the washing out of redds in high flows. This is a consequence of the mobile nature of the river bed and in no way means that all production from those redds is lost. This mobility is natural for an upland river, with clean coarse bed substrate, that is not locked together by finer sediment. The positive being that the surviving redds, and disturbed eggs that are not damaged will be well oxygenated and have high survival rates.

It is not just trout and grayling that have been observed spawning in the area, coarse fish including barbel (*Barbus barbus*) have also been seen spawning on certain gravel shoals. This is also evidence of potential areas where smaller substrate is present, as barbel favour spawning substrate of a size range that overlaps that favoured by trout and larger grayling.

Due to the large size and dynamic character of the Ure in this area, trout spawning will not be restricted to the main river; smaller trout are likely to utilise lower flow areas out of the main channel, and tributaries. These too can be enhanced by felling trees into the channel to increase retention of finer spawning substrate, and provide shelter from flow and predation for emerging fry. This would be particularly beneficial along the smaller side channels of the two islands (Pictures 10 & 11).

Picture 10. Area of fast flow in side-channel near Saw Dub, where increased cover and shelter could enhance spawning and juvenile habitat (SE2684877949).

Picture 11. Backwater to the side of the island near Slee Gill (SE2657178581). Here the flow is slow for parr, but laying some of the bankside trees into the channel would increase cover and protection for them as they drop down from upstream as fry.

For reasons mentioned the main river channel on TAC waters would only be expected to contribute a portion of the total spawning habitat for trout inhabiting TAC waters. Larger salmonids, i.e. salmon and sea trout, also utilise TAC waters for spawning as the substrate is very well suited to their requirements.

This again highlights the importance of fish passage, as although often termed resident, trout and grayling in this part of the river may travel to find suitable spawning areas. The same is true for all life stages, especially when considered that there could be significant displacement of small juvenile fish downstream in high flows. These fish may need to ascend the river again at some stage to exploit different habitat as they grow. The key is to protect as naturally diverse a habitat as possible in all areas, but also ensure that all life stages can move freely within the river system, as they require.

4. Overview and Recommendations

Activity	Location(s)	Cost	Achievable by
Targeted coppicing and pollarding to increase low level cover and prolong tree life	• Sparingly throughout the club waters • Old Wives - SE2587777298	Riverkeeper's time	David Griffiths
Investigation into sedimentation of Black Robin Beck	• Walkover of the whole Beck	½- 1 day of time to walk	David Griffiths or club member
Buffer fencing	• Old Wives - SE2587777298 • Lowside Deep (SE2675277720)	• Fencing around £6/m	Contractor
Strategic planting of native trees and shrubs	• On the outside of bends and in areas vulnerable to accelerated rates of erosion. • Throughout TAC waters where cover is limited • Within buffer strips once established	• £2-3/shrub + £1 for guard if required • Some could be achieved through planting willow whips taken as cuttings from existing trees	David Griffiths (+ volunteers)
Creation/increasing Large Woody Debris	• Regular locations along the river • Old Wives - SE2587777298	• Riverkeeper's time	David Grffiths
Hinging willow	• Regular locations, particularly from Mickley Weir, downstream • Willow below power lines at	• Riverkeeper's time	David Grffiths

	Lowside deep SE2675277720		

The move in recent years to greatly reduce trout stocking is a positive step that will help to reduce the impact on wild fish, while saving the club money. Current stocking levels pose a reduced ecological risk, but unless infertile triploid fish are stocked the risk of detrimental impact from breeding between farmed and stocked fish still exists.

It may also be worth reducing the bag limit from 10 fish/day, as this should discourage anglers from taking so many fish. If this can be adopted, alongside an increased level of catch and release angling, the potential for protecting wild fish stocks is significant. Nationally, the statutory bag, and size limit for grayling has also reduced, a fact that is worth making all members aware of. More details can be found on the EA website. (http://www.environment-agency.gov.uk/static/documents/Leisure/Northeast_byelaws.pdf)

An argument is sometimes made that when stocking has taken place for a long time, no truly wild fish are left that do not have genetic material from farmed fish. This is not necessarily the case. There is a wealth of peer-reviewed, scientific literature suggesting that even when stocking has taken place for very long periods, the level of genetic mixing of farm-reared and wild trout (introgression) is often limited.

This is due to a combination of factors such as the level and spatial pattern of stocking, greater catchability and poor survival of stocked fish, different spawning times or locations, reduced fitness of farm-reared and wild ‘hybrids’ and "outbreeding depression" (loss of fitness and local adaptation through additional genetic variation). This leads overall to poorer survival and reduces the effective breeding population of the trout, with fewer fish effectively contributing to the next generation.

The risk of introgression through stocking with fertile, farm-reared trout will increase with time. Although introgression may be naturally limited, the sooner stocking is stopped, the lower the potential impact. Some studies have also shown a fairly rapid recovery of genetic fitness within wild populations when stocking with fertile, farm-reared fish ceases.

There are rare situations where the introduction of new genes to a population might be beneficial, but even then it should not be from farm-reared, domesticated stock. On a large river like the Ure, low numbers of fish from other areas of the catchment will periodically and naturally contribute to the gene pool. Similarly, within sea trout populations the level of straying has been found to be around 6%. This leads to low numbers of fish from one catchment migrating to another to spawn. Increasing runs of migratory fish on the Ure, following water quality improvements and removal of barriers, may make a small contribution to the genetic health of the trout population as a whole.

These examples show how a low level of genetic variation can naturally occur. Even so, the genetic material introduced may or may not persist in the population depending on how beneficial it is. This is a very different scenario to one where regular stocking with farmed fish takes place in an area and non-beneficial genetic material may effectively be forced into a population by sheer numbers of stocked fish.

In addition to introductions of new genetic material, science suggests that some species (like salmonid fish) that are naturally at risk of inbreeding depression in the wild utilise sophisticated mate-choice mechanisms to ensure optimal genetic composition of offspring, at least partially combating the issues themselves. Consequently, it is important to recognise that mate choice is not something we can mimic in supportive breeding or even sophisticated fish farming techniques. As such, stocking with fertile, farm-reared fish should only be undertaken in exceptional circumstances.

Concerns have been raised that triploid brown trout pose an ecological problem for the river through better winter survival and their need to feed, depleting the river's natural production. There is little evidence that the in-river survival of stocked triploid brown trout is substantially different to stocked diploid trout but, in any case, WTT recommends that clubs attempt to remove as many stocked fish from the river as possible towards the end of the fishing season. This not only reduces any possible impacts on ecological reserves but also removes potentially attractive prey items for piscivorous birds such as cormorants, goosanders and red-breasted mergansers.

A recent study undertaken by the Government agency Cefas investigated whether triploid brown trout in the River Itchen preyed on salmon smolts. Unfortunately no clear conclusion was possible as the stomachs of the triploid trout were found to be largely empty of any food items.

The numbers of fish retained by club members each season is relatively high, and with this in mind it is strongly recommended that any fish stocked are marked, so they can be definitively distinguished from wild. That way the wild fish can be returned and the marked, stocked fish can be retained by anglers. This will preserve broodstock within the river and help to improve wild fish densities.

There are several methods available for marking fish, including panjet dye (Picture E, appendix 4) and Visual Implant Elastomer (VIE), which are coloured elastomer markers inserted into the fish’s skin (Picture C & D appendix 2). Further advice should be available from your local Environment Agency fisheries officers.

The two barriers on TAC waters are significant obstructions to fish movement but in the case of trout probably not at a scale that would lead to a genetic bottleneck through limiting population size. Grayling populations may be affected to a greater degree as their ability to migrate upstream over obstacles is lower than that of trout.

The obstructions could also prevent habitat being used to its full potential. This is because juvenile fish washed downstream over the weirs, and progeny resulting from spawning downstream of them are unlikely to be able to return upstream. Therefore, wild fish populations above the weirs will be heavily reliant on colonisation from upstream and the larger fish that can ascend the barriers. There is a possible benefit of some juvenile fish taking up residence above the weirs in the impounded sections, but this is a small positive as they may be susceptible to increased predation.

Improvements to upstream passage arrangements at the obstructions seem likely for the river to be able to comply with requirements of the WFD. The owners and the EA should be approached to find out the current position. The angling club should consider whether it might be willing to contribute towards the cost of any improvement work.

Habitat observed during the walkover would suggest that although there are issues through sedimentation in certain areas (particularly Black Robin Beck), and a high ratio of large to small bed material, that there is still ample suitable spawning areas for good natural trout production. This can however be further improved on by employing some of the methods described in this report and detailed in the WTT manuals and guidelines on our website (http://www.wildtrout.org/index.php?option=com_content&task=view&id=177&Itemid=237). They will help to improve the health of the river, increasing the number of fish that the river can produce and support.

Finally, there is often an assumption that if stocking is reduced that the workload on a river will be greatly reduced, particularly when fish are no longer required to be reared on site. This may be far from the case, the management and maintenance of a healthy river can also take a considerable amount of time and effort.

Full consultation with the EA over any proposed work will reduce the potential for inadvertently committing an offence under relevant legislation such as the Wildlife and Countryside Act, Land Drainage Act or Salmon and Freshwater Fisheries Act. As previously stated, it is a legal requirement that written Environment Agency consent must be obtained prior to undertaking any works, either in-channel or within 8 metres of the bank.

5. Making it Happen

WTT may be able to offer further assistance such as:

- WTT Project Proposal
    - Further to this report, WTT can devise a more detailed project proposal report. This would usually detail the next steps to take and highlighting specific areas for work, with the report forming part of a land drainage consent application. This is not likely to be as relevant to TAC as David Griffiths is already involved with habitat improvements for the club, but help and advice are available if required.
- WTT Practical Visit
    - Where clubs are in need of assistance to carry out the kind of improvements highlighted in an advisory visit report, there is the possibility of WTT staff conducting a practical day for a club. This would consist of 1-3 days work with a WTT Conservation Officer teaming up with David Griffiths and any interested club members to demonstrate the habitat enhancement methods described

above. TAC would be asked to contribute only to reasonable travel and subsistence costs of the WTT Officer.

- WTT Fundraising advice
    - Help and advice on how to raise funds for habitat improvement work can be found on the WTT website - http://www.wildtrout.org/index.php?option=com_content&task=view&id=157&Itemid=157

      The WTT officer responsible for fundraising advice is Denise Ashton: dashton@wildtrout.org

6. Acknowledgement

The Wild Trout Trust would like to thank the Environment Agency and the Grayling Society for the support that made this visit possible, and for useful comments from the Grayling Society on an earlier draft version of this report.

7. 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.

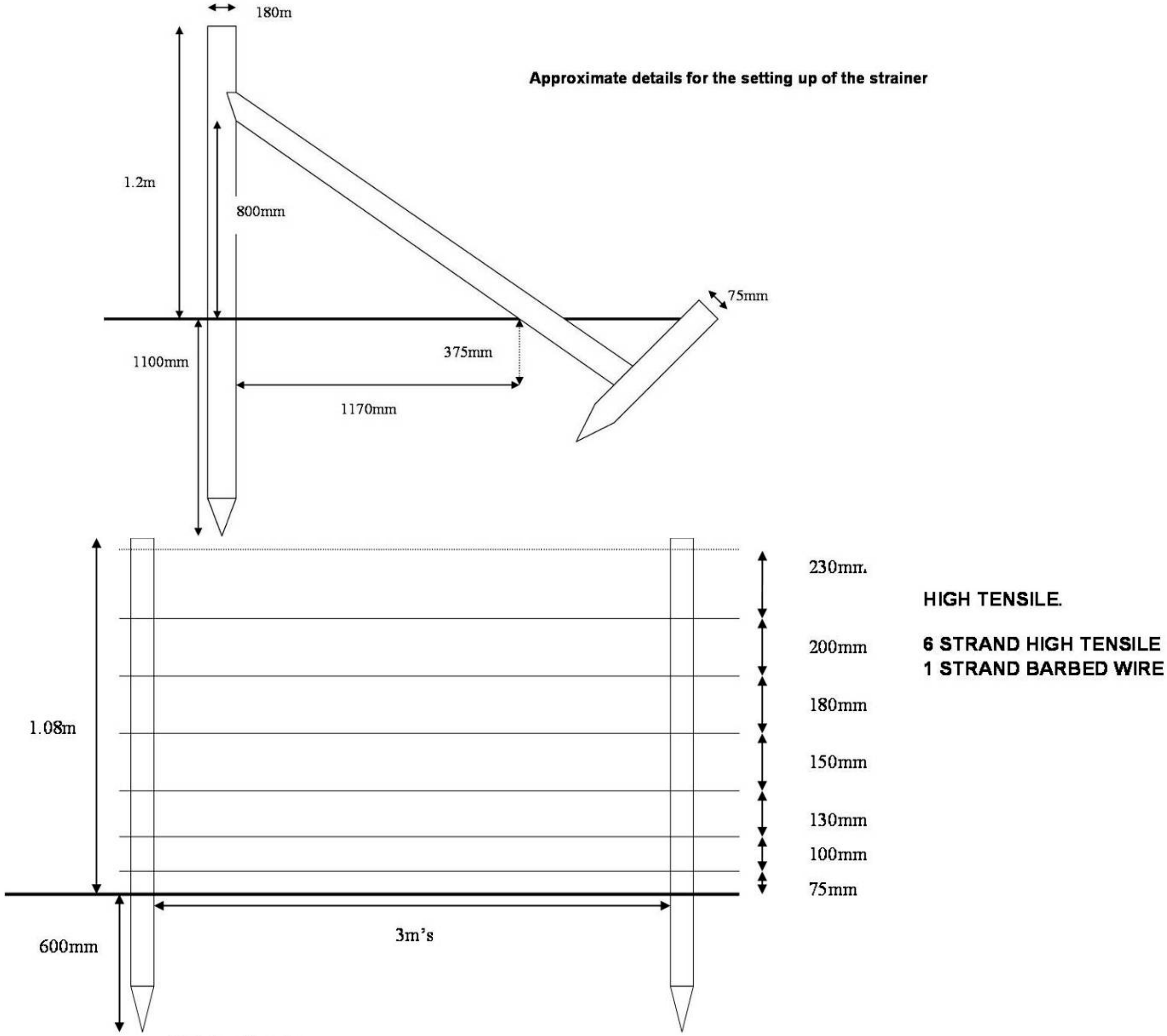
Appendix 1

Picture A. Hinged Willow.

Picture B. Partial cutting and laying of willow (like hedge laying) is a quick way of creating low cover which is firmly fixed to the stump and bank.

Appendix 2

Specification for buffer fencing



High tensile wire

- Shall not be less than 1.06m high from ground to top wire.
- Wire shall be galvanised (BS4102), 3.15 mm diameter.
- Straining Posts shall be 180mm minimum top diameter x 2.4m's to be driven into the ground.
- Strainers to be set at centres not exceeding 50m's.
- Turning posts shall be 155mm top diameter x 2.1m's. May be pointed and driven to 900mm into the ground.
- Struts shall be 120mm dia x 2.1m long and notched into the straining post at an angle no greater than 45 degrees. Allow two struts for strainer/turner where angle is less than 135 or one bisecting the angle where the internal angle is greater than 135.
- Intermediate post shall be 75 - 100mm dia x 1700mm to be driven to 450mm. To be set at no more than 3 m intervals.
- Galvanised steel radisseurs to be used to tighten strands.

On upland spate rivers it may also be beneficial to install additional straining posts to provide sacrificial sections that can be allowed to wash out in floods, saving the rest of the fence.

Appendix 3

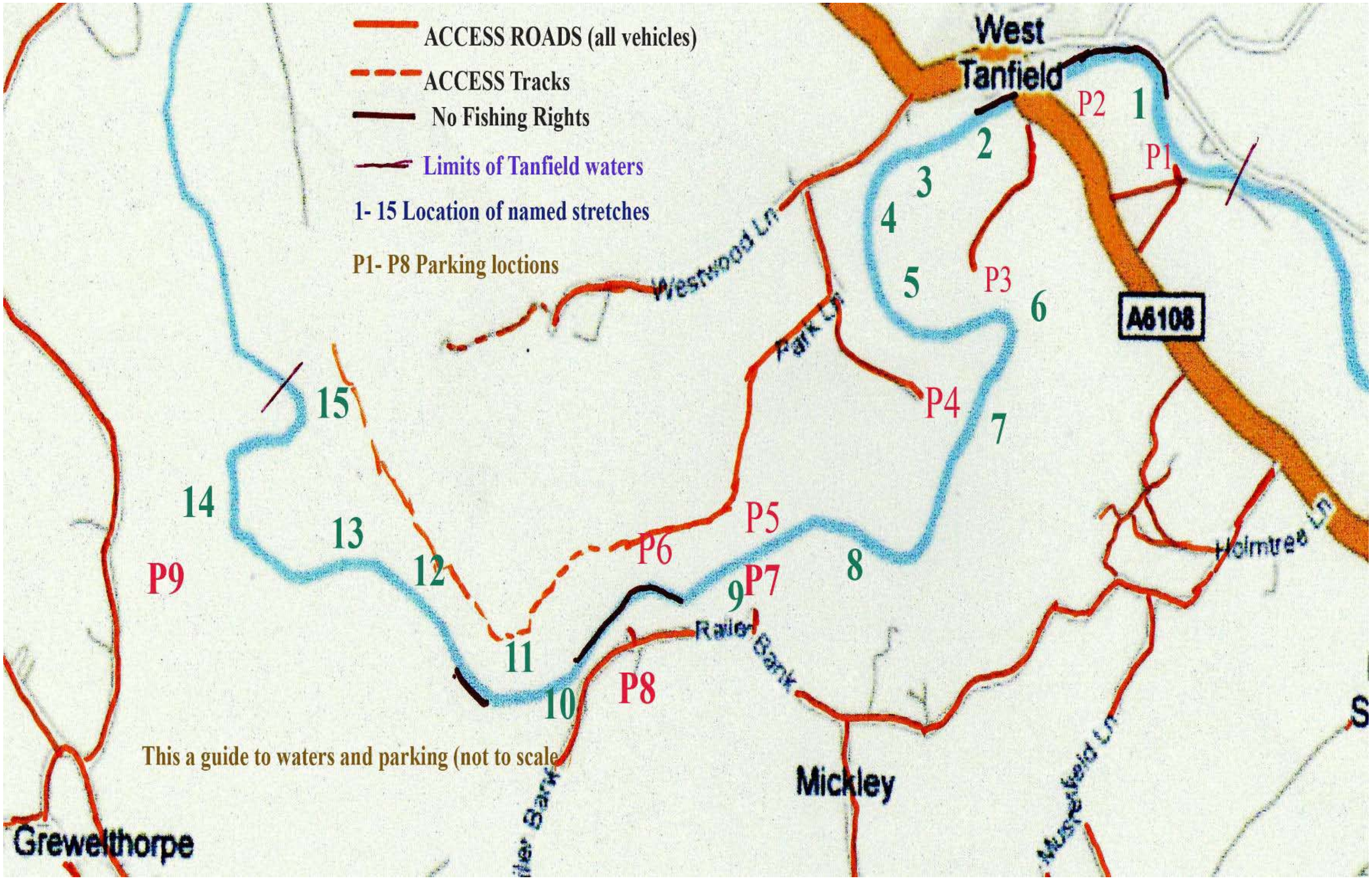
Picture C. A fish with an orange Visual Implant Elastomer (VIE) mark on lower jaw. This type of mark is injected just beneath the skin.

Picture D. A fish with a pale orange VIE implant on its belly.

Appendix 4

Picture E. Blue panjet mark at the base of the pectoral fin.

Appendix 5



ACCESS ROADS (all vehicles)
ACCESS Tracks
No Fishing Rights
Limits of Tanfield waters
1- 15 Location of named stretches
P1- P8 Parking loctions
West Tanfield
A6108
Westwood Ln
Park Ln
Holmtree Ln
Rails Bank
Mickley
Musterfield Ln
Grewelthorpe
P1
P2
P3
P4
P5
P6
P7
P8
P9
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15
This a guide to waters and parking (not to scale)

Appendix 6

Tanfield locations and parking

Fishing Locations

1	**Near Slenningford Mill**	P1
2	**Church View**	P2, P3
3	**Slee Gill**	P2, P3
4	**Hatchery**	P2, P3
5	**Rocky Stream**	P3
6	**Sow Dub**	P4 or P3 + wade
7	**Lowside deep**	P4 or P7
8	**Staveley Stream**	P4, P5 or P7
9	**Old Wives**	P5
10	**Mickley Weir**	P6 or P8
11	**Dead Mans Beach**	P6 or P8
12	**Quarry Stream**	P6
13	**Sandbed Stream**	P6
14	**Hack Falls**	P6 or P9
15	**Hell Hole**	P6 or P9
16	**Black Robin**	P6 or P9