Advisory Visit

River Nidd

27 September 2011

1.0 Introduction

This report is the output of a site visit undertaken by Gareth Pedley and Tim Jacklin of the Wild Trout Trust to the River Nidd on 27, September 2011. Comments in this report are based on observations on the day of the site visit and discussions with Michael Pattinson, Steve Anderson, John Shilcock, Keith Saunders and John Kerby of Nidderdale Angling Club (http://www.nidderdaleac.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.

1.0 Catchment overview

The River Nidd rises on the moors of Great Whernside in the Nidderdale Area of Outstanding Natural Beauty (AONB). The predominant geology in the upper catchment is Millstone Grit, which combined with the peaty moorland produces an acidic pH and characteristic brown stain to the water. The resulting low light penetration and relatively low nutrient content of the water are likely to limit aquatic plant growth on Nidderdale Angling Club (NAC) waters. Further South and East in the catchment the river becomes buffered by areas of Magnesian Limestone and species like water crowfoot (*Ranunculus sp*) that are absent from the NAC sections start to estabish.

The River lies within the Humber River Basin District (under the Water Framework Directive - WFD) and NAC's waters are contained within the WFD waterbody; River Nidd from Howstean Beck to Birstwith (GB104027068293), which is currently classified as being good status for fish.

Due to reservoirs in the upper Nidd catchment, and associated impacts of abstraction and impoundment, the river is classed as Heavily Modified and therefore assessed against Good Ecological Potential, rather than Good Ecological Status under the WFD. This is because it is not feasible to fully mitigate the impact of the upstream reservoirs without removing them. Further information on these waterbodies and their classification can be found at (www.environment-agency.gov.uk/research/planning/33106.aspx).

There are three reservoirs on the Nidd all lying within the upper catchment, the first being Angram Reservoir (outside of NAC's control). A short distance downstream of Angram the river enters the second reservoir, Scar House. The fishing here is controlled by the club and is currently operating as a successful wild brown trout (*Salmo trutta*) fishery, producing good numbers of fish from juveniles up to large specimens.

Downstream of Scar House the river flows east before losing flow down Manchester Hole where the water is carried underground until a point south of Lofthouse. The

river then continues its course in a south/south easterly direction towards the third and final reservoir, Gouthwaite. Again, the fishing here is not controlled by Nidderdale AC, but is of interest as it holds the only stillwater population of grayling (*Thymallus thymallus*) in the UK. These fish became cut off from the river when the reservoir was created for compensation flow to buffer river flows from the affects of abstraction in the reservoirs upstream.

Although the compensation was originally designed to protect mill abstractions down the Nidd Valley, and only operational when water was required for milling, it is now operated to protect the base flow of the upper Nidd and potentially buffers the river in periods of low flow. The water from the reservoir could also be of benefit if the current warm summers associated with climate change continue as the water is likely to be cooler than the ambient river temperature.

Below Gouthwaite Reservoir NAC controls most of the fishing for approximately 7 miles, from their upper limit (SE 14192 68216), to a point below Summer Bridge at Dacre Bank (SE 19955 61793). The fishing is predominantly double bank, but restricted to single bank in sections.

On the NAC controlled sections of the river there are several tributaries of suitable size and character for spawning and nursery areas. Adult fish from the main river are likely to run up these smaller tributaries late in the year when flows are elevated to exploit suitable spawning areas.

2.0 Fishery Overview

The club is in the enviable position of owning the majority of the 7 miles of fishing. This makes the club waters an even more valuable asset, with great potential for developing wild fish stocks with minimal impact from other angling interests.

Nidderdale AC currently manage the fishery under four different regimes, ***Unrestricted*** (bait fishing and taking fish permitted), ***Fly Fishing Only*** (taking fish permitted), ***Catch and Release*** (any method), and ***Fly Only Catch and Release***.

Club waters have historically been stocked with 1800 fish annually at considerable cost to the club. The 1800 fish were introduced in 3 batches of 600 at different locations and times during the season. This year stocking in the upper section did not take place, so only the 1200 fish in the middle and lower sections downstream of Pateley Bridge were stocked. These were a mix of diploid and triploid fish with the triploids dye-marked to see if there was any difference in performance. Steve Anderson commented that no difference had been observed, which is in line with studies undertaken on many other fisheries. There was a strong suspicion among many club members that only a fraction of fish stocked ever contribute to angler catches.

Club membership was said to be healthy and sits at around four hundred fulfilling the required quota.

3.0 Habitat Assessment

The river section of primary importance to this report lies between Gouthwaite Reservoir and Nidderdale AC's downstream limit at Dacre Bank. As the reservoirs prevent fish access further up the catchment any potential input to the fishery or improvements that can be made upstream are limited.

The River was walked in two sections that were chosen by committee members as being representative of the club waters:

- Wath Bridge (SE 14459 67729) to Pateley Bridge (SE 15726 65519)
- Glasshouses Bridge (SE 17116 64328) to the bend downstream of the first sewage works (SE 17837 63935)

Both sections had a similar range of management regimes and habitat types so will be assessed as one but specific issues will be identified and grid referenced.

Although the section of river directly below the reservoir river was not walked it is possible to surmise that habitat there will be compromised to an extent by a reduction in gravel supply and lack of peak flows that would normally clean and win new gravel from the bed. This increases the importance of habitat on the remaining accessible water.

The main river is a typical upland system with a relatively steep gradient, creating primarily riffle and glide habitat interspersed with some pools. This is due to the steep gradient of the valley resulting in high velocity flows, which encourage the river towards a straighter course with fewer slow deep bends. There was also an obvious history of channel maintenance in many sections with stone walled areas and flood banks that appeared to have been created from historic channel dredging. This combination results in much of the finer sediment being transported down stream, only accumulating around weirs and obstructions. As a result the bed material is many areas is dominated by cobble and boulder, with a lesser degree of gravel and fine sand. The gravels that were present within the main river channel tended to be clean but of a large diameter suitable only for larger fish spawning. There were some obvious exceptions to this where the river was impounded for long sections, which will be addressed later.

The cobble/boulder type bed provides suitable habitat for parr and adult trout, but often lacks the slower water required by fry, again increasing the importance of spawning and juvenile nursery areas on the tributaries. Of these tributaries the Dauber Gill is reported, by John Shillcock, to get a good run of trout in the lower reaches and be one of the prime spawning tributaries. It was also said to have an impassable waterfall c.500m upstream of its confluence with the main river and for

this reason it is recommended that work should be carried out on the accessible section to optimise its production.

Methods such as hinging and bending saplings and small branches down into the watercourse would greatly increase the level of aerial cover and protection from predators. Planting goat willow or sallow (*Salix cinerea and S. caprea*) shrubs, or whips along the waters edge would also help and provide future trees to work with. Installation of living willow or hazel (*Corylus avellana*) bundles staked to the bed or bank would also give similar benefits, increasing cover and protection for fry from both flow and predation. This would in turn improve the carrying capacity (number of fish that a section of water can hold), survival rates and retention of fish within the watercourse. These methods could also be applied in areas along the main river channel.

There were several notable impounded, slower areas present on the main channel, in most cases associated with human intervention. The obvious causes being the five major weirs present on NAC waters. Two of these were observed on the day, one at Pateley Bridge Caravan Park (SE 15520 65762), and the other feeding the millrace at Glasshouses (SE 16667 64635). These both result in long impounded sections upstream with little flow diversity or in-stream structure due to a loss of shallower areas.

Both weirs visited were assessed as major obstructions to fish migration, impassable to all but the largest trout in high flows and likely completely impassable to juvenile trout and grayling. The vertical ridge along the crest of the weir at Glasshouses further exacerbates the problem as shown below (Photo 1). Discussion with club members, and assumptions on the purposes of the other three weirs, it is likely that they too pose issues to trout, and particularly grayling migration.

Photo 1 – Weir at the top of Glasshouses mill race. The vertical step at the top makes a difficult weir impassable in all but very high flows. Small fish don't have a chance of ascending it.

Fish access to the appropriate habitat for their life stage could be greatly improved by fish passes or removal of the obstructions. Unfortunately, both of these options have issues and are likely to be very costly due to the scale of work required. There is also the issue that the weirs are likely to have historical significance to Nidderdale as part of the cultural heritage. That said it is still worth the club making contact with local EA fisheries officers to find out what their plans are for improvements to fish passage in the area. The structures are likely to be of medium/low priority currently as being in an heavily modified waterbody, with obstructions up and downstream, but it may be that they would be more likely to undertake improvements if the club had money to enter into a partnership project. This could potentially be the catalyst for creating at least an easement, if not a full fish pass.

Another impounded section of river is created where Foster Beck has been realigned and now enters the main river at ninety degrees to the flow (SE 15257 66426). Bed material deposited into the main river from the Beck has backed up the main river for a significant distance upstream. Again, creating over wide and deep areas by drowning out valuable shallower habitat.

Beneficial areas of low lying branches and low tree canopy often absent from other reaches were observed within the impounded reaches. It was considered that this may be due to the reduced wading in deeper areas and therefore less pruning activity for angler access. The high numbers of fish seen rising in these areas are testament to the benefit of low level aerial cover and it is highly recommended that similar low cover is retained and increased in other areas.

There was a general lack of large woody debris (LWD) within the channel, notably in the deeper slower sections where it would normally accumulate, but where present was also associated with obvious signs of fish (rising and fish visibly up near the surface). LWD naturally creates valuable variation in habitat capable of supporting a range of fish age classes (Photo 2 & 3). To retain valuable LWD in high flows it can be beneficial to anchor it to the bed or bank. Detail of how to achieve this can, along with other useful information on LWD and tree management can be found on pages 11-13 of the Upland Rivers Habitat Manual (Available on the WTT website).

Photo 2 – Woody debris created by a large tree trunk that protrudes across the channel creating good flow diversity and cover. Also note the good length of grass on the bank and good leafy tree cover over the water.

Photo 3 – Good example of smaller natural woody debris on the far bank. Healthy self set alder shrubs can be seen on the near bank, protected from livestock within the buffer fence. A contrasting lack of shrubs and larger vegetation can also be seen on the unfenced far bank.

Discussions with committee members confirmed that historically much of the woody debris has been removed from the river channel. This practice is often undertaken with good intentions, to tidy up the river and ease casting, but in fact removes vital habitat and should be avoided. Ideally all trees and branches that fall into the river should be left in place to increase flow diversity and provide cover. The same is true of living branches which hang low or trail in the river.

It is often argued that LWD in the channel and low/trailing branch cover should be removed or pruned to improve fishing as there is no point in retaining structure that renders the fish in the lies uncatchable. This is not the case: if the cover is so dense that a lie cannot be fished, the fish will invariably have to move out from that location at some point to feed. They may spend time in the cover, and will certainly return there when disturbed, but better to have the fish there and available some of the time than absent from the area due to a lack of cover. It is exactly this kind of cover that is required to support the larger fish and if it is removed most of the fish inhabiting that area are likely to leave in search of better habitat.

Most of the bankside and aerial cover on the river is provided by alder (*Alnus glutinosa*), willow (*Salix* sp.), sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), hawthorn (*Crataegus monogyna*) or rowan (*Sorbus aucuparia*), with alder making the majority. The tree canopy provides abundant cover with the roots offering vital bank protection and fish cover. Trees also provide a good source of terrestrial insects to the river for trout food and a safe haven for recently hatched aquatic species to rest and moult in.

The river has sufficient width in many places to allow light penetration from above, but judicious coppicing along the more heavily tree lined sections could increase the amount light reaching the banks and margins. This would also prolonging the life of old and sickly trees, and may help to retain trees that are in danger of falling in to the river. This would promote the growth of understory vegetation and allow the smaller saplings to establish, providing future bank protection and cover as the mature trees are lost.

Coppicing would be particularly beneficial in buffer fenced areas where stock can't get at the regrowth. Again, retention of low branches, particularly those trailing into the water, is paramount and coppicing work undertaken should avoid their removal where possible. Felled timber can be used to increase the level of woody structure within the channel by pinning along the bankside, or cabling the butt of the tree to the stump. This would provide all of the benefits of natural woody debris, but can be targeted in areas of lower flow diversity such as the slower impounded sections.

It is recommended that coppicing is only undertaken on a maximum of 20-40% of trees within a section in any one year to maintain a good number of mature trees for shade and to provide habitat for other wildlife. Once coppiced trees should not require further maintenance for a minimum of 10 years.

Another method that would complement the coppicing work is hinging. Smaller more supple trees and shrubs can be partially cut through and laid into the channel. This method is particularly effective with willows and sallows, and hawthorn but can also be used on smaller alders. The method works like laying a hedge, keeping the tree alive and well anchored in the ground. (See appendices for photos of coppicing and how to hinge willow)

It was noted that in several places, particularly RHB downstream of Foster Beck (Cover photo, SE 15342 66336) and particularly downstream of Glasshouses Bridge LHB (Photo 4, SE 17303 64272), the canopy of the bankside trees had been lifted through pruning and tree management. This, as with the management of woody debris, is something that can have a significant negative impact on the trout habitat and fish numbers within the river. By pruning the low lying and trailing branches most of the cover that trout require for shade and security is removed. Consequently, the habitat in that area becomes unfavourable to trout and often only capable of supporting low numbers of smaller fish. The larger fish often leave in search of better habitat. These areas could be drastically improved by low coppicing to encourage regrowth and replace the cover at water level.

Photo 4 – The tree canopy on the LHB has been lifted way above the river by pruning and provides very little in the way of cover for fish. Coppicing here would encourage low level growth again. Also, note the over grazing on the RHB leading to erosion and a lack of bankside cover.

The rule with tree cover and overhanging branches is generally the lower the better. Branches trailing in the water bring the added benefit of flow disruption and catching of debris that in turn provides further cover. A good example of low aerial cover can be seen in (Photo 5). If left uncut the branches will continue to grow out over the channel and should eventually reach the water creating valuable trailing and sub surface cover in the water.

Photo 5 – Low level aerial cover creating ideal trout habitat, particularly when adjacent to riffled water.

Much of the land use adjacent to the river was rough or improved pasture. This often leads to erosion, exacerbated by cattle poaching of the ground, but little was evident on the sections walked. It is assumed that this is partly due to the steepness of the banks deterring stock from the river margins and partly due to low grazing pressure, particularly cattle. It should be noted however that the heavily grazed areas were susceptible to erosion and provided little ecological value. The several sections that were exposed to higher grazing pressure also had a lack of tree cover. This can usually be attributed to a long history of grazing where the older mature trees die off and the new growth and self set shrubs are eaten off before they become established. This was particularly apparent in the second field downstream of Glasshouses Bridge (Photo 4), but a general lack of smaller trees was evident in many of the grazed fields.

Sections of buffer fencing were observed on the visit and the optimal scenario would be if stock could be excluded from more of the riverbank. It is suggested that where buffer fencing is undertaken stock should be excluded for the first 2-3 years to allow the self set shrubs to get established without grazing pressure. After this time it may be beneficial to allow light grazing in areas, but this must be carefully

managed as too high a stock density, or having stock on for even a couple of days too long can have a significant negative impact.

Areas where stock are excluded, like the buffer fencing around Meal Ark (Photo 6, SE14587 67350), had a much healthier and more diverse species mix. The rank vegetation they support not only provides better marginal cover for fish, but also benefits a wide range of other wildlife from invertebrates to small mammals and birds.

Well vegetated buffer strips create a valuable food bank for fish in the river supporting a wide range of terrestrial insects, and provide refuge for aquatic species emerging from the river. Planting of native deciduous species within the buffer strips would also be beneficial and if large enough areas can be fenced and planted may draw funding from the Woodland Trust.

It should be noted that management of invasive non-native species, such as Himalayan balsam, should be undertaken within buffer fenced areas to avoid problems of competition with the desirable native plants. Pulling up of the plants before they seed is hard work, but very worthwhile. Alternatively stock could be allowed on for a closely monitored, short period.

Photo 6 – Good growth of self set alder and long grass. In areas such as this it is important to tackle the Himalayan balsam so that it doesn't out-compete the other more valuable native vegetation.

If fencing is not possible the natural succession of self set trees and regrowth from coppicing work is likely to be targeted by sheep and cattle. It was noted that in areas with steeper banks some growth was sustained where stock pressure was low and the vegetation was able to grow over the river channel out of reach.

It is worth noting that Policy NE7 within the Nidderdale AONB Management Plan 2009-2014 (http://www.nidderdaleaonb.org.uk/PDF/ManagementPlan_2009_14WEB.pdf), included the aim of - "*working with owners and managers to reduce the intensity of agricultural management along river corridors and by targeted action against invasive non-native flora and fauna."* Within this was a specific action to "*Establish a Catchment Sensitive farming project in 2009*." The result being that much of the land adjacent to the river is now within stewardship schemes and potentially eligible for subsidy payments on land that they put into buffer strips. This provides a significant sweetener of payment to landowners for every hectare of land that they include within buffer fencing.

In addition, it is also worth checking with the Woodland Trust what support may be available for the capital costs of tree planting and the compensation to land managers for change of use. See www.woodlandtrust.org.uk/en/moretrees-moregood/Pages/home.aspx

4.0 Recommendations

4.1 Habitat

The level of management required along the main river should be specifically targeted and will in many cases come down to the less done the better. Random coppicing, undertaken on a long rotation could help increase light penetration, but all low level branches should be retained. Where the tree canopy has been lifted by grazing or pruning it is suggested that rotational coppicing is undertaken to encourage new low level cover. This would greatly benefit from being undertaken in conjunction buffer fencing to protect the regrowth.

It is proposed that all fallen trees, branches and other large woody debris are retained within the river channel. Where necessary these may require anchoring to the bed or bank, but could also be tethered/cabled to existing tree stumps (detail of how this can be achieved is available in the Upland Rivers Habitat manual on our website).

Tree planting would be beneficial on many sections of the river, particularly where there is little marginal cover. However the success of this is likely to be reliant on finding areas that are inaccessible to livestock.

It is advised that the potential for buffer fencing to prevent stock accessing the river is investigated wherever possible as this alone will increase the level of marginal cover, but also greatly improve the success of any other work.

Activity	Location(s)	Cost	Achievable by
Coppicing alders	• DS Foster beck confluence • Downstream of Glasshouses • Any areas where canopy has been lifted	Volunteer labour	NAC working party and assistance from members in the forestry trade
Laying alder and willow	• Various locations along the river wherever cover is limited	Volunteer labour	NAC working party
Bending and partially snapping branches into river	• Foster Beck • Dauber Gill • Various locations along the river where suitable limbs are present	Volunteer labour	NAC working party
Pinning bundles of willow and hazel	• Margins in sections of Dauber Gill and Foster Beck accessible to fish	Volunteer labour	NAC working party
Discussion with riparian landowners regarding Buffer fencing	• All areas not currently fenced	Club members (Ideally committee)	Time
Buffer fencing riparian zone wherever possible and as far back from the river as can	• Field DS Foster beck • Second field DS Glasshouses Bridge • Anywhere stock (particularly high	• Approximately £6/m	Contractor

be negotiated	densities) have access to the river bank		
Planting trees	• Inside bufferstrips	• Approx £750/acre	Contractor
Pulling Himalayan balsam	• Inside bufferstrips	Volunteer labour	NAC working party
Discussion with EA regarding improvements to fish passage	• All weirs	Time	Committee members

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.

It is also advisable that you contact your local EA area Fisheries and Biodiversity officers before undertaking any work as they should have records of any protected species within the area that you intend to work that require consideration. They will also be able to inform you if there are any associated restrictions applicable to the timing of the work.

4.2 Management – fishery rules

It is always encouraging to visit clubs that have already adopted wild fish sections, and catch and release within their fishery. This is the single best way of promoting wild fish stocks and allowing large fish a chance to become established, thereby improving sport and potentially protecting the beneficial genes for survival in the wild. These practices should be continued and extended wherever possible. To that end the upper section above Pateley Bridge would benefit from being entirely catch and release, along with continuation of the no stocking policy.

While club members still wish to take fish from the river it is recommended that the club continues stocking, at a reduced level, with marked fish, either panjet or adipose fin clipped. Anglers should be encouraged to complete catch returns (maybe by free entry into a prize draw for all completed returns). This should over time provide good catch return data of how many stocked fish contribute to angler catches, and how many are retained. The ability to distinguish marked stocked fish from wild fish means that the club could apply a rule whereby only marked stocked fish can be taken. This would protect the wild breeding stock and allow the wild fish to grow on to larger sizes.

The number of fish stocked currently stands at 1200, recently reduced from 1800 per annum. This is considered to be very high for the length and size of river to which they are introduced. Stocking at a high density not only reduces the potential for the fish stocked to find a niche but is also likely to increase the impact upon the wild fish population. For this reason it is recommended that the stocking rate be greatly reduced and potentially spread over more introductions.

It may be that if the number of people taking fish on the river reduces further stocking could cease. This could be an ideal situation for protecting wild fish and promoting larger specimens, but relies upon the vast majority of members embracing catch and release. Any money saved from the stocking budget could then be spent on fencing and habitat creation that would further benefit wild fish populations and improve the quality of fishing

Using infertile triploid stock fish is recommended to prevent interbreeding between native and stocked fish which has the real potential to reduce the abundance of native fish through the poorer survival of stock fish x wild fish hybrids.

5.0 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 an 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 fund the cost of labour (two/ three man team) and materials (max £1800). 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.

As NAC have technical expertise within the club and friendly contractors who can carry out the larger scale work it is suggested that the club is able to undertake much of the prescribed work through working parties. In addition to this, WTT staff are also contactable for help and advice. The WTT website has contact details for all

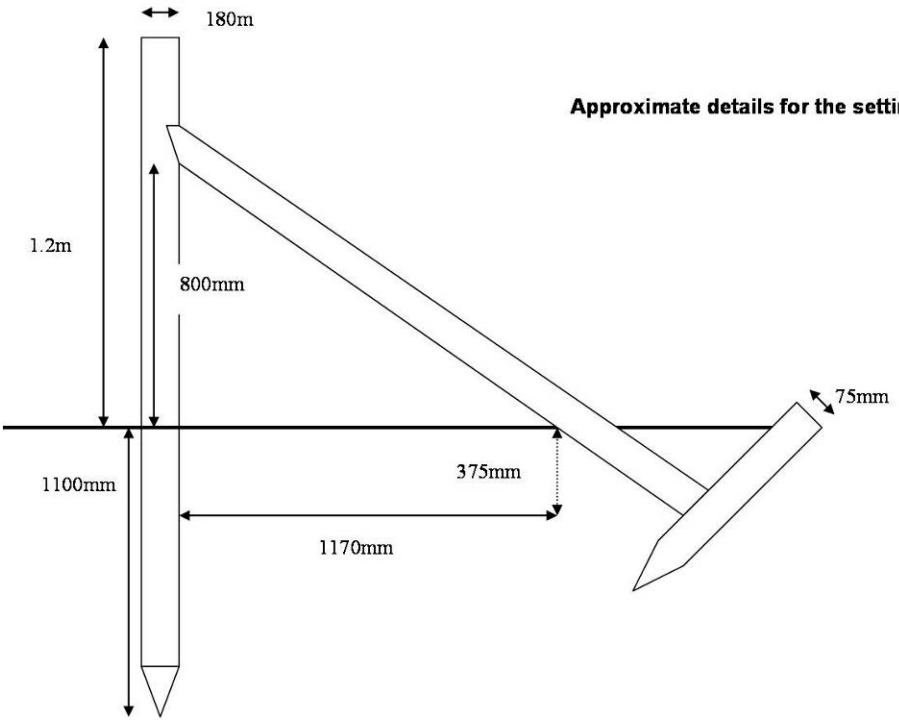
staff members and electronic versions of our habitat manuals which detail the habitat improvement techniques described in this report.

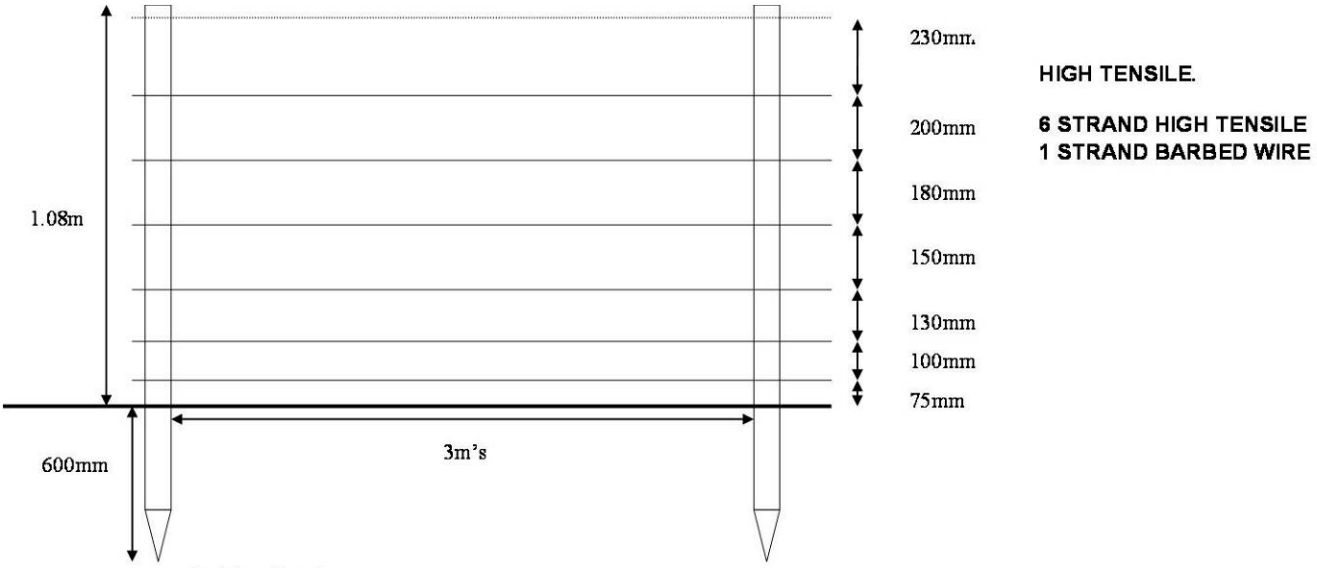
Acknowledgement

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

Disclaimer

Appendix 1 – Suggested design 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.

Appendix 2 Examples of habitat improvement techniques mentioned in the report.

- Examples of fencing projects – before and after

River Eden, Crackenthorpe, November 1998

River Eden, Crackenthorpe, July 2002

River Eden, Barrowmoor, October 1999

River Eden, Barrowmoor, August 2000

Pictures courtesy of Eden Rivers Trust

- Introducing low cover by laying willows

Partial cutting and laying of willow (like hedge laying) is a quick way of creating low cover which is firmly fixed to the bank. The willow should root along its length.

- Coppicing trees

Coppicing trees produces bushy re-growth which creates excellent low cover over the water (if protected from grazing) but doing it all in one go like this produces a uniform size of trees. Better to adopt a rotational coppice to increase variety. The lower picture represents 4 years re-growth (River Dane, Cheshire/Staffs.)