**Pont and Blyth Investigation**

**River Pont - from source to Fenwick Burn**

**(Waterbody ID - GB103022076850)**

**Date 07/03/12**

## 1.0 Introduction

This report is the output of a site visit undertaken by Gareth Pedley of the Wild Trout Trust to the River Pont on 7 March 2012. 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.

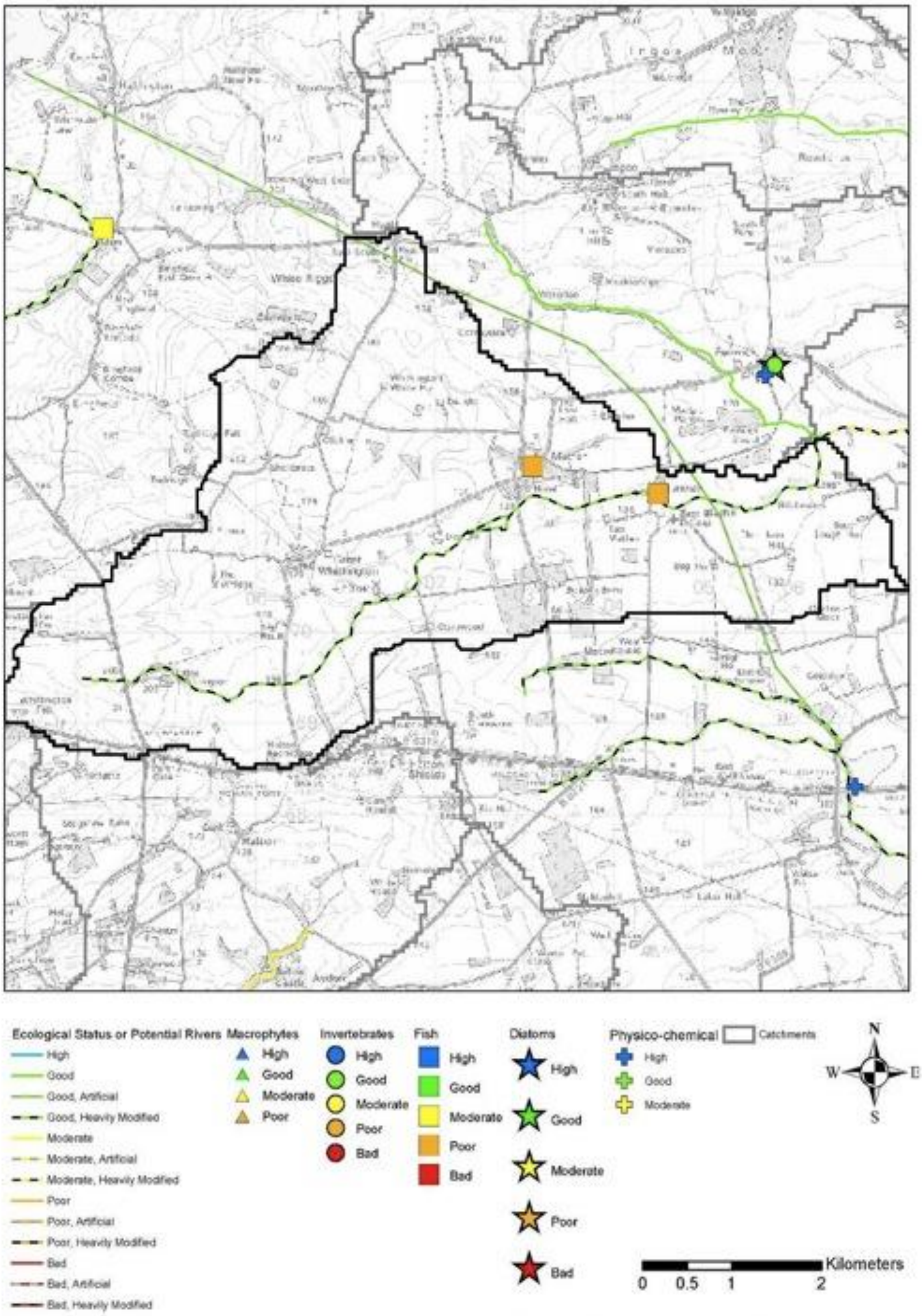
The walkover assessment was undertaken from the upstream limit of the waterbody, starting at the source (NY9724069785), following the course of the river to the downstream limit at Fenwick Burn confluence (NZ0586572276).

The River Pont from source to Fenwick waterbody has been assessed as moderate 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 GB103022076850

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## 2.0 Habitat Assessment

The River Pont forms in the fields to the West of the A68, near Pont Head Covert. The watercourses forming the Pont are little more than field drains, but the adjacent land use creates a high sediment input. The problem is exacerbated by dredging that has been undertaken for significant lengths of the watercourse which now flows over a highly erodible, earth bed.

In this area the river is too small to support salmonids, but should provide suitable habitat for valuable invertebrate species that contribute to downstream populations. The banks are very open, lacking in cover from anything other than grasses and reeds. A few mature trees are present in areas, but long reaches devoid of any substantial cover were common.

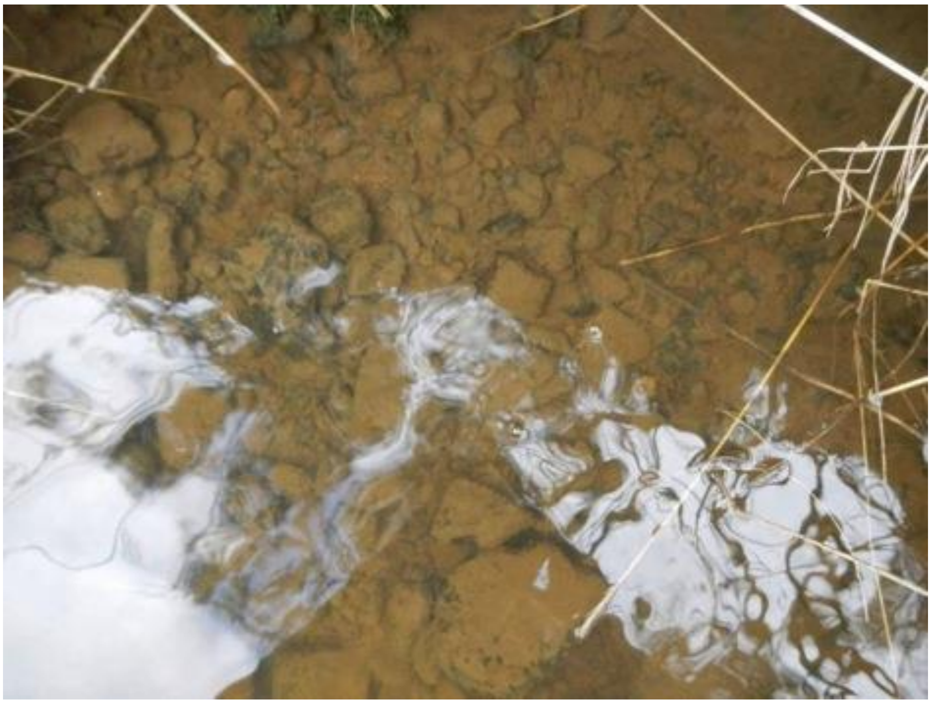
**Picture 1. Dredged, straightened and incised river channel, with a lack in tree cover and the bank protection they provide. Erosion scarring from sheep can also be seen, with the bare earth further contributing to sedimentation of the watercourse.**

The unrestrained livestock access to the water is also resulting in multiple crossing points, which also vastly increase the sources of sediment (Picture 2). Buffer fencing would greatly reduce the sediment input from this area, although some would still be inevitable, due to the dredged, earth bed.

**Picture 2. Livestock crossing point and sheep erosion scarring (NY9841769500).**

**Picture 3. Typical of the habitat between the A68 and the gorge c.250m downstream.**

Downstream of the A68 the substrate of the river is more natural, with some gravel beds and aquatic vegetation becoming established. However, the serious sediment loading from the short, upstream length mean that even if present, salmonids would not successfully spawn (Picture 4). Discussion with a farmer revealed that although perennially wet historically, this section has dried up over the last few summers, and in general, appeared to carry less flow than previously.



**Picture 4. Heavily silted gravel and cobble substrate, as was common throughout most of this waterbody.**

c.250m downstream of the A68 the river enters a deep, steep sided, wooded gorge, flowing over bedrock shelves (Picture 5). While these shelves were not impassable to salmonids they would be a significant behavioural barrier, only passable in certain flows.

Within the gorge were numerous pools capable of supporting juvenile salmonids, but as the section is known to dry up and further investigation downstream revealed impassable barriers, it is unlikely that there are any present.

The gorge opens out into unimproved pasture at the downstream end, where a farm access track crosses the River. This is also a significant sediment source in wet conditions (Picture 6).

**Picture 5. One of several bedrock steps within the gorge.**

**Picture 6. Farm access track over the River, which provides significant sediment input (NY9903269621).**

The first two fields below the gorge were grazed by horses, which had unrestrained access to the watercourse in many areas, although gorse bushes along the bank did provide some protection. Where they did have access heavy poaching and sedimentation of the watercourse were observed (Picture 7). Various cased caddis

(Trichoptera) were observed on the bed in this area, indicating that other than sediment, the water quality was reasonable (Picture 8).

**Picture 7. Poaching and sedimentation through horse access to the watercourse.**

Downstream of the second horse field the river valley opens out further to a much wider floodplain. Land use remains unimproved grassland, with sheep and possibly cattle grazing, rather than horses, but similar issues occur, with unrestricted access allowing livestock to enter and cross the River at multiple points, each causing erosion and sedimentation issues.

At this point (NY9933469377) the first of two major barriers were observed, a large ponded area of the River, created by a pipe dam (Picture 9). This creates a vertical drop of c.60cm, with no depth below, making it impassable to all fish species. A short distance below this was a second sluice structure, which is no longer in operation, but is also likely to have created a barrier to fish passage (Picture 10).

**Picture 8. Cased caddis flies on a riverbed cobble.**

**Picture 9. Pipe dam (c.60cm) creating a complete obstruction to fish passage. The downstream end of the wooded gorge can be seen in the background.**

**Picture 10. The remains of an old sluice, the walls of which were >120cm and is likely to have created a barrier to fish passage when in operation.**

At NZ9968269262 another very small tributary joins the Pont, almost doubling its size, and at this point the first starwort (*Callitriche stagnalis*) is observed. The increase of aquatic vegetation within the River will be beneficial for invertebrates, providing food and shelter.

At the following field boundary downstream (NY9987169423) another small tributary joins the River. From this point major dredging and straightening of the River occurs (Picture 12), which continues for nearly 1500m. Through this reach there is little cover or flow diversity and the habitat is greatly degraded for all fish species. Some small bends were present, between straights, but nothing that would create a significant natural pool. Where dredging is less extensive, some of the natural cobble substrate remains, but nothing of a suitable size for salmonid spawning. Several species of cased and case-less caddis were present in the cobbled areas, as were some small mayflies (Ephemeroptera). This again supports the theory that other than sedimentation, water quality was good. Limited areas of exposed bedrock were also observed (Picture 13), which may explain the reduced dredging in some areas.

**Picture 11. To the left of shot a small tributary provides around 40% the River's flow at that point. From here downstream starwort was observed.**

**Picture 12. Typically straightened and dredged channel.**

Throughout the heavily straightened reach livestock poaching was a recurring issue and the high sediment loading was obvious. Any wider areas where the flow velocity decreased hosted significant accumulation of fine materials on the bed.

This was further demonstrated in a large pool, presumably created for cattle watering, where large volumes of sediment had accumulated. This could be beneficial in lower flows, trapping silt and suspended solids, and preventing their transportation downstream. However, poaching around the pool will also be contributing to the problem and there may also be issues in high flows, when greater flows entering the pool could re-mobilise large volumes of silt, and heavily silted areas were observed downstream (Picture 15).

Minimal insect life was observed in the silty areas, and although such areas will provide habitat for some species, it will be of significantly lower quality for many of the species that should be present.

**Picture 13. Large pool that is acting as a silt trap.**

Along the LB of the pool an ochreous discharge was noted (NZ0053969516). The size of area affected and the volume being discharged to the river did not appear to be having an affect on the watercourse, but the area affected was quite noticeable (Picture 14).

**Picture 14. Ochreous discharge entering the river.**

**Picture 15. Heavily silted area, with no natural coarse substrate visible on the bed.**

Downstream of the heavily straightened and dredged reach the habitat improved for salmonids, with some increase in sinuosity and flow diversity (Picture 16). An increased amount of coarse substrate was also observed, and stone turning revealed that invertebrate abundance and diversity had improved.

A short distance downstream on the LB was an arable field where a filed margin gutter appeared to have been connected directly to the river via a sub surface drain (Picture 17, NZ0107270026).

**Picture 16. More natural channel with cobble bed. Dredging possibly limited by bedrock.**

**Picture 17. Probable sub surface field drain.**

The reach downstream to Whittington Mill was narrow, and within a long enough section of reduced sediment input, to maintain coarse gravel and cobble bed (Picture 18). The field, directly upstream of

Whittington Mill was heavily grazed and here exclusion of livestock from the river would be beneficial (Picture 19, NZ0138670320).

**Picture 18. Narrower channel with coarse clean substrate.**

**Picture 19. Well-grazed area upstream of Whittington Mill.**

Downstream of Whittington Mill the River was again seriously realigned, with the sinuous natural channel clearly visible through the LB field (Picture 20, NZ0162570409) (also visible on Google maps). This could be the ideal site for a river re-alignment project.

**Picture 20. Low-lying ground that represents the old river course.**

At the downstream end of that field the river passed under a road, through a piped culvert, which poses a small barrier to fish passage that would be more easily passable to smaller rather than larger fish at low flows. Fluming is also likely to occur at higher flows, limiting fish passage and restricting access to medium-low flows (Picture 21).

**Picture 21. Pipe culvert which poses a small barrier to fish passage (NZ0192070863).**

Channel re-alignment continued through the two fields downstream of the culvert, with a straightened, narrow channel resulting (Picture 22). This prevents the formation of deeper pools and wider shallow riffles required to form the fine, clean gravels for spawning. Some natural substrate remains, but the high sediment content, unnatural width, and profile provide poor habitat (Picture 23).

**Picture 22. Realigned channel downstream of Whittington Mill access track culvert.**

**Picture 23. Range of substrate size, although the 5-50mm required for salmonid spawning is limited.**

In the third field downstream of the culvert the potential sinuosity of the River was apparent, with a more natural, meandering plan form.

**Picture 24. Very sinuous, naturally meandering river course (NZ0183270796).**

At the downstream end of the field a major tributary joins the River Pont that is of similar size (Picture 24). This tributary was not walked, but appeared to be subject to the same pressures as the Pont, as demonstrated by its unnaturally straightened appearance, lack of natural substrate variation and high sediment loading, at least in the short observed reach above the confluence with the Pont (Picture 25), and at the points spot checked further upstream.

**Picture 25. Straightened tributary with similar issues to the Pont (NZ0189570863).**

Spot checks carried out on the tributary upstream revealed un-fenced, grazed fields contributing to sediment issues, an impassable barrier at NZ0035170406 (Picture 26), and notable sediment issues at NZ0076471030 and NZ0091470969 (Picture 27).

As with the Pont, fencing would allow some naturalisation of the tributary. However, without major re-meandering and possibly gravel reinstatement the habitat for salmonids will remain compromised, with limited spawning potential and a lack of suitable habitat for all life stages.

**Picture 26. Impassable Barrier upstream of the road bridge to the South of Great Whittington. Directly downstream of the Bridge was a drinking point with high sediment input.**

**Picture 27. Sedimentation issues at a drinking point, directly downstream of the Matfen to Great Whittington Road. Sediment is also accumulating here from upstream, as can be seen by the bar, to the left of shot. This was also the case at the next crossing point upstream.**

A short distance downstream of the tributary there is an old sluice structure on the Pont, which appears to serve no purpose (Picture 28). If the sluice boards were removed, passability of the structure for fish would greatly improve, but ideally the structure should be removed to allow natural fluvial processes and complete fish passage.

**Picture 28. Small concrete structure posing an obstacle to fish passage (NZ0192070863).**

Downstream of the sluice, the channel is beginning to display some more natural features, with greater flow and substrate diversity, and increased aquatic vegetation, but erosion remains an issue.

**Picture 29. Erosion issues from stock access to the riverbank (NZ0229571031).**

The land use then changes in the field upstream of Matfen Golf Course, where the river becomes further constrained within a boulder clay channel, through a coniferous plantation (Picture 30). Here, the River flows through a heavily shaded, 60cm wide trench, within a boulder clay two stage channel, that is likely to be a constant source of vey fine sediment and provides very poor habitat for fish and invertebrates.

**Picture 30. Two stage boulder clay channel (NZ0249971151).**

Downstream of the plantation, the river enters the Golf Course and becomes constrained by a stone wall revetment, that will prevent any natural channel adjustment (Picture 31).

The River channel is dredged and impounded throughout the Golf Course, with many areas of bank reinforcement; a series of weirs are also present which pose a range of issues for fish passage (NZ0292971356, picture 32; NZ0301571445, picture 33; NZ0332971430, picture 35; NZ0341671383, picture 36; NZ0356271356, picture 37).

The river also receives a significant input of water via a transfer channel, from Hallington Reservoir at NZ0305771483 (Picture 34), as the Pont is used to transport water into the Whittle Burn Reservoir system. The water originates from a different catchment, with different geology and soil type, creating a notably clearer, humic-stained appearance. The difference in chemical composition between these two contrasting water sources is also likely to have some affect on the productivity of the River Pont.

**Picture 31. Walled bank revetment, present in many areas through the Golf Course.**

**Picture 32. Small weir (c.25cm) that poses a barrier to juvenile fish, grayling and minor species, limiting their exploitation of upstream habitat. The shallow apron on the downstream side exacerbates the problem. Two valuable shrubs on either bank, downstream of the weir have also been recently coppiced, removing the valuable cover they would provide. This appeared to be an on-going maintenance issue, probably for minimal aesthetic benefit and should be stopped.**

**Picture 33. c.50cm weir that poses a more significant barrier to fish passage. The height of the jump alone is a significant issue for juvenile fish, grayling and minor species, but with the shallow water on the downstream side, created by the weir apron, the weir becomes impassable for all fish at low and medium flows.**

**Picture 34. The point at which the Hallington Transfer water enters the Pont. The water is of a notably clearer, with much lower fine sediment content, but exhibited a humic-stained appearance reflecting the different catchment origin.**

**Picture 35. The largest weir in the Golf Course (>60cm). This is likely to pose little barrier to large salmonids, as there was good depth below and they are likely to swim straight through. In contrast, the weir is likely to pose a significant barrier to smaller fish, and grayling, impassable to juveniles due to the high velocity, chute flow over the weir.**

**Picture 36. Derelict weir that should be passable to most fish, larger than fry. Notching or removal would still benefit the river by allowing better substrate transport downstream and reducing the impoundment upstream.**

**Picture 37. Another small weir that is only likely to be an issue for small and juvenile fish, but limits sediment transport and causes impoundment of the river.**

Downstream of the Golf Course, the first of two channels originating in Matfen Village discharges to the Pont (Picture 38). This channel supplied significantly less water than the other (Picture 42, c. 820m downstream) and was only of use to juvenile salmonids.

**Picture 38. Small channel with minimal flow that discharges to the Pont below just below the downstream limit of the Golf Course.**

Much of the River downstream of the golf course was confined and straightened, with little in-stream habitat or structure, and a general lack of aerial cover (Picture 39). The depth was also very uniform (45-60cm) in most places, with an absence of shallower, wider riffles, or slower deeper pools.

The flow velocity was high, and although suitable for salmonids, the prolonged lengths without shelter and habitat diversity through slower and deeper, or wider, shallower areas is likely to limit its use to older juvenile salmonids (1+, 2+ and possibly 3+), and the occasional smaller adults. This is because the velocities within the reach are too high for smaller juveniles (above their swimming ability), and require an excessive level of exertion, above what is viable for many adult fish. The inclusion of structure within the channel to provide areas of slack water would greatly improve the area and improve its carrying capacity, as would meandering the channel.

**Picture 40. Fast flowing, straight section, with few in-channel features, that will fail to fulfil its potential fish holding capacity due to a lack of resting areas.**

Within this section another ochreous discharge was identified (Picture 41, NZ0430471543). As with the previous, it was not considered to be of a significant volume to be detrimental to the river, but is worth noting in case the volume increased. A small weir was also present, which posed little obstacle, but removal of the central third would be beneficial (NZ0423871522).

**Picture 41. The second ochreous discharge observed on this waterbody.**

The reach of the River that carries the additional water from Hallington is also the first area where water crowfoot (*Ranunculus* sp.) was observed, with good beds visible around NZ0433971550. Interestingly, the areas where water crowfoot was present also provided good areas of spawning substrate, demonstrating the close relationship between flow and vital salmonid habitat features.

**Picture 42. Good beds of water crowfoot associated with salmonid spawning substrate.**

Additional spawning substrate was also provided c.200m downstream, where the second of the channels originating in Matfen Village discharges to the Pont. This channel carried significantly more water and provided clean, salmonid spawning substrate (Picture 43).

**Picture 43. Salmonid spawning substrate provided by the second of the two channels originating in Matfen.**

A short distance downstream the river opens out, where grazing, along with a reduced level of incision within the channel and absence of bank revetment have allowed significant widening of the channel. This has allowed the formation of riffles, as would be expected throughout the reach, but are restricted upstream by the formal, man-made channel.

The habitat here was again of a high quality and provided the kind of diversity lacking in most other areas of the reach, below the addition of the Hallington water. Water crowfoot beds were present and good areas of potential salmonid spawning substrate were present, making the area of great significance for recruitment within the reach (Picture 44). Fencing within this reach would enhance and protect this potential, as the ongoing grazing and associated erosion is likely to lead to over-widening and increased sedimentation. This would also facilitate marginal vegetation becoming established, which would greatly benefit emerging fry.

**Picture 44. Significant area of wide shallow riffle, providing some of the vital habitat that is lacking in the reach upstream.**

Further downstream at NZ0533971347, was one of the single most significant negative impacts on the whole Pont/Blyth system. This is the point at which the water for the River Pont is supplied from the transfer channel. This structure is completely impassable to fish in almost all flows and completely disconnects the River Pont from its upper catchment. In ecological terms, with the upper River Pont actually feeds the Whittle Burn system, barring a very low volume that feeds the Pont via a c.15cm pipe, running around ½ bore (Picture 45 & 46). Additional water would be supplied via the overspill (Picture 45), when a significantly higher amount of water is flowing down the transfer channel. The benefit of this to the river is limited, as it still fails to provide connectivity for fish passage or substrate transport.

The implications of this are massive; effectively the flow within the River Pont is flat-lined at greatly reduced volume from that point downstream, in most flows, until an instant increase occurs as over-spilling occurs. This creates issues through flushing, without a significant ramping effect, as would be expected with natural flows.

The other, and equally crucial issue, is the prevention of fish passage up or downstream between the two parts of the River Pont. This not only prevents exploitation of the habitats by many organisms from above to below, and vice versa, but also prevents re-colonisation following pollution incidents and fish kills, which are a regular occurrence on the Pont. Consequently, the benefits that could be gained from the improved substrate and flow within the transfer channel are mostly lost, leaving only the negatives. This is a major issue for the River Pont system and needs to be addressed.

**Picture 45. Side view of the water supply to the Pont downstream of the transfer channel, showing the high flow overspill in the foreground.**

**Picture 46. The entirety of the Rover Pont, as supplied from the transfer channel.**

The scale of the issue can be observed at the point the River passes over the downstream limit of the apron (Picture 47). The flow here can be directly compared to the volume of water present in the River Pont at the weirs above the input of water from Hallington Reservoir, in pictures 32 and 33.

**Picture 47. The outflow from the apron of the supply to the River Pont.**

The contrast between the flows within a "more natural" can also be contrasted between picture 29 upstream of the transfer system, where the channel is 1-2m wide, with a significant flow; and 48 & 49 downstream, where the channel is c.60cm with little flow.

It can also be seen that the River reverts to a significantly incised and straightened channel, with little in-stream structure or riparian tree cover. As with other similar sections upstream, there was a lack of natural substrate and little, if any, potential for spawning.

**Picture 48. The River Pont below the transfer system, at around 60cm, or two feet wide, with very little flow.**

**Picture 49. River Pont below the transfer, at a small proportion of its volume upstream of the transfer.**

Further downstream, at NZ0624671581, a tributary joins the Pont, increasing the flow, but not enough to provide significant improvement to salmonid habitat. There was an increase in the number of faster flowing areas below this point and an increase in coarse bed material, through the greater flow and reduced dredging. However, the habitat was still poor quality for salmonids and unlikely to provide the suite of features required for the salmonid lifecycle between here and the downstream limit of the waterbody.

The contrast in water predominantly originating from Hallington Reservoir, as opposed to the natural water of the Pont system was again observed here (Picture 50). The darker water, with less fine sediment on the left of the picture is the Pont, and the lighter water on the right of shot is the tributary. Sedimentation from the tributary appeared to be a minor issue, to be expected, as it appeared to be subject to much of the channel alteration/maintenance and livestock issues of the rest of the catchment.

**Picture 50. The contrast between water originating from Hallington, and the transfer, and a Pont tributary can be seen.**

Observations at the downstream limit of this waterbody confirmed the same as the walkover of the Pont from Fenwick Burn to Med Burn GB103022076840; on the day of the visit the River Pont was providing a much lower than expected proportion of the flow (Picture 51).

**Picture 51. The downstream limit of the waterbody at the confluence of the River Pont and Fenwick burn. The River Pont is left of shot, the Fenwick Burn right.**

# 3.0 Recommendations

## 3.1 Erosion Issues

Erosion issues were identified throughout the waterbody generally associated with over-grazing and livestock access to the riverbank. Where possible these should be addressed with buffer fencing.

### 3.1.1 Areas for Buffer Fencing

- NY9841769500 - Picture 2, and fields upstream
- NZ0049269488 – Picture 13, large area of poaching around drinking pond
- NZ0138670320 - Picture 19
- NZ0183270796 – Picture 24 & 25
- NZ0076471030 – Next field u/s of picture 27
- NZ0091470969 – Picture 27
- NZ0229571031 - Picture 29

### 3.1.2 Areas with potential for re-meandering the watercourse

Fine sediment issues were also identified in the plantation upstream of Matfen Golf Course, where the river is incised within a boulder clay trench. This increases the input of very fine sediment to the River, as no vegetation can grow on the clay. This is a difficult issue, but the ideal solution would be to re-meander the watercourse, outside of the plantation.

The reach downstream of Whittington Mill NZ0162570409 (Picture 20) would also greatly benefit from re-meandering. Here the River could be easily returned to its old course relatively, as the relic channel is still visible in the field on the LB.

- NZ0162570409 – Old channel course downstream of Whittington Mill (Picture 20)
- NZ0249971151 – Erosion issue thorough boulder clay (Picture 30)

Large reaches, throughout the whole Pont and Blyth Catchment would benefit from re-instatement to their original course, with too many individual sections to detail them all, but the two described above are considered more achievable short to medium term.

### 3.2 Runoff

Issues through areas providing potential for significant runoff were observed at the following locations:

- NY9906169672 – Picture 2
- NY9903269621 – Picture 6
- NY9914869527 – Picture 7
- NZ0107270026 - Picture 17

### 3.3 Barriers

Many barriers were observed throughout the waterbody, at the locations identified in Table 1. The ideal solution for all of these structures would be full removal as soon as possible to facilitate adequate habitat utilisation for significant natural recruitment and to remove the impact on fluvial processes. The feasibility of removing these structures will require further investigation.

If removal is not possible adequate fish passage solutions should be sought, although that solution would be a significantly poorer result.

Of the structures the most significant is the transfer structure which feeds the River Pont. A solution should be achieved here that provides adequate flow to the river at all times, and allows both up and downstream fish passage at all flows. It is likely that this issue will have to be addressed through the abstraction licence process, and a suitable solution should be sought as a requirement of that consent.

The weirs through the golf course exist for aesthetic reasons, which are valid, but the ecological benefit of their removal should be posed to the owner as this may gain support for their removal. Issues with listing and historical significance of the weirs may be prohibitive, in which case, the fish pass options should be explored.

**Table 1.**

| Location | Description | Issue | Solution |
|---|---|---|---|
| NY9933469377 | Pipe dam (Picture 9) | Major - Impassable | Full removal |
| | Pipe Bridge (Picture 21) | Minor issue | Improve when maintenance is undertaken |
| NZ0035170406 | Weir - Great Whittington (Picture 26) | Impassable | None as high on a small tributary |
| NZ0192070863 | Small sluiced weir (Picture 28) | Impassable at low flows | Remove sluice short-term. Remove structure long-term |
| NZ0292971356 | Weir in Golf Course (Picture 32) | Issue | Notching in centre; Ideally full removal. |
| NZ0301571445 | Weir in Golf Course (Picture 33) | Major issue | Full Removal |
| NZ0332971430 | Weir in Golf Course (Picture 35) | Major Issue | Full removal |
| NZ0341671383 | Weir in Golf Course (Picture 36) | Minor issue | Remove centre 1/3 |
| NZ0356271356 | Weir in Golf Course (Picture 37) | Minor issue | Remove centre 1/3 |
| NZ0423871522 | Small weir | Minor issue | Remove centre 1/3 |
| NZ0533971347 | Transfer structure (Pictures 45/46) | Major issue disjointing the upper catchment | Complex solution required through consultation with NWL |