CASE STUDY: Gib torr

Gib Torr is situated amidst the Leek Moors Site of Special Scientific Interest (SSSI) and surrounding Priority Habitat. The site was formally a conifer plantation but has undergone felling operations to revert habitat to support native species. Headwater tributaries of the Dane catchment rise and flow through this site.

Location: Gib torr, Leek Moors Water course: Unnamed upper tributaries of Black Brook Sub-catchment: Dane, Upper Weaver-Gowy



Ownership:

Staffordshire Wildlife Trust (Nature Reserve)

Access:

There are no marked public or permissive footpaths through this part of the nature reserve. However, SWT have created a nature trail through this part of the reserve from which the interventions are visible.

About the project:

The aim of the project was to create a suite a Natural Flood Management large scale leaky dams known as 'run-off attenuation features'. They are located close to the source in a moorland setting in a <1k catchment. The headwater catchment run-off is attenuated during high flows behind the large leaky dams. By installing a series of 4 large scale run-off attenuation feature within the gulley the flow rate is slowed down during heavy rainfall events and water pools up behind the features contributing towards reducing downstream flood risk. In low flows, water passes unimpeded underneath the dams. In addition to installing the features, an upstream and downstream flume have been installed to measure the effectiveness of the features.

How it was achieved:

The installation of these large scale leaky dams was achieved by a combination of volunteers and contractors. Prior to the work commencing an initial assessment of the hydrology was carried out using GIS modelling to determine the attenuation potential



of the features. The construction of the dams commenced by transporting timber to site from a local conifer plantation and then across the gully to each dam location. 3.6m tall strainer posts were then knocked in across the gully using a mini digger to ensure the construction was anchored sufficiently into the ground to avoid wash-out. The digger tracked across the site using bog mats to avoid damage to the sensitive vegetation with the SSSI. Once the strainer posts were in situ, the rest of the construction was carried out by local volunteers. Timber lengths (7.6m long) were carried across the gulley using strops and timber handles in order to place the lengths against the strainers and secure them in place. This was achieved using fencing wire and staples, tensioning the wire in a cross brace around each timber length to attach it to the strainer. Construction continued using this method building the height of the dams up to 1.5m at the deepest point across the gully. Once the structures had been built to the optimal height the next stage was to construct the 'hydro-hedge' on the upstream side of the timber frame. This decreased the permeability of the leaky dams by effectively building a 'dead hedge' to reduce the passing of water through the structures following heavy rain. The hydro-hedge was built using brash and locally sourced grey/goat willow to stake it in place. The entire run-off attenuation feature was therefore built using all locally sourced, non-treated timber and woody material. The dams spanned the width of the gully and the location of each was determined to maximise the potential attenuation volume that the features could store during high-rain events. The construction was sufficiently designed to mitigate against wash-out and destabilisation.









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 Staffordshire County Council.

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 along with consulting other statutory organisations such as Natural England for SSSI consent.

Why was the work needed:

The work formed part of a wider Landscape Partnership Scheme delivering a Natural Flood Management Project called Slowing the Flow with a core aim of reducing flood risk downstream, particularly in at-risk communities. This piece of work sits right at the top of the Dane catchment in which there are over 400 at risk properties in the nearest downstream town. Projects like this in the headwaters, to improve the catchments ability to retain run-off after heavy-rain events, are essential in order to provide catchment resilience. This work forms part of a wider landscape scheme to retain small volumes of water at a plethora of sites, which collectively contribute to reducing flood risk.

Jon Rowe, Senior Land Management Officer, Staffordshire Wildlife Trust

Why have you allowed this work in your woodland?

"We have allowed this work on our site for two core reasons. 1) It enhances the wetland features of the site and improved the habitat for breeding wading birds which are a priority species for this area. 2) To deliver the Natural Flood Management benefits that these features bring."

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

"The work has brought localised benefits to the site by enhancing the wetland features in close proximity to the dams which has had positive impacts on foraging grounds for breeding wading birds. The features allow more water to engage with the gully floor for longer meaning that the vegetation and invertebrate life benefit from the localised wetland habitat features this has created."

Benefits:

These run-off attenuation features deliver a primary benefit of reducing the rate at which rainwater falling over this headwater catchments travels downstream by providing physical barriers within the flow pathway. Following heavy rain each of these 4 dams actively pools and attenuates water on the upstream side. Additionally this site has provided a pilot project for assessing the effectiveness of this type of intervention. It has been paired with research by Lancaster University looking into the methods of Quantifying Natural Flood Management. The installation of 2 flumes at this site provides a robust scientific reference as to their effectiveness. This ability to measure and monitor also facilitates informing design modifications. The actual 'leakiness' of the features can be controlled via adding to or removing material from the hydro-hedges. This projects allows us to use robust evidence gathering to directly inform design of capital interventions.

Construction data:

- 4 Run-off Attenuation Features
- 200 m of watercourse providing storm water attenuation

Costs:

- 14 days FTE labour, 74 days volunteer labour, 2 days of excavator contractor labour, materials at a total costs of £12,400 (ex VAT)
- Number of structures: 4
- Cost per structure: £3100 (ex VAT)







info@cheshirewt.org.uk www.southwestpeak.co.uk/projects/ natural-heritage/slowing-the-flow