

**Wildmoorbank Hollow** is a steep-sided valley of Priority Habitat comprising Deciduous Semi-Natural Ancient Woodland. An unnamed tributary of the Dean catchment flows through this woodland east of the village of Rainow. The contributory catchment consists of tightly grazed hill-sheep farming.

**Location:** Wildmoorbank Hollow, Lamaload

**Water course:** River Dean

**Sub-catchment:** Dean, Upper Mersey



## Ownership:

The woodland and watercourse are owned by two separate landowners, with the brook forming the ownership boundary. On one side, the woodland is owned by United Utilities and the other side is privately owned.

## Access:

There are no public or permissive footpaths through the site therefore none of the interventions can be seen by the public.

## About the project:

The aim of this work was to slow down the flow of water through the water course and reduce peak flood flows further down in the Dean catchment. Sixteen Large Woody Debris (LWD) log jams were installed along 720m of watercourse with the view to restoring natural stream process. The woody jams allow low flows to pass through as normal and only slow water down in high flow. Following heavy rain when river levels rise, the woody material provides physical resistance to flow so that peak flood flow further down the catchment is reduced. This woody material not only restores natural resistance to flood peaks, but it also enhances the aquatic habitat for native wildlife too such as invertebrates, fish, riparian birds and mammals.

## How it was achieved:

Tree felling into the stream at Wildmoorbank Hollow created LWD log jams with the intention of mimicking the natural processes such as windblown trees and deadwood in rivers. Trees were selected based on a number of criteria with both the aquatic and terrestrial habitats in mind. There was approximately 40 trees felled to create the 16 log jams in the brook. The jams were comprised of felling predominately non-native conifers, and the occasional alder, willow, beech and sycamore to introduce deciduous timber which has a lower resin content. This stream runs through a very steep sided clough with a tightly closed canopy and a narrow upland stream profile so trees were mostly felled parallel with flow direction. Approximately 2-3 trees were used per jam and trees were felled on top of the previous tree to create a lattice of interlocking branches and woody material. This interlocking mass creates a heavy, dense structure which doesn't mobilise in high flows. The most downstream trees were also back-tethered to their stumps using wire rope and cable clamps. This prevents them from mobilising in high flows but also acts as a fixed debris trap to collect any material should it come loose from upstream. This work was carried out using training arborists to fell the trees. The technique used here has been described as the 'Chop n Drop' approach which seeks to mimic windblown trees enabling the aquatic habitat to be restocked with woody material. The natural process of LWD in rivers is called the 'Riparian Wood Cycle'. LWD not only helps to reduce peak flows but it also has a crucial ecological role in freshwater rivers and streams.



**Rob Hudson,**  
Woodland Officer, United Utilities

**Why have you allowed this work in your woodland?**

“We’re really keen to ensure that the wider catchment is managed in a way that benefits water quality. We recognise that best-practise adopted across drinking water catchments improves water quality coming through our drinking water resources. This stream is directly above one of our drinking water reservoirs so we were keen to engage in work that would improve water quality.”

**What impacts has it had on the environment and habitat in your woodland?**

“The habitat has improved greatly since the work has been complete. In a rapid space of time we’ve seen physical differences to the watercourse and the way the stream responds in high flow. In partnership with Cheshire Wildlife Trust we have installed a trail cam in this woodland to observe how the stream now responds to high flows. We’ve been really impressed how the flow slows down dramatically behind each jam. This in turn has meant that lots of fine silts have dropped out onto the banks instead of flowing down into the reservoir.”

**Consents:**

The works at this site required the following consents:

**Land Drainage Consent**

Under Section 23 of the Land Drainage Act 1991 permitting works that may impede the flow of a water course. Issued by Cheshire East County Council.

**Felling licence**

Issued by the Forestry Commission under the Forestry Act 1967 permitting the felling of trees for any purpose that falls outside the exemptions listed by the act. In this case, the felling licence was part of an existing woodland management plan agreed with the Forestry Commission.

**Section 28 of the Wildlife and Countryside Act**

This act is in place to ensure wildlife, species and habitats are protected against disturbance and habitat degradation. As the work was also within the Peak District National Park consultation with the PDNPA was also required.

**Why was the work needed:**

Wildmoorbank Hollow had very few naturally occurring LWD jams within the stream. It flows through the bottom of a steep sided valley with a fast flow regime. The installation of LWD log jams improved the habitat for wildlife by introducing the pool and riffle effect. This provides shelter and foraging places for fish and invertebrates and also suitable spawning gravels. Additionally the work was needed to provide physical barriers in the stream to slow down peaks flows. Bank side felling of non-native conifers also allowed more light to penetrate the forest floor benefiting native ground flora.

**Benefits:**

LWD log jams have multiple benefits. Firstly, and crucially, log jams reduce flow rates meaning peak flow conveyance is much slower. Secondly, LWD has a localised positive impact on immediate downstream gravels and stones as the flow rate in the immediate vicinity is altered enabling the flushing through of fine silts and cleaning of spawning substrate. Silt and sediment eventually accumulate behind the structures with a leaf-pack. This creates the ‘pool-riffle’ effect above and below jog jams. LWD can also divert water during higher flows and allow it to reconnect with the floodplain. This allows silt and sediment to drop out of the water column onto the floodplain, decreasing the total sediment load in the stream. Woody debris also provides a natural habitat for many invertebrates, lower plants and fungi. It provides important refuge and foraging ground for fish and affords shelter for juveniles from high flows and predation. It engineers habitat diversity and biocomplexity.

**Construction data:**

- 16 LWD log jams
- 720 m of watercourse restored with LWD

**Costs:**

- 2 days FTE labour, 4 days of arboricultural contractor labour at a total costs of £1400 (ex VAT)
- Number of structures: 16
- Cost per structure: £87.50 (ex VAT)

