Pont and Blyth Investigation

River Pont – from Small Burn to Bellasis

(Waterbody ID - GB103022077050)

Dates – 09/02/12

1.0 Introduction

This report is the output of a site visit undertaken by Gareth Pedley of the Wild Trout Trust on 9 February 2012 to the River Pont. Comments in this report are based on observations on the day of the site visit and discussions with Robbie Stevenson of the Environment Agency (EA).

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.

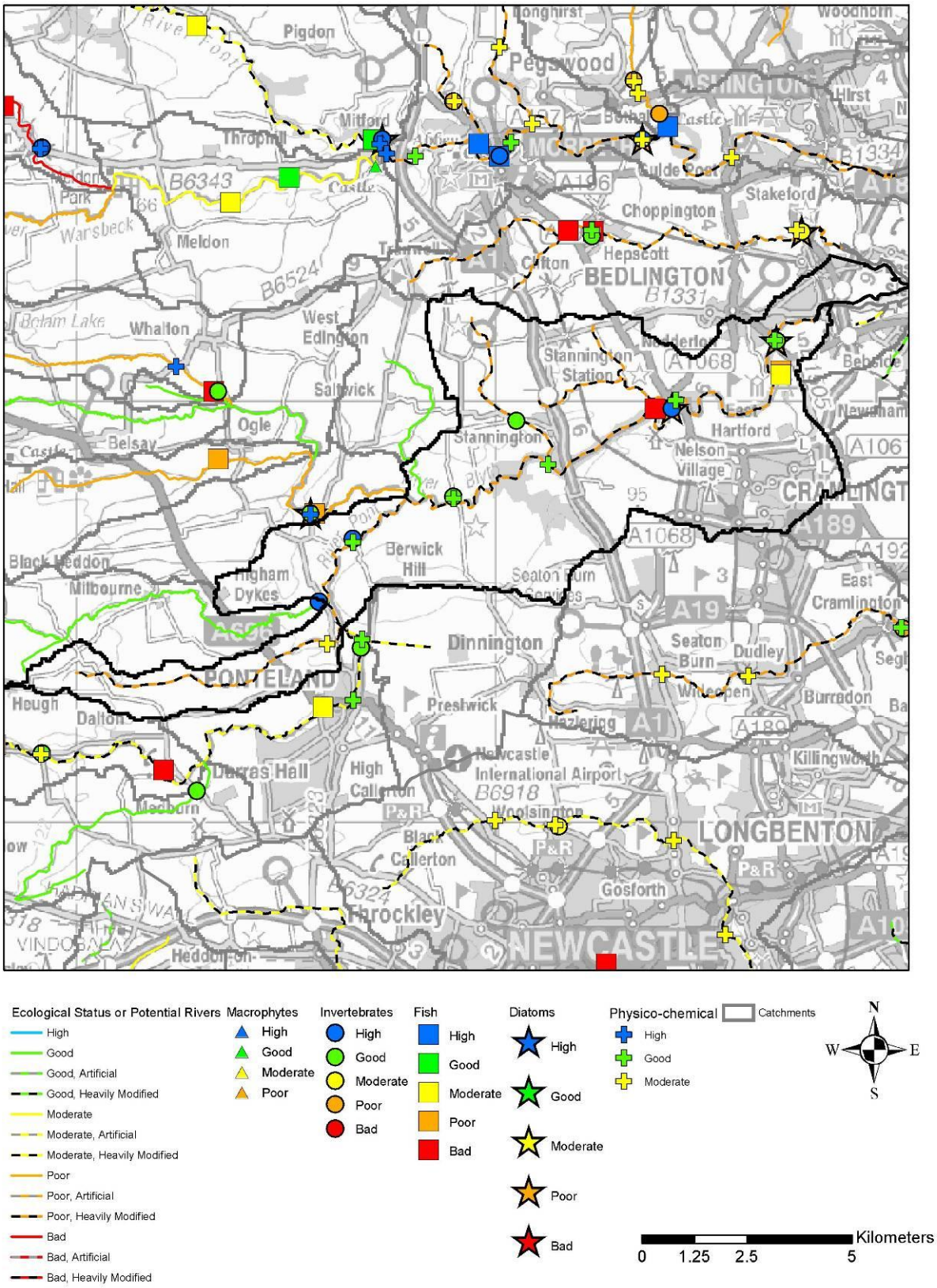
The walkover assessment was undertaken from the River Pont/Small Burn confluence (NZ1631274624), following the course of the river downstream to Bellasis Bridge (NZ1901877668).

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. The waterbody is also classed as heavily modified.

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 GB103022077050



2.0 Habitat Assessment

The river channel ranged in width from approximately 6-9 metres on the river Pont, and approximately 8-11 metres on the Blyth, below the Pont Blyth confluence. The channel was heavily dredged and straightened in most areas and there was a significant lack of natural coarse bed substrate.

At the start of the section, an area of improving habitat was present around the pool and riffle the Small Burn confluence creates. This appears to have provided enough gravel and sediment to lift the bed level, creating more natural features and increased flow diversity. Consequently, some gravel and water crowfoot (*Ranunculus sp.*) beds are evident.

It is important to note that the gravels are heavily silted and of minimal use for salmonid spawning (Picture 1). This indicates that there is a significant sediment input to the River upstream, as described in areas on the Pont and Small Burn upstream. These issues must be addressed before significant improvements can be made to the in-channel habitat.

For most of the following kilometre downstream, almost to the Coldcotes Burn, the river channel is subject to significant straightening and dredging, leaving the bed deeply incised. The result is a channel lacking in features and with over-deep, slow flowing water.

The LB is buffer fenced, with a good hedge line of hawthorn (*Crataegus monogyna*) that provides valuable aerial cover, but the RB is open to livestock, which is limiting the extent of natural narrowing that can occur.

Picture 1. Gravel of a suitable size for salmonid spawning, but seriously compromised by high sediment loading (NZ1631274624).

Habitat improves slightly downstream where the River is buffer fenced on both banks (NZ1619774839). Prevention of stock access has allowed areas of slumped bank to consolidate and re-grade. It has also allowed the river to begin naturally narrowing, through underwater sediment berms deposited along the margins (Picture 2). This increases the flow rate and has enabled water crowfoot to establish, which also takes up channel capacity and further accelerates the flow. These berms could be planted with willow whip cuttings to increase consolidation and assist channel narrowing.

In this area some coarse gravel has accumulated, remaining clean by the faster flow. This form of natural recovery significantly improves the habitat, but it cannot fully mitigate the underlying issues of over deep water and a reduced supply of natural bed material from upstream. This will ultimately limit the value of the substrate for many of the invertebrate species that should be present, and the potential fish spawning habitat.

Picture 2. Naturally narrowing channel with a sub-surface berm (left of the picture) that is being consolidated by emergent vegetation. The increased flow has benefitted the water crowfoot.

In the area around the Coldcotes Burn the buffer zone is larger and longer established, supporting a wider diversity of vegetation, including mature alder (*Alnus glutinosa*) and willow (*Salix sp.*). These not only provide valuable aerial and trailing cover within the channel, but also a good source of large woody debris (LWD) (Picture 3). This type of in-channel structure is likely to be removed in other areas of the system to reduce flood risk, but should be retained wherever possible to create flow diversity, scouring and gravel sorting.

Picture 3. Beneficial LWD, but is causing erosion due to the steep bank. While the flow created is beneficial, the situation could be improved by anchoring the butts of the branches to the bank and allowing them to slew round and rest along the bank. Willow whips could then be planted along the erosion scar.

The Coldcotes Burn (NZ1598775188) had potential as a spawning tributary, carrying a significant flow. As with the Small Burn, there was evidence of tufa on the substrate, which although not extensive, suggests a high alkalinity and potentially productive watercourse.

The plan form of the Burn appeared to have been relatively un-altered from its natural course (supported by Google Earth images), and the substrate size in the area observed was suitable for salmonid spawning.

As with the main channel, the Burn bed had a high sediment component which needs to be addressed. If the sediment inputs can be reduced, the Burn appeared to have a real potential for partially mitigating the lack of spawning habitat in the area.

Picture 4. The bed of the Coldcotes Burn, just upstream of the Pont. The substrate was of a suitable size for spawning, but overly silty, as can be seen by the brown plume.

Due to the extent of past dredging work on the Pont, and depth of channel incision, many areas of the riverbank were subject to slumping (Picture 5). This is the natural way that the river will re-profile the bank to a more natural gradient, but without suitable vegetation and tree cover to provide a good root system this effect can be lost. In fenced areas with good vegetation cover the bank has a good chance of stabilising before it is washed away.

Picture 5. Slumping bank that is naturally starting to consolidate.

Below this point was a sparsely wooded area where livestock have historically been excluded. However, a large tree has recently uprooted, damaging the fence-line (NZ1599475394). This should be repaired to prevent deterioration of the riverbank through livestock access and grazing.

In this area the spoils of dredging were evident along the banktop, but some parts of the riverbed retained more-natural substrate. The habitat of this area could be greatly improved with the installation of a gravel riffle, but again, until the sediment input issues are tackled the benefit is likely to be inhibited (Picture 6).

Picture 6. Possible site for gravel riffle re-instatement. Note that even though the channel is relatively shallow, with a fast flow, there is still excessive sedimentation of the bed (NZ1630374655).

From this point downstream, the level of dredging and incision varies, but is significant, until a point where bedrock becomes evident (NZ1603775742), which will have prevented further dredging for a short section (Picture 7). This area would also benefit from gravel introduction.

Picture 7. Exposed bedrock on the river bed.

The next notable tributary to enter the Pont was the Swallow Syke. In contrast to the Coldcotes Burn, this appeared to be heavily straightened and carried an even higher sediment loading. The bed of the Burn primarily consisted of silt and sand, providing little potential for salmonid spawning. The main significance of this Burn is the negative impact the sediment input is likely to have on the Pont. The causes of this input should be investigated further.

Much of the Pont at in this area remains subject to intermittent, deep dredging, but where the dredging is reduced and some sinuosity remains to the channel, the habitat improved. In these areas water crowfoot and some cleaner gravel was observed (Picture 8).

Picture 8. Healthy beds of water crowfoot and some gravels, where the dredging is less extensive.

Below this section the RB continues to be fenced, but fencing on the LB ceases at a watergate. From this point, stock access begins and the effect is immediately evident (Picture 9, NZ1632276439). The level of marginal vegetation diminishes and the level of bank erosion greatly increases.

Picture 9. Contrast between the well vegetated foreground and RB, and grazed, eroding LB. The reduced root mass of the grazed land provides less stabilisation for slumped areas, which are likely to wash away before they can become consolidated. (Compare with picture 5 where greater vegetation cover exists and consolidation is occurring) The apparent terraced area in the top left of shot comprised of river dredgings.

Approximately 150 metres further downstream of the watergate, the level of dredging appears to decrease and the level of incision decreases. Consequently the bed increases in diversity, with gravel bars producing riffles and areas of faster water (Picture 10, NZ1634476450). If livestock could be fenced out of this area the habitat would greatly improve naturally to an extent where the bed may provide some potential for salmonid spawning.

Picture 10. Area of channel with grazed bank that could be greatly improved through stock exclusion This would allow encroachment of marginal vegetation as is occurring on the fenced RB, naturally narrowing the channel and aiding gravel cleaning/sorting.

Downstream of this point, to Kirkley Mill Bridge, the channel was more heavily dredged and the habitat reverted to a much poorer quality. At the upstream side of the bridge there was a notable pollution source. A small pipe was discharging a grey plume into the river, with a localised proliferation of sewage fungus on the bed and vegetation (Picture 11, NZ1661476629). This obviously warrants further investigation with mitigation if appropriate.

Picture 11. Discharge to the river with notable odour and sewage fungus.

Below the bridge the fencing regime changed, with the LB being fenced and the RB not. The lack of vegetation on the LB suggests that stock from the RB are crossing the river and grazing the LB, giving increased importance to stock exclusion from the RB (Picture 12).

Picture 12. Evidence of grazing on both banks, although the LB is buffer fenced.

The reduction in historic dredging throughout the length of this field again means that if stock could be excluded from the riverbank the benefit from natural adjustment and narrowing is likely to be significant.

Below this field, stock are excluded from the RB, which is in relatively good condition, but the LB becomes grazed for the following three fields. A single strand breast wire fence exists along the LB of the first, but this is of no use in excluding the sheep that are currently grazing the field and riverbank.

The channel throughout the length of these fields varies from heavily dredged, to areas with some natural characteristics. Fencing stock away

from the bank would greatly improve all areas, but particularly the slumping banks and the shallower riffles, with potential for natural narrowing.

Downstream the river enters Pont Ends Plantation, where the habitat changes significantly. There are still areas of significant dredging, but also numerous points where LWD had become established in the channel. This has led to a great improvement in the habitat for adult salmonids, and where present, facilitated gravel sorting to an extent that a possible redd was observed. The gravel was still heavily silted and unlikely to have produced high egg and fry survival, but it shows that where natural processes are allowed to occur, the habitat will improve.

There was an obvious overall lack of gravel substrate in this area. As in the other sections, this is assumed to be due to the large scale removal that has occurred through past dredging, and the large gravel sinks that the dredged sections create.

Below the wood, to the bottom of the section at Bellasis Bridge, the river has a sufficient buffer on either bank to allow beneficial marginal vegetation to have established, which is greatly benefitting the banks. Significant lengths of dredging and channel straightening are evident and much of the river is significantly over-deepened. Limited shallower areas were present, and as with upstream sections, they provided some flow diversity, facilitating growth of water crowfoot.

Within this section, a significant tributary enters the Pont, the Duddo Burn; and the River Pont becomes part of the Blyth. The Duddo Burn appeared to be another very silty tributary that is likely to further contribute to sedimentation issues downstream. The Blyth above the confluence with the Pont is a different WFD waterbody and will be dealt with in a separate report.

3.0 Summary

The predominant issue on this section of the waterbody is the realignment and channel dredging. This has left the river over-deep and wide for the majority of its length. In most places the river flows at the bottom of a deeply incised channel, with a predominantly steep, trapezoidal bank profile. This greatly inhibits the river's ability to naturally adjust and meander, although occurring to a limited extent in some areas.

Major benefits would be realised by raising the bed level with gravel introductions. The scale of work required to tackle this on the whole river is cost prohibitive, but it may be achievable in discrete areas.

In areas where less dredging has taken place there is more realistic potential for improvement through gravel reinstatement. These areas could be further enhanced by raising the bed slightly downstream of the riffle to provide shallow nursery habitat. The margins in these areas could be packed with a matrix of loose willow brash bundles and cobbles to increase the juvenile cover available.

If the numbers of well-covered, shallow, gravelly areas with marginal vegetation can be increased, the quality of habitat for salmonid spawning and juvenile habitat could be greatly increased, but sediment input to the system must be reduced.

Marginal vegetation was generally good throughout, where fencing was present to exclude livestock. However, in areas where livestock had access there was a distinct lack of cover, leading to poor habitat and accelerated bank erosion.

Some natural narrowing is occurring, within the fenced areas. This has locally increased velocity and improved substrate quality, but the channel still remains over deep for much of its course. This scenario is still an improvement for many areas and fencing livestock away from all sections of the river would be highly beneficial.

There was a lack of riparian tree cover in most areas, aside from the plantations and older buffer strips. This could easily be addressed in the fenced areas by planting with locally native tree species.

As a consequence of the minimal tree cover there was also a lack of LWD within the channel. This is again something that could be easily improved if the material can be sourced locally.

The extent of modification to the main channel means that in addition to improving the main channel, it is vital to improve the tributaries, particularly as auxiliary spawning and nursery areas. This is particularly pertinent to the Small Burn (with many issues highlighted in the Small Burn report) and the Coldcotes Burn, where the primary issue appeared to be sedimentation.

4.0 Recommendations

4.1 Sediment Reduction

The first issue that has to be addressed before any serious improvements can be made to wild fish production is sedimentation of the watercourse. It is understood that this is being tackled in conjunction with the Northumberland Rural Diffuse Partnership, which will be pivotal to any future improvements to the river.

4.2 Gravel Reinstatement

Any riffle should be two to three times as long as the channel width and stabilised by first lining the bed with large stones or cobbles before top dressing with 20-50mm, angular river gravels.

This work would be well complemented by providing shallower areas downstream of the riffles for juvenile habitat, with the inclusion of brushwood and cobbles along the margins for cover.

The whole of this section would benefit from major gravel reinstatement, but specific sites where greater benefit may be gained by working with existing characteristics were:

- NZ1630374655 - NZ1630374655 (numerous locations along straightened section)
- NZ1630374655 – Picture 6

- NZ1630374655 – Steep section of straightened river, but has sufficient gradient to create salmonid spawning redds
- NZ1594775646
- NZ1603775742 – Area around exposed bedrock (Picture 7)
- NZ 16296 76436 – Horse field u/s picture 10.

Gravel reinstatement would be beneficial in all dredged areas, the particular locations tackled may be best selected by spacing them through the section at points where easy access can be gained.

4.2 Buffer Fencing

Buffer fencing would be of benefit in all areas where stock have access to the riverbank and should be undertaken wherever possible. Areas that would gain particular benefit from exclusion of livestock and have a good potential for natural improvement are:

- NZ1644274545 - NZ1620974832 (RB – Currently no fence)
- NZ1600475401 (RB damage to fence required repair)
- NZ1622176444 - NZ1650976600 (LB - two fields with horse grazing)
    - This area would gain great benefit from fencing as the bed level exhibited gravel and a more natural profile for a short section which is likely to improve naturally through natural narrowing (NZ1634376449). Currently, the banks in this area are eroding badly.
- NZ1662576629 - NZ1682576791 (RB – one field of horse grazing with loss of marginal vegetation)
- NZ1683076815 - NZ1750177317 (LB – three fields of sheep grazing with serious bank erosion)

4.3 Tree management and planting

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

4.4 In-stream Structures

Although well-placed trees will provide some flow variation, the extent of the dredging and straightening on the Pont and Blyth have left the channel so 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 natural techniques will be the most appropriate. Methods like introducing LWD into the channel and narrowing with living willow hurdles or bundles would work well. They can be either paired, or alternating, to create pinch points and meanders within the channel.

These methods would work well in conjunction with areas of gravel introduction, where the increased flow velocity and diversity can be employed to keep the gravel clean. As with the tree planting, LWD should be installed throughout the section, and will be most appropriate to the heavily dredged and straightened areas. Locations can be easily targeted from aerial photography (Google Maps).

4.5 Tributaries

The Small Burn is covered in a separate report, but it is recommended that the Coldcotes Burn (NZ1598775188) is investigated further. The Burn appeared to have significant potential as a spawning tributary, but the quality of the gravel was compromised by high sediment loading.

The Swallow Syke and Duddo Burn should also be investigated as supplying un-naturally high sediment input to the Pont.

4.6 Pollution

The discharge at Kirkley Mill (NZ1661476629) should be investigated as it appeared to be of a high organic content and was supporting a significant accumulation of sewage fungus.

4 Disclaimer

This report is produced for guidance only and should not be used as a substitute for full professional advice. Accordingly, no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon comments made in this report.