



**Walkover Assessment**

**River Rede**

**(Elishaw to Otterburn)**

**Northumberland**

**06/11/2018**



**Undertaken by Gareth Pedley**

## **Key findings**

- Unrestricted livestock access to much of the riverbank in this section and the associated impact on riparian vegetation and tree regeneration is a visible issue. There was a general lack of trees in many areas of the riverbank, which is in common with other areas of the River Rede. Many of the trees present are old or diseased.
- There is currently a positive impact from buffer fencing in some areas but in many it is now no longer functioning. In several areas, the type of fencing could potentially be improved upon.
- Throughout the section inspected there is a general lack of in-channel structure and limited woody material, which is undoubtedly influenced by the general lack of bankside trees.
- The weir at Otterburn is a major obstruction to fish movement for both up and downstream migration. This structure is a particular issue for juvenile salmonid dispersal and smolt emigration, but also undoubtedly impacts upon the timing of upstream adult migration.
- Despite the issues highlighted, some areas of the river are now starting to recover from the adverse effects of unsympathetic maintenance work carried out in the past.

## 1.0 Introduction

This report is the output of a walkover on the River Rede, which is a major tributary of the River North Tyne. The visit was undertaken on the 6 November 2018, on behalf of Groundworks North East and the Environment Agency, to provide a general habitat assessment and inform potential actions as part of the Revitalising Redesdale project.

Normal convention is applied throughout this report with respect to bank identification, i.e. banks are designated left bank (LB) or right bank (RB) while looking downstream. The Ordnance Survey National Grid Reference system is used to identify specific locations and references to upstream and downstream are often abbreviated to u/s and d/s for convenience.

The river was walked from the A68 road bridge at Elishaw (NY 85983 95068), d/s to the B6320 road bridge at Otterburn (NY 88840 92655). Photographs taken during the walkover are geotagged to provide accurate locations; the picture names are auto-generated via the camera software. As such, some photographs may not appear in the final report or may be used out of sequence.

## 2.0 Catchment/Site Overview

Under the Water Framework Directive, the waterbody (Rede from Bellshiel Bridge to N Tyne) is not classed as being a 'Heavily Modified Waterbody' (which is surprising considering the severe channel degradation in the section walked) and has been designated in good ecological status, being good or better for the parameters assessed.

### Classifications <sup>i</sup>

#### Cycle 2 classifications <sup>i</sup>

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Classification Item	2013	2014	2015	2016
Overall Water Body	Good	Good	Good	Good
Ecological	Good	Good	Good	Good
Biological quality elements	High	High	High	High
Macrophytes and Phytobenthos Combined	-	High	High	High
Fish	High	High	High	High
Invertebrates	High	High	High	High
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
Physico-chemical quality elements	High	High	High	High
Specific pollutants	High	High	-	-
Chemical	Good	Good	Good	Good

<http://environment.data.gov.uk/catchment-planning/WaterBody/GB103023075320>

### 3.0 Habitat Assessment



**Photo DSCN4939.** Looking d/s from the A68 road bridge at Elishaw. The RB is effectively buffer fenced with stock netting (NY 85985 95065 - NY 86137 94832). The plain wire fence on the left bank is completely ineffective at excluding livestock (NY 85985 95065 - NY 86152 94866).



**Photo DSCN4940.** The completely ineffective 2 stand plain wire fence on the LB. Note the significant accumulations of wool from sheep passing freely beneath the bottom wire.



**Photo DSCN4941.** A small, formal outfall on the LB just d/s of the bridge looks striking due to the iron oxide staining but appears to be a low volume and/or iron content (evident by the limited extent of the staining). The dilution factor when this enters the river means it is unlikely to create a negative impact.



**Photo DSCN4946.** Looking upstream: the first LB field appears to be cut for fodder, then aftermath grazed, with the sheep generally favouring the grass regrowth in the mown areas over the unmown, rank vegetation of the river margin. However, the browsing that is taking place along the riverbank in the absence of an effective fence is sufficient to be preventing natural tree regeneration and suppressing the development of much other than grasses. Sheep will generally preferentially browse saplings over even grass regrowth.



**Photo DSCN4948.** Durtrees Burn joins the Rede at NY 86158 94847. A short distance u/s on the burn, the A696 road bridge footings create small obstruction (NY 86213 94872). The obstacle is reduced by an accumulation of cobble substrate towards the RB, which is acting as a rock ramp easement. However, the shallow water and smooth concrete apron u/s do further reduce the passability of the structure in medium and low flow conditions.



**Photo DSCN4951.** Brief inspection of the Durtrees Burn u/s of the A696 revealed a predominantly cobble substrate that should offer good invertebrate and juvenile salmonid habitat. However, excessive quantities of fine sediment and algal growth appeared to be present on the bed. While this could be a result of a low flow summer, it could also indicate excessive fine sediment and nutrient inputs u/s and so warrants further investigation.



**Photo DSCN4953.** Suspected *Phytophthora alni* (a fungal disease of alder trees) was observed by the numerous dead trees on the burn and on the main River Rede, right from the u/s extent of this walkover.



**Photo DSCN4956.** High quality invertebrate and juvenile salmonid habitat was observed in the River Rede, both u/s and d/s of Durtrees Burn. Tree lining of the LB d/s of the burn provides additional habitat diversity and bank protection.



**Photo DSCN4957.** The RB is completely unfenced in the second and third fields d/s of the bridge (NY 86137 94832 - NY 86280 94573). Note the increased bank erosion occurring where there is less vegetation to protect and consolidate the bank. Also note the dead alders in the foreground, but some natural regeneration in the absence of any grazing.



**Photo DSCN4963.** The site of EA Otterburn flow gauging station. A good example of a gauging station with minimal impact upon river ecology. This site is a stark contrast to many stations found elsewhere which employ intrusive weir structures which inhibit sediment transport and fish movement, and generally degrade habitat quality u/s and d/s.



**Photo DSCN4972.** The third RB field is unfenced but appears to be used for fodder production (NY 86280 94573 - NY 86435 93963), then grazing. This again is encouraging preferential grazing in the mown areas; the limited protection to the bank provided by this is also dependent upon low stock density. Note the looming issue of tree loss along the riverbank, likely again in part due to *Phytophthora*, but exacerbated by the long term lack of tree regeneration. This creates an issues through the completely natural die-off of relatively short-lived (~150 years) species like alder.



**Photo DSCN4975.** The substrate of the River Rede through much of this section is relatively coarse in nature, even in the slower flowing areas, although they do appear to be accumulating fine sediment in periods of low flow.



**Photo DSCN4969.** The LB is completely un-grazed along the A696 roadside (NY 86152 94866 - NY 86364 94405), then buffered for an extended (>2.75km) section (NY 86364 94405 - NY 88107 93106: it should be noted that integrity of the fence was not inspected for much of this length). The initial section widens to ~50m in what appears to be a small field that has been relinquished into buffer strip (probably due to flood issues on the low-lying inside bend). This area could offer an excellent opportunity for native deciduous planting to extend an existing small area of riverside woodland (red ellipse).



**Photo DSCN4981.** High quality riffle habitat with gravel and cobble substrate – ideal for juvenile salmonids and the invertebrate communities upon which they feed. The areas of smaller, mobile substrate also offer potential for salmonid spawning.



**Photo DSCN4983.** Between NY 86435 93963 and NY 87145 93536, the right bank is buffer fenced with five strand wire fencing (4 plain and 1 barbed), which is a minimum standard to be sheep-proof and may be ineffective at excluding lambs. Seven strand plain (+ 2 additional barbed on top if cattle are present) is usually recommended. Efforts have been made to maintain the fence, as evident by replacement posts, but this area appears to be flood-prone and post and rail fencing may be more appropriate (as has been used in other areas).



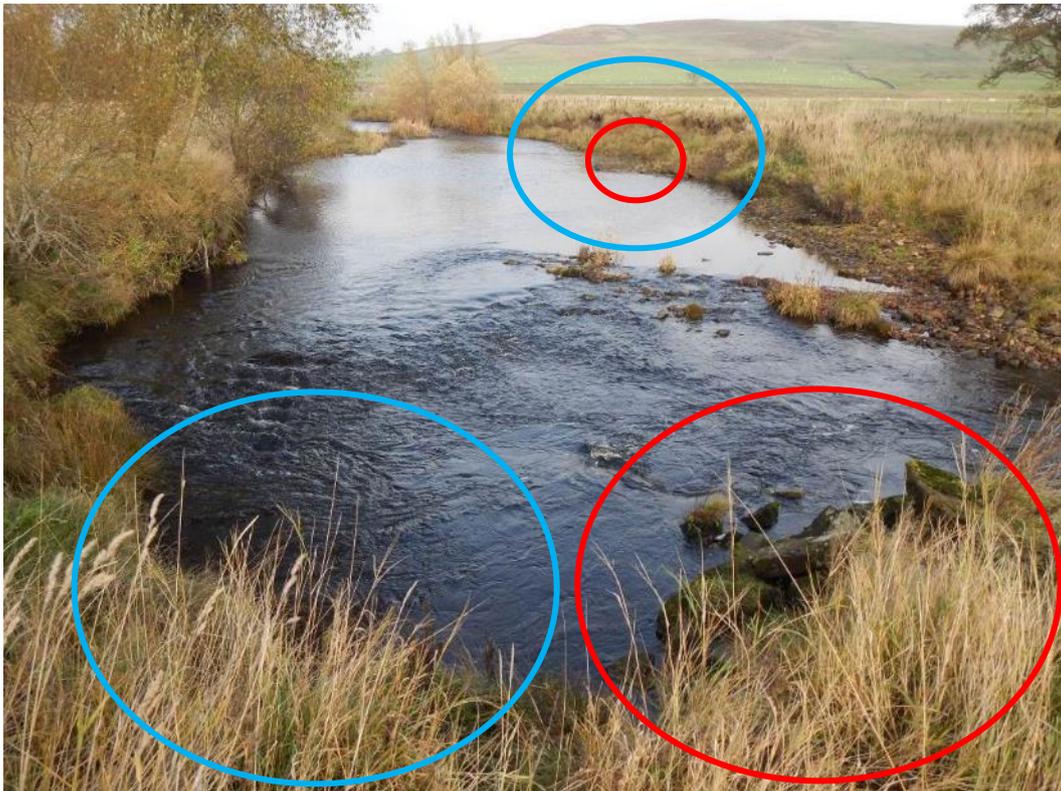
**Photo DSCN4984.** Generally scarce in-channel habitat provided by a toppled, but still living tree. This type of high quality habitat structure provides shade and cover in which fish can shelter from high flow and evade predators.



**Photo DSCN4990.** Good quality in-channel habitat, enhanced by willow trees along the LB which help to consolidate and protect the bank, driving erosive forces into the bed to maintain deeper pool habitat (background). Most of the trees present on the LB are relatively young, suggesting that it may have been unfenced for long periods previously and from which the trees are now recovering. Even so, they are generally only present along the bankline, with a lack of trees further back in the buffer.



**Photo DSCN4991.** Bank erosion, almost certainly exacerbated by the installation of rock to the channel a short distance d/s, which has increased back-eddying and scouring at the toe of the bank. A flood bank, set back from the bank top will also promote greater flow energy within the channel during floods which is also likely to increase erosion.



**Photo DSCN4998.** Around NY 86733 93783, what are suspected to be inappropriate cobble and boulder groynes (but could be the remains of attempts to protect the banks with rock) have been installed (red circles), which are greatly contributing to bank erosion and bank slumping (blue circles). The impact of the rocks in the foreground can be seen from an alternative angle in Photo DSCN4997.



**Photo DSCN4997.** While the erosion created by the rocks is relatively localised, and creates some additional channel sinuosity and habitat diversity (so creates no significant detriment to the reach as a whole), more sympathetic, green habitat improvements that replicate more natural features could have created a far better end result.



**Photo DSCN4995.** In many areas, sections of post and rail fencing have been installed (instead of the more generally used post and wire) to protect susceptible areas from flood damage. These appear to have worked but are now well into their effective lifespan and the top rails appear unable to withstand pressure from cattle, which were not observed during the visit but almost certainly caused the damage.



**Photo DSCN5009.** A potential spawning site, provided by the characteristic lift at the tail of the pool that salmonids favour. The range of graded substrate sizes here 10-60+mm is ideal for a range of fish sizes, from <0.5kg upwards. Note the lack of trees along the far (LB), both along the bankline and further back from the river. Additional overhanging and trailing cover would greatly enhance the spawning habitat (and habitat in general).



**Photo DSCN5013.** More valuable cobble riffle habitat: this area being suited to larger migratory fish - some of which were observed at the site.



**Photo DSCN5020.** Continuing around the bends in this more sinuous section of channel, valuable pools, riffles and glides provide a range of recovering, high quality juvenile and adult salmonid habitat.



**Photo DSCN5032.** For a short section, the river flows alongside a small coniferous plantation, where longer term exclusion of livestock has allowed recolonisation by a broader range of vegetation. Some deciduous trees have also established (or been retained) along the river's edge, which are helping to limit bank erosion (even though it is a relatively tight outside bend) to a natural rate and driving scour into the bed to create a deep holding pool for larger migratory fish.



**Photo DSCN5039.** The section d/s of the wood appears very uniform and over capacity. This may be associated with past dredging of the channel and what appeared to be a raised embankment along the LB. Again, note the lack of trees along the LB.



**Photo DSCN5047.** Trees at the bend d/s of the section provide good in-channel structure and help consolidate the bank, but many are now precariously close to being lost. The deep slow pool u/s is likely to interrupt sediment supply to this section which would certainly contribute to the erosion. If, as suspected, the pool was dredged historically, that rapid loss of sediment transport and interruption of d/s supply may have initiated the erosion, even though some sediment transport is now occurring (possibly on very high flows).



**Photo DSCN5045.** Fencing on the RB in the field d/s of the plantation is old and no longer stock-proof, with many posts now rotten and leaning (NY 87172 93348 - NY 87641 93245). Stock may be accessing the d/s end of the plantation from this field. Additional wire strands and/or stock netting (where appropriate) would better protect the buffer strip.



**Photo DSCN5055.** The fence in the next field d/s (NY 87668 93225 - NY 88143 92949) appears to have been in a similar state but has relatively recently been renovated with the replacement of many posts (red ellipses) although some rotten posts did appear to have been missed.



**Photo DSCN5070.** The fence in the next section d/s on the RB is in need of repair, ideally replacement (NY 88143 92949 - NY 88333 92714), and is falling over in several areas. The river has eroded laterally and undermined the fence, which has been replaced with a temporary section. By this point, the river is already impounded by Otterburn Mill weir and in-channel habitat is severely degraded for the river's native flow-loving species.



**Photo DSCN5066.** The LB is unfenced which is further exacerbating erosion issues (NY 88107 93106 - NY 88500 92965).



**Photo DSCN5076.** The field alongside Otterburn Mill Weir is encompassed by floodbanks (red line), suggesting an additional impact from the weir upon flooding. The first ~260m of the field is fenced but the majority d/s to the B6320 road bridge (NY 88333 92714 - NY 88841 92658) is unfenced, with the riverbanks suffering from severe erosion and slumping in many areas d/s of the weir.



**Photo DSCN5080.** Otterburn Mill Weir (NY 88575 92884) is a >1m stone sett obstruction that limits the timing and ability of fish to pass u/s and d/s. The impoundment degrades over 1.5km of habitat u/s and interrupts the river's natural sediment supply, contributing to channel incision and erosion d/s. This is particularly pertinent with reduced sediment supply and transport, as highlighted in various previous reports for the River Rede.



**Photo DSCN5078.** While not being a complete barrier to all fish, the weir is an obstacle to most fish, under the majority of flow conditions. As well as the impacts upon u/s fish migration and dispersal, numerous studies show that artificially impounded reaches can result in up to 80% mortality of emigrating smolts. This is aside from the general increased fish mortality experienced in the vicinity of any obstruction.



**Photo DSCN5081.** Channel incision, bank slumping and erosion d/s of the weir which is exacerbated by interrupted sediment supply through the impounded reach, coupled with livestock trampling and excessive grazing pressure. Note the sheep scarring not only weakens the bank but is preventing them from adequately re-vegetating, consolidating and re-grading.



**Photo DSCN5083.** A smaller weir, immediately d/s of the larger weir creates less of an issue and does ease access over the larger weir; however, with current understanding of the major detriment weirs create to riverine ecosystems and hydromorphology, all man-made obstacles should be removed from river channels wherever possible. However, it will be important to ensure that the main weir is removed first.



**Photo DSCN.** The LB is also unfenced d/s of the weir, to the B6320 road bridge (NY 88617 92886 - NY 88841 92658). The channel in this area provides some habitat variability but the river margins are severely degraded when compared to the buffer fenced sections upstream. Occasional trees provide better quality habitat locally but the area is notable underperforming, with excessive bank erosion and a lack of regeneration ultimately threatening the few trees that do remain.

#### **4.0 Summary**

Livestock access to riverbanks creates a potentially significant impact upon riparian habitat and riverbank stability. Even light sheep browsing pressure can result in a total loss of tree regeneration which then impacts upon the age and size structure of the riparian tree stock - ultimately leading to a total loss. Tree disease (*Phytophthora*) and even natural wastage therefore becoming much more significant issues. Similarly, even light sheep browsing can suppress herbaceous vegetation. This is why even aftermath grazing (through which some bankside vegetation is maintained) can still lead to a notable reduction in species and habitat diversity along a watercourse. Livestock exclusion with riverside buffer fencing is therefore an important aspect of river management.

In many areas the River Rede has been buffer fenced historically, but much of this fencing is now reaching the end of its workable life and is no longer stock proof. Sections of post and rail fence have been employed innovatively to reduce the susceptibility of sections to flood damage, but many of these are now in need of repair/replacement. Even short-term sheep browsing

pressure could set back their development considerably. Moreover, future fencing schemes could be enhanced by the addition of native tree planting and possibly wildflower/vegetation seeding. This is particularly true in some of the areas where a larger livestock exclusion area has already been afforded along the river.

The other significant issue observed is the long (>1.5km) reach of degraded river habitat u/s of the large weir. The lack of energy within the impounded reach to transport sediment, and the inability of sediment to easily pass the obstruction of the weir also adversely impacts the downstream reach.

The issues weirs create for the u/s migration of large migratory salmonids have long been accepted but the ability of fish to disperse and utilise the range of habitats required at different life stages is equally important. If they cannot, a population will have little chance of fulfilling its full potential (affecting both resident and migratory fish).

The significant delays incurred at weirs and impounded reaches by downstream dispersing parr and emigrating smolts makes them a far easier target for predation, as demonstrated by the artificially high aggregations of predators around such areas. Even short delays to migration may increase mortality and reduce natural production by preventing individuals from using optimum migration windows, as well as reducing their ability to find habitat appropriate for their size or life stage.

#### 4.1 Fencing and land management

Observation	Photo (If required)	Priority (1-3)	Location	Proposed action
Suitable stock fencing (RB).		3	NY 85985 95065 - NY 86137 94832	Ensure fencing is maintained.
Completely ineffective stock fencing (LB).		2	NY 85985 95065 - NY 86152 94866	Install appropriate buffer fencing to exclude livestock from the riverbank.
Lack of buffer fencing (RB).		1	NY 86137 94832 - NY 86280 94573	Install appropriate buffer fencing to exclude livestock from the riverbank.
Lack of buffer fencing (RB).		2	NY 86280 94573 - NY 86435 93963	Install appropriate buffer fencing to exclude livestock from the riverbank.

<p>Long &gt;2.7km section of buffer fenced riverbank (LB).</p>		<p>2</p>	<p>NY 86364 94405 - NY 88107 93106</p>	<p>Ensure fencing is maintained. Much of this section was not inspected due to the walkover being conducted from the other bank in this area. It should be ensured that the fence is stock-proof.</p>
<p>Old poorly stock-proof buffer fence (RB).</p>		<p>2</p>	<p>NY 86435 93963 and NY 87145 93536</p>	<p>Ensure fencing is maintained stock-proof and ideally replaced.</p>
<p>Old poorly stock-proof buffer fence (RB).</p>		<p>2</p>	<p>NY 87172 93348 - NY 87641 93245</p>	<p>Ensure fencing is maintained stock-proof and ideally replaced.</p>
<p>Old poorly stock-proof buffer fence (RB).</p>		<p>2</p>	<p>NY 88143 92949 - NY 88333 92714</p>	<p>Ensure fencing is maintained stock-proof and ideally replaced.</p>

Lack of buffer fencing (LB).		2	NY 88107 93106 - NY 88500 92965	Install appropriate buffer fencing to exclude livestock from the riverbank.
Lack of buffer fencing (RB).		1/2	NY 88333 92714 - NY 88841 92658	Install appropriate buffer fencing to exclude livestock from the riverbank.

#### 4.2 Other observations

Observation	Photo (If required)	Priority (1-3)	Location	Proposed action
Obstacle to fish movement.		2	NY 86213 94872	This is a low priority as obstructions go, owing to the limited impact; however, improvements could easily be made with the installation of baffles to increase the water depth over the footings and focus attraction flow.

Suspected fine sediment input on Durtrees Burn.		2	NY 86158 94847	Further investigation of the waterbody u/s.
Significant potential for planting (LB).		2	NY 86364 94405 - NY 88107 93106	The >2.7km long section of buffer fence area offers an opportunity for tree planting, with additional potential in the particularly wide section (NY 86372 94251 - NY 86654 93907) if the landowner is amenable.
Inappropriate in-channel structures/rocks.		2	NY 86733 93783	Ideally, these structures should be removed, although the erosion created means that they may well disintegrate if left alone. In-channel structures and/or bank protection should not be installed without seeking appropriate advice.
Major obstruction to fish movement.		1	NY 88575 92884	Options to remove both weirs at this location should be fully investigated, to allow natural fish movement and alleviate the degradation of >1.5km of river habitat u/s (and any impact d/s).

## **5.0 Making it Happen**

This type of walkover assessment is designed to identify the range and location of issues impacting upon selected underperforming watercourses. The accompanying report highlights potential solutions to the issues encountered and provide the supporting evidence for future projects and funding bids.

The WTT website library has a wide range of free materials in video and PDF format on habitat management and improvement:

[www.wildtrout.org/content/wtt-publications](http://www.wildtrout.org/content/wtt-publications)

We have also produced a 70 minute DVD called 'Rivers: Working for Wild Trout' which graphically illustrates the challenges of managing river habitat for wild trout, with examples of good and poor habitat and practical demonstrations of habitat improvement. Additional sections of film cover key topics in greater depth, such as woody debris, enhancing fish stocks and managing invasive species.

The DVD is available to buy for £10.00 from our website shop [www.wildtrout.org/shop/products/rivers-working-for-wild-trout-dvd](http://www.wildtrout.org/shop/products/rivers-working-for-wild-trout-dvd) or by calling the WTT office on 02392 570985.

## **6.0 Disclaimer**

This report is produced for guidance; 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 guidance made in this report.