Pont and Blyth Investigation

River Blyth – from Ogle Burn to River Pont

(Waterbody ID - GB103022076910)

Dates – 12/04/12

1.0 Introduction

This report is the output of a site visit undertaken by Gareth Pedley of the Wild Trout Trust on 12 April 2012 to the River Blyth, between Ogle Burn and the River Pont. Comments in this report are based on observations on the day of the site visit.

Normal convention is applied throughout the report with respect to bank identification, i.e. the banks are designated left hand bank (LB) or right hand bank (RB) whilst looking downstream. Location coordinates are given using the Ordnance Survey National Grid Reference system.

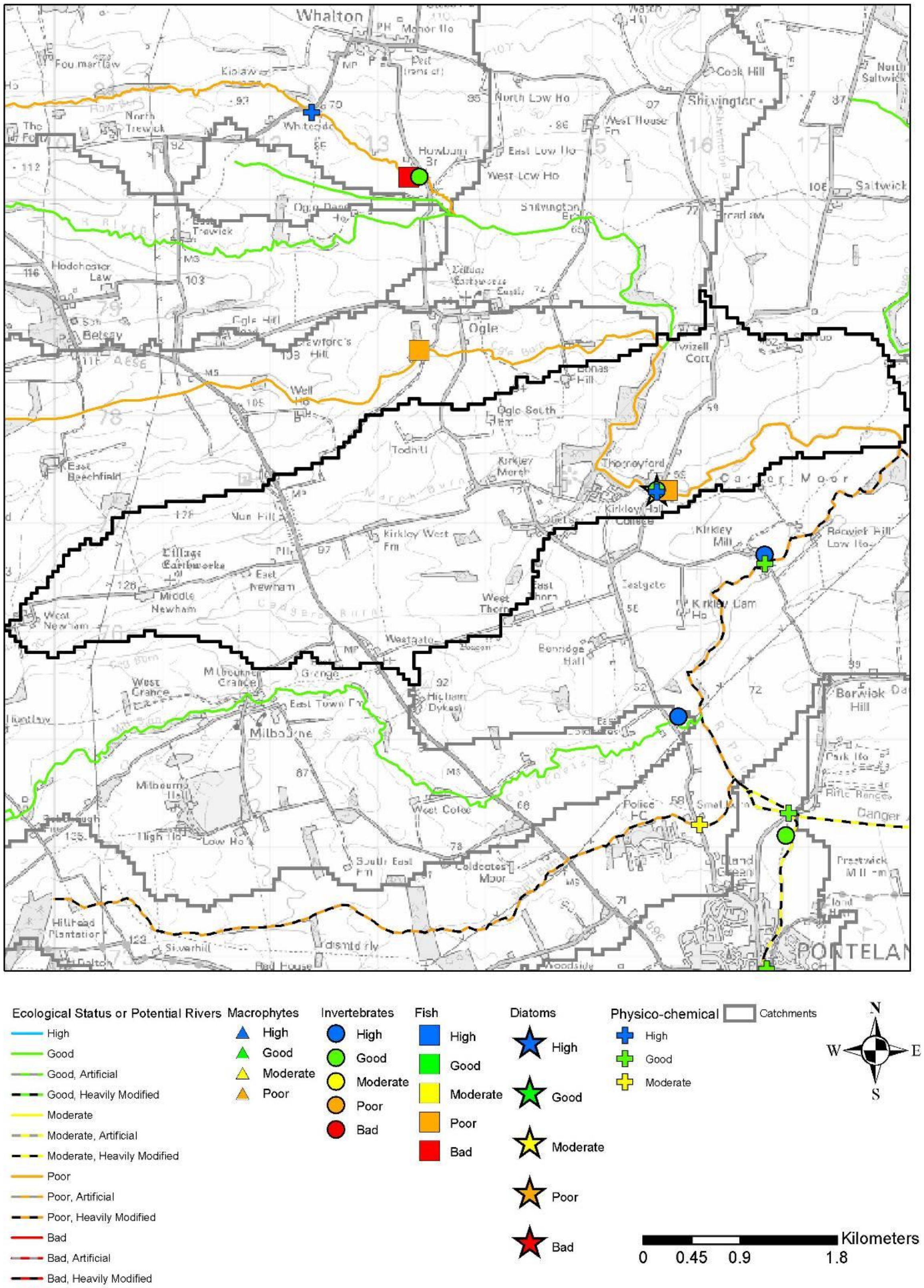
The walkover assessment was undertaken on the River Blyth from its confluence with the Ogle Burn (NZ1564378628), following the course of the river downstream to the River Pont (NZ1784977692).

The waterbody has been assessed as poor for fish under the Water Framework Directive (WFD) classification which suggests that less fish are present than would be expected.

This report will aim to assess the suitability of habitats for fish within the waterbody, identifying pressures and possible mitigation measures that can be undertaken to improve habitats.

A map showing the extent of the waterbody and brief detail on its WFD designation can be found on the next page.

Ecological Status or Potential for GB103022076910



2.0 Habitat Assessment

The assessment of this waterbody can be broken into two sections based on the issues encountered. The upper section is defined as Ogle Burn to Thorneyford Road Bridge, and the lower section, from Thorneyford Road Bridge, downstream to the River Pont.

2.1 Upper section - Ogle Burn to Thorneyford Bridge (NZ1564378628 - NZ1559777286)

The upper section of this waterbody flows within a shallow gorge and exhibits a range of high quality habitat, with a natural pool and riffle sequence supporting a balance of substrate size and type (Picture 1). The river channel ranged in width, from around 4-8 metres, usually in the 5-6 metre range.

In most areas the river flows through or alongside woodland, where a natural deciduous tree cover provides a balance of light and shade, structure within the channel, and a readily available source of woody material to the watercourse (Picture 2).

Picture 1. Good juvenile salmonid habitat, provided by shallower water over gravel and cobble substrate. The wider channel in this section is in major contrast to the over deep and narrow, dredged sections, with a lack of natural substrate range at the lower end of this waterbody.

Picture 2. The tail of a pool, flowing into riffle (c.6-7m wide), with beneficial LWD dam in the background. The dam is providing flow diversity, cover and scouring of the river bed.

Although the upper section of this waterbody was generally in good condition, some issues were encountered. There where obvious erosion problems resulting from unrestricted stock access to the riverbank at the upstream limit. The problem also continues upstream into the adjacent waterbody (Picture 3). This is leading to a loss of land and increased siltation of the watercourse. Some attempts appear to have been made to inhibit the rate of erosion by planting willows in the areas worst affected. Again, stock access and grazing/browsing is likely to reduce the efficacy of any living bank protection.

Other than stock access and erosion issues the channel was in reasonably good condition, particularly for this catchment, with no obvious signs of dredging and a limited, natural level of incision within the banks. Major improvements could still be achieved by simply excluding livestock from the riverbank around the upper limit with a buffer fence. Once installed, further benefit could be gained through additional planting of native shrubs, particularly willow/sallow (*Salix* spp.) whips. These can be pushed straight into the eroding areas of bank, to increase cover and bank protection.

Picture 3. Erosion in the field at the upper limit of this waterbody. Willow in the centre of shot appears to have been planted as bank protection and is providing some benefit, but suffering from grazing. Buffer fencing would greatly improve the situation here.

The erosion issues highlighted, and other sources of sedimentation further upstream producing the high levels of turbidity on the day, are contributing to a degradation of the substrate quality throughout. Even in areas of high flow velocity and shallow water depth the substrate contained a high silt loading (Picture 4). Consequently, in many areas where salmonid spawning substrate was present it was compromised, and likely to yield poor fry emergence.

Although most areas were buffer fenced there were areas in which the fence has fallen into disrepair. If these fences can be maintained, the healthy bank-side vegetation and bank stability can be protected (Picture 5).

One potentially significant discharge was identified within the upper section in the area of Kirkley Hall College. It is advised that the quality of this discharge should be investigated, as it appeared to have a high organic component, with a strong sewage odour (Picture 6).

Picture 4. Heavily silted gravels, as demonstrated by the silt plume liberated from the riverbed by shuffling. This action also revealed that the bed was compacted and not easy to move through the fine sediment, further reducing its suitability as salmonid spawning substrate.

Picture 5. An area of unmaintained fence where sheep appeared to be escaping. Wool attached to vegetation outside of the fence appeared to confirm this issue.

Picture 6. Discharge to the river that appeared to have a high organic content and was producing a significant 'sewage odour'.

2.2 **Lower Section** - Thorneyford Road Bridge to River Pont (NZ1559777286 - NZ1784977692)

The landscape of the lower section was in stark contrast to that of the upper, with the river flowing through a wider corridor and shallower gradient. The adjacent land use was predominantly arable farmland at the upper end of the section, with occasional grazing, increasing towards the downstream limit.

Buffer strips were in place for much of the upper two thirds of this section, which hosted a range of rough vegetation and beneficial habitat features, including shade, cover, and flow diversity/turbulence. The vegetation provided significant bank protection, with erosion generally limited to the sharpest bends. Some areas of bank side trees were present, predominantly willow shrubs and alder (*Alnus glutinosa*), also providing valuable habitat and bank protection (Picture 7).

On a river with natural geomorphology the habitat present in this section would ordinarily provide a high proportion of the features required for a healthy salmonid river, if a little lacking in low level cover. In this case however, as in many areas of the Blyth catchment, the channel is subject to significant historical maintenance.

Picture 7. Willow on the far bank, providing flow diversity, cover and bank protection.

Much of the river below Thorneyford Road Bridge has been dredged, incising the channel within its banks (Picture 8). The river has also been straightened in several areas, particularly around NZ1640177583, and the bottom field of the reach around the Pont confluence (NZ1784977692, Picture 9). This has reduced the prevalence of natural channel features and the range of substrate expected, somewhat limiting the availability of fine gravel.

However, the extent of this maintenance in most of the upper two thirds does appear to have been less than in many other Pont/Blyth waterbodies. This is primarily attributable to two factors, the original extent of straightening and dredging being less, and the generous width of buffer strips allowing natural channel adjustment.

It may also be that due to relatively un-impacted section directly upstream, and steeper, narrower valley, a greater supply of bed material has been available to replenish some of the material lost from the dredged section. The result is that although straightened and incised, the channel appears to be naturally recovering, to a degree. A range of substrate was present within the channel, although a lower than expected presence of suitable salmonid spawning substrate (5-50mm dia.) was observed. This is likely to be a combination of the reduced presence/supply (through dredging), and the incised channel being less conducive to the accumulation of finer substrate. This is often an issue on deepened channels constrained within high banks, as peak flows are unable to spill out into the flood plain, causing increased scour of the bed and mobilising the finer materials downstream from the riffle areas.

Picture 8. The first area in which the river channel was significantly incised. Dredging spoil was evident at the top of the LB.

Picture 9. The current, straightened river channel is visible in the foreground (flowing right to left). To the right of shot (in the background) is the upstream end of what was originally a meander, that would have joined the relict channel to the left of shot (in the background), probably via a short section of the current channel (centre shot foreground).

The other significant issue encountered in this section was overgrazing and poaching by livestock, as can be seen in pictures 10-12. This was encountered in the lower section of the river, from NZ1651177685 on the RB, and NZ1666877912 on the LB, from which point buffer livestock had access to the river. The impact was immediate and the level of erosion went from a low level, predominantly on the outside of sharp bends where natural adjustment was occurring, to major erosion and sedimentation for long sections of river (Picture 10 & 11).

Picture 10. Little or no erosion on the un-grazed RB where healthy levels of vegetation are present (right of shot). Serious erosion is occurring in the un-fenced fields (foreground and background).

Picture 11. Again, very little erosion is occurring in the background where the river is buffer fenced, but immediately outside the fence major erosion is occurring due to over-grazing and livestock poaching (foreground, right).

Cattle crossing areas and watering points are causing major erosion and siltation issues (Picture 12). If stock access to the river could be restricted to one area of the riverbank per field, where formal drinking areas could be provided, the river bank would be much less susceptible to erosion. This would be a vast improvement on the current scenario where stock have unrestricted access and are accessing the river in multiple areas of each field. It is important to note that the damage is not restricted to the side of the river in which the buffer fencing in absent, as cattle are clearly crossing the river to exploit grazing within the fence on the other side (Picture 13).

Where soils are light and friable, as is the case here, simply the prior loss of varied species vegetation and the associated root mass can be enough to allow erosion to start. When this is coupled with damage from cattle poaching the problem is vastly exacerbated and large areas of land can be lost in a short period (Picture 13).

Picture 12. Cattle crossing point that is facilitating increased erosion of the river bank. The bare earth, here and disturbed ground will also be increasing the rate at which sediment is washed into the river during wet conditions.

Picture 13. Erosion that has been seriously exacerbated by grazing from livestock that have crossed the river from the unfenced bank. The buffer fence is restricting access from one bank, but not the other.

The knock-on benefit of double bank buffer fencing would be enhancement of habitat that the vegetation and marginal cover would provide, allowing the channel to adjust to a more natural width. Without grazing pressure self-set shrubs and seedlings are also likely to become established over time, and the potential would also be created for additional planting within the buffer strips.

This would lead to the more beneficial scenarios seen in pictures 14 and 15, where established trees provide a wide range of habitats and bank protection. Some land management within the buffer strips would still be required to reduce the risks posed by invasive species, and to prevent the development of a vegetation monoculture. This may be achieved by very low intensity periodic grazing, but this is unlikely to be required for at leas 3-5 years, to allow establishment of the beneficial shrubs and herbage.

Where mature trees are present, management options, such as coppicing and pollarding are also advisable, to increase low level cover and provide large woody material to be installed within the watercourse.

It is recommended that these techniques are employed on selected trees among the stands of mature trees throughout this section of the waterbody.

It is important that this is not done to excess, and coppicing one trunk out of a group of four or more, would be sufficient to encourage some low re-growth and provide a large log that could be anchored to the stump or jammed between the remaining trees as a kicker.

The further management option of hinging is available, where young supple tree species are present. This method involves partially cutting the trunk of the tree/shrub and then pushing it down over, or into the watercourse. By leaving the trunk attached to the stump, the tree will be retained in place and will remain alive, providing even greater cover through continued growth, in a similar way to laying a hedge.

More detail on this and other habitat improvement techniques can be found in the physical enhancements section of the Wild Trout Trust Website.

(http://www.wildtrout.org/images/PDFs/Upland_Manual/uplands_section5.pdf).

If these techniques are employed, natural scour and deposition can be encouraged, facilitating naturalisation of the channel, reducing uniformity and increasing the range of width and depths. Greater heterogeneity of the channel will encourage formation of a more natural pool and riffle sequence.

Picture 14. A group of alder trees representing a prime opportunity for coppicing and installing tree kickers to increase low level cover and structure within the dredged channel.

Picture 15. Bank side willows and hawthorn on a dredged and straightened reach that could be employed to greatly increase in-channel structure and low level cover by hinging some trunks into the channel.

3.0 Recommendations

The upper section of this waterbody was generally in good condition and requires little attention (other than where stated below), the lower section is subject to much greater modification and requires a greater degree of remediation.

3.1 Sediment Reduction

The first issue that has to be addressed before any serious improvements can be made to wild salmonid production on this waterbody is sedimentation, particularly from sources upstream. It is understood that such issues are being tackled in conjunction with the Northumberland Rural Diffuse Partnership, and this will be pivotal to future improvements on the river, particularly for improvements to substrate quality.

4.2 Buffer Fencing

Buffer fencing would be beneficial in all areas where stock have access to the riverbank. This is primarily an issue in the first field, at the upstream limit of the waterbody, and at the fields at the downstream end of the lower section.

4.3 Tree management and planting

Tree planting should ideally take place throughout the whole of the lower section of this waterbody, as there was a general lack of marginal tree cover. It is recommended that as a bare minimum, willow whips could easily be planted along the waterline at regular intervals. Where livestock have access these are likely to be eaten and it is suggested that buffer fencing should be undertaken before planting is attempted. Planting of other types of tree-guarded shrubs would also be beneficial along other areas of the bank, within the buffer fencing.

Random coppicing would also be of great benefit throughout the lower section, where trees are present, to increase the low level cover and provide material for in-stream structures.

4.4 In-stream Structures

Although well-placed trees will provide some flow variation, the extent of the dredging and straightening on the lower section of this waterbody has left the channel so deep and over capacity that it will be beneficial to artificially restrict the channel in areas.

Several options for achieving the desired narrowing exist but it is recommended that more natural techniques will be the most appropriate, due to the lesser extent of human modification in this waterbody. Methods like introducing LWD into the channel and creating tree kickers from some of the existing mature trees would greatly enhance cover and flow diversity. Staking living willow bundles into the river margins would also work well. These can be either paired, or alternating, to create pinch points and meanders within the channel, also helping to encourage channel adjustment.

4.5 Gravel reinstatement

It may also be beneficial to reinstate/improve some riffles throughout the lower section of this waterbody. It was not possible to fully assess the extent of gravel on the river bed, due to the level of turbidity, instead spot checks were undertaken that seemed to indicate a lower than expected presence of salmonid spawning substrate. This could be addressed to an extent through gravel riffle creation. Widening of some areas in which gravel can be introduced would also help with retention of the new bed material, but care should be taken to over-widen the channel, which would leave it susceptible to sedimentation. A reference of the appropriate width could be taken from areas in the upper section.

4.6 Pollution

It is advised that the discharge around Kirkley Hall College (NZ1515577459) should be investigated as it appeared to be of a high organic content and a distinct sewage smell was apparent in the area of the pipe. This issue could be leading to negative enrichment of the watercourse downstream.