

# Wild Ennerdale



## Woundell Beck Fish Spawning Improvements

DRAFT  
Report on Proposals

June 2008

Gareth Browning  
On behalf of The Wild Ennerdale Partnership

## Index

<b>INDEX</b>	<b>2</b>
<b>INTRODUCTION</b>	<b>3</b>
<b>HISTORY</b>	<b>3</b>
<b>RECREATION ISSUES</b>	<b>3</b>
<b>ECOLOGICAL ISSUES</b>	<b>4</b>
<b>LANDSCAPE ISSUES</b>	<b>4</b>
<b>PROPOSED SOLUTION</b>	<b>5</b>
<b>DETAILED PROPOSALS</b>	<b>6</b>
Bridge Specification	6
New Foot Path	6
Old Bridge and forest road	6
<b>BUDGET</b>	<b>7</b>
<b>TIMESCALE</b>	<b>7</b>
<b>NEXT STEPS</b>	<b>7</b>
<b>SUMMARY</b>	<b>7</b>
<b>APPENDIX 1 LOCATION MAP</b>	<b>8</b>
<b>APPENDIX 2 PHOTO SURVEY</b>	<b>9</b>
<b>APPENDIX 3 GEOMORPH REPORT</b>	<b>10</b>
<b>APPENDIX 4 WORK PROPOSALS</b>	<b>11</b>
<b>APPENDIX 5 SKETCH ELEVATION</b>	<b>12</b>

## **Introduction**

Following the publication of the Wild Ennerdale Stewardship Plan in 2006 the Wild Ennerdale Partnership has been focussing increasingly on implementation. In doing so a theme of "Restoring natural aquatic processes" is developing and giving birth to a number of activities around the valley including, lakeshore revetment removal, replacing the fish pass between the River Ehen and Ennerdale Water and in, partnership with the Environment Agency, restoring the char population. Continuing with the theme this report outlines a proposal, to replace the Pipe Bridge over Woundell Beck.

## **History**

During the late 1970's and into the early 1980's the Forestry Commission extended the forest road network in Ennerdale and completed a westerly loop which involved the construction of two pipe bridges across the River Liza and Woundell Beck. (see Appendix 1)

The River Liza pipe bridge was replaced by a box culvert bridge in the late 1990's however the Woundell Beck pipe bridge still exists in its original form. A photo survey is included in this report as Appendix 2 (photos 1 to 8).

The Woundell Beck Pipe Bridge is located approximately 360m upstream from where Woundell beck has its confluence with the River Liza. The bridge provides vehicle access around the south side of the Ennerdale Valley as well as a route for pedestrians, horse riders and cyclists along the bridleway from Bowness Knott to Wast Water.

Woundell Beck drains a catchment of 540ha and is the result of Silvercove Beck and Deep Gill merging approximately 500m upstream (south) of the Pipe Bridge. In common with other watercourses in the valley Woundell Beck responds quickly to high rainfall and carries a high gravel load in flood events.

## **Recreation Issues**

The Woundell Beck Pipe Bridge is located across a very dynamic part of the watercourse, where the beck is starting to braid and meander. The bridge needs constant maintenance to prevent it being buried under gravel and to repair damage caused by the grinding action of the bed load during flood events. Water appears to be seeping underneath the bridge and the original concrete foundations are undercut on the downstream side. On a number of occasions over the past ten years the bridge has become almost impassable to pedestrian traffic and in most years is impassable to vehicle traffic for short periods until it is repaired. Whilst the bridge is less than 30 years old its future longevity would be significantly limited without ongoing maintenance and intervention. The Wild Ennerdale Partnership is committed to maintaining public access ( [see section 16v of the Wild Ennerdale Stewardship Plan](#)) and is concerned that the continued maintenance of the Pipe Bridge over Woundell Beck is not the most practical and sustainable way of achieving this.

Approximately 20 to 30m upstream of the concrete Pipe Bridge is the point where the legal line of a public bridleway crosses.

The area around the site including Silver Cove, Woundell Beck and the River Liza is dedicated as open access land under The Countryside and Rights of Way Act 2000 .

## **Ecological Issues**

Pipe bridges are known to cause a number of problems within watercourses as detailed below:-

- *Gravel Deposition*:- During flood events and high flows the river carries gravel downstream which is an important natural process especially in relation to fish spawning as the gravel refreshes spawning beds. The pipe bridge significantly interrupts this process as it acts as a dam slowing down the river flow making it drop its bed load. This can be seen in the gravel beds that build upstream of the Pipe bridge. These gravel beds raise the level of the river bed and fill in the pipes threatening to engulf the Pipe Bridge. To prevent this gravel has to be regularly removed by excavator to ensure the bridge remains passable.
- *Blockage to Fish Spawning*:- Pipe Bridges create a significant obstacle to fish passage upstream and hence prevent access to spawning grounds. Over the years the pressure of water through the pipes at high flow has blasted away the gravel bed downstream of the bridge leaving the pipes clear of the water level. In low flows this makes it difficult for fish to swim into the pipes as they have to jump out of the pool below the bridge into a pipe. This is often compounded by the water in low flows being evenly distributed across the pipes. Conversely in high flows the flow through the pipes is often too powerful for fish to swim against. When the water over tops the bridge the situation doesn't improve as a backward rotating stopper wave develops which is again difficult for fish to deal with.

The Woundell Beck pipe bridge exhibits both of the above problems and is therefore a significant obstacle to the operation of natural aquatic processes within Woundell Beck.

In addition to directly impacting the success of spawning Char, Salmon and Trout the bridge could also be impacting the Freshwater Pearl Mussel population of the River Ehen, an SAC and SSSI (see [Natural England](#)). This is the largest population in England and Wales and importantly the only population with any likelihood of survival into the future. The mussel spends its larval, or glochidial, stage attached to the gills of salmonid fishes, preferring salmon over trout (see [JNCC information](#)). The Ehen population is in unfavourable status due to reproduction levels being extremely low. In a survey of the mussel beds in 2006 the lack of salmonid fish was identified as a possible contributing factor in the low numbers of young pearl mussels.

In policy terms the removal of the impact of the pipe bridge on spawning fish is a key part of the Environment Agency's Salmon Action Plan. Also the Wild Ennerdale Stewardship Plan clearly identifies the importance of natural processes as a key Guiding Principal (see [section 15 Guiding Principals](#)) and the [Water Extraction](#) and [Conservation Management](#) statements also provide support to this aim.

## **Landscape issues**

The current road and pipe bridge have a significant impact on the local landscape and can be seen from the northern valley ridges however these views are distant and have less impact. Replacing the existing bridge with a narrow bridge and removing the forest road will improve the immediate visual landscape. In addition the reduction in vehicle access will reduce noise and visual intrusion of vehicles in the landscape increasing the sense of wildness experienced by visitors to this part of the valley.

## **Proposed Solution**

The proposed solution to the issues detailed above is to replace the existing pipe bridge with a single span footbridge. This would allow freedom for fish spawning and gravel movement whilst ensuring continued public access.

Given the dynamic nature of Woundell Beck at the current pipe bridge location the Environment Agency was asked to investigate the most stable location for a new bridge. To this end a survey was carried out in 2006 which recommends the most stable location to be approximately 60m up stream of the current bridge point, see Appendix 3.

Finally it is proposed that the new bridge should be built to accommodate pedestrian only and not vehicular access. There are a number of reasons for this:-

- The cost of a vehicle capable bridge cannot be justified by current low usage or predicted future usage and is likely to be of such an order that it would rule out this project from securing funding.
- A vehicle capable bridge would have a much larger visual and environmental footprint and would detract significantly from the sense of wildness compared to a bridleway bridge.
- Removing vehicle access across Woundell Beck should reduce vehicle access to the area south of the River Liza between the pipe bridge and the middle concrete bridge as there would no longer be a loop road. This would contribute significantly to increasing the sense of wildness across the whole of the Western Valley and Southern Lakeshore Wild Zone, (see [Wild Zone Map](#)), a key part of the Wild Ennerdale vision and guiding principal.
- A single span bridge could be built from local materials and is within the capability of local staff in partnership with the Lake District National Park Authority's bridge maintenance team and Forestry Commission civil engineers. This was demonstrated recently with the replacement of the bridleway bridge east of Blacksail YHA in late 2006.
- Removing vehicular access provides the opportunity to reduce the landscape impact of the forest road across the open ground at the bottom of Woundell Beck.

The bridge will be sited approximately 50-60m upstream of the existing pipe bridge in an area which is regenerating with scattered trees and gorse and where the beck is more constrained and stable. This will help reduce the impact of the bridge hiding it from distant views and ensure its future security from river erosion.

The connecting path will be dedicated as a public footpath however permissive use by cyclists will also be allowed. The existing bridleway which crosses woundell beck upstream of the existing pipe bridge will be unaffected by this proposal.

## **Detailed Proposals**

The proposals below should be read in conjunction with the photos 9 to 14 in Appendix 2, map in Appendix 4 and the sketch in Appendix 5.

### **Bridge Specification**

As shown in Appendix 5 the bridge will cross two stream beds, one using a culvert the other (the main flow) a timber deck bridge, with a deck width of 2m. After investigation a culvert is thought sufficient to accommodate the rare and limited flow down this channel. The bridge will be based on recently replaced timber bridge upstream of Blacksail at the head of the valley, as shown right.



The timber (Oak or Douglas fir) will be supplied by the Forestry Commission from a local forest and sawn in West Cumbria.. None of the timbers will be pressure treated.

The bridge sections will be supported on gabions filled with stone taken from dry gravel beds of the River Liza and Woundell Beck. The gabions are required to provide a firm foundation for the bridge sections. There is the possibility that the ground conditions on the eastern bank may support a concrete pad instead of needing a gabion.

The bridge will be erected on a 4 degree slope as the two banks of the beck are significantly different in height. A sloped bridge is thought to fit in well with a path climbing from one side to the other.

Two short net fences will be erected either side of the bridge to help with herding sheep when the river is not crossable but these will be kept to a minimum, max 20 m each.

### **New Foot Path**

To connect the new bridge location to the route of the bridleway a new path is proposed as shown in Appendix 3 and photo 14. The new path will utilise stone from the redundant forest road either side of the old bridge and reuse the old bridge through crushing of the pipes and concrete. The path will be 2m wide and surfaced with a fine gravel similar to the path constructed in Blengdale to avoid the flooded forest road. This will include the excavation of the ground to a maximum depth of 300 to 450mm and to accommodate vegetation encroachment the initial path excavation will be to a width of 2.3m. The route of the path will meander gently to avoid straight lines and the path surfacing will be raised approx 300mm above ground level to aid drainage.

### **Old Bridge and forest road**

The redundant pipe bridge will be removed and crushed and reused as sub base for the new path.

The old road will be reused as material for the new path and any unused will be re-profiled. Turfs and soil from the path excavation will be used to help break up the line and kick start regeneration of the old road. A National park approved seed mix will also be used where appropriate.

## **Budget**

An initial cash budget of around £16,000 has been estimated which is split roughly as below

Timber Bridges	- £4,000
Gabions	- £3,000
New Path	- £5,000
Remove old bridge	- £2,000
Culvet	-£1,000
Fees and Misc	-£1,000

The cost of labour for erecting the bridge and creating the path has been assumed to be available from the Forestry Commission, National Trust and Lake District National Park teams.

In terms of funding £6,300 has been donated by the public through a partnership with Honister Mine via the Tourism & Conservation partnership through a voluntary £0.25 addition to each mine entry ticket. The Environment Agency has donated £5,000. The Wild Ennerdale Partnership will be supervising the project, supplying timber and labour to build the new path and will fund the gap of £4,700 unless another funder comes forward.

## **Timescale**

Assuming positive feedback from consultees, planning permission and right of way diversion applications are successful then the aim would be to start the work in the late Summer/early Autumn 2008 and continue into summer 2009. The aim would be to complete in river work outside of the spawning season which continues from October and May.

## **Next Steps**

The Forestry Commission's Regional Civil Engineer, Recreation Rangers and Lake District National Park Authority Bridge team are being involved in the detailed design and build.

Planning permission will be applied for during July 2008.

In the mean time further detail is being incorporated into the plans and more secure cost estimates sought from suppliers.

## **Summary**

The replacement of the Woundell Beck Pipe Bridge provides a real opportunity to secure public access and restore natural aquatic processes. In addition the project provides an exciting opportunity for people to get involved as shown through Honister Mine and hopefully through other partners coming forward to fund and be involved in the work. Finally the completion of this project will increase the sense of wildness experience in this part of the valley contributing to Ennerdale developing as a wilder valley,

Gareth Browning  
June 2008

**Appendix 1 Location Map**

**Appendix 2 Photo Survey**

**Appendix 3 Geomorph Report**

**Appendix 4 Work Proposals**

**Appendix 5 Sketch Elevation**