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CASE STUDY
Overtown Farm, Cranham

A mixed livestock farm in the upper Painswick Valley. Much of the land is permanent pasture with some areas of arable on free-draining higher ground. Works have taken place in two locations on the farm - firstly within Sheepscombe Brook and secondly on grassland at Old Overtown within the catchment of an adjacent tributary.

Location: Overtown Farm, Ebworth Estate

Water course: Sheepscombe Brook and Painswick Brook

Sub-catchment: Painswick Valley, Stroud Frome

Ownership

The farm is owned by the National Trust and leased through a long-term agreement to a tenant.

About the project

Ten large woody debris (LWD) leaky dams and a fenced stream-side corridor were installed within Sheepscombe Brook. The aim of these structures was to help reduce flood risk by slowing the rate at which high flows travel to the Painswick Stream. The leaky dams were constructed from coppiced alder trunks and branches to provide a partial blockage of the stream. Coppicing will ensure that there is a sustainable supply of wood if the structures need repairing or rebuilding in the future. At Old Overtown, nine earth bunds have been created to slow down overland flows from fields.

How it was achieved

The LWD structures were pinned using 1.2m long 23mm wide reinforcing steel bars to prevent movement. Trees were felled and then manoeuvred into place using a tractor winch. Both the tenant and landowner wanted the works to be carried out by their existing contractors. The project officer worked with the contractors as a supervisory labourer to ensure that the works met the specification. Timber costs were donated.

The stream was fenced on both sides to create a stream-side corridor and prevent cattle from accessing the stream or the structures. To compensate for loss of drinking water, a drinking trough was connected to an existing spring as an alternative water supply. Again, the contract for this work was awarded to the farm's existing fencing contractor.

The low earth bunds have been formed in areas with high levels of surface flow during intense rainfall. These earthworks were completed using a 13 tonne excavator. All of the bunds were created by removing turf and top soil, removing sub-soil and then re-shaping the clay to form a bund structure. Bunds were compacted at all stages and sub-soil and top soil relaid, then re-seeded using a permitted seed mix. No material was brought on or taken from the site.

Consents

The works described above required four types of consent:

Land drainage consent – a consent under Section 23 of the Land Drainage Act 1991 permitting works that may impede the flow of a water course. Issued by Stroud District Council under powers devolved from Gloucestershire County Council.

Felling licence – a consent 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.

A derogation from Natural England – the land is currently under a Higher Level Stewardship agri-environment agreement so the derogation is needed to confirm that there is no conflict between the work and the aims of the agreement.

Permission from the Soil Association – As an organic farmer, Martin was required to confirm that no non-organic material would be used in construction.

Why this work was needed

The structures at Flock Mill and Old Overtown are primarily designed to help reduce flood risk by slowing the rate at which high flows travel to the Painswick Stream. The topography of the stream at Flock Mill allows a large amount of water to accumulate on the small flood plain.

Benefits

Large woody debris has several benefits. Firstly, and crucially, the structures reduce high flows, slowing the rate at which flood peaks travel downstream. Secondly, LWD will, over time, speed up the flows that are immediately downstream of each structure, cleaning gravels and stones of silts. Silt and sediment will eventually accumulate behind the structures, creating a small head of water and resulting in long-term changes to the stream structure. Large woody debris can divert water during higher flows and allow it to collect on the floodplain. This allows silt and sediment to drop out of the water column onto the flood plain, decreasing the total sediment load in the stream.

Woody debris also provides a natural habitat for many invertebrates, lower plants and fungi. It engineers habitat diversity, creating a system of pools and riffles which will attract a range of invertebrates and fish.

Fencing the stream will prevent cattle poaching and the erosion of stream banks. It will also protect cattle from injuring themselves on the structures. This will reduce levels of silt entering the stream, minimising pollution and flood risk downstream. The tenant has also recorded a few instances of liver fluke in this area. Reducing livestock access should reduce this issue.

The field bunds will reduce the surface flows that are caused by intense rainfall. The bunds attenuate peak flows, spreading themover a longer time scale. Attenuated water has an increased rate of infiltration, as the water is spread at shallow depth over a large surface area. The larger bunds can be grazed and driven over with farm machinery which limits the negative impact to the farm.

Construction data

- **10** large woody debris leaky dams
- **0.5km** stream-side fencing
- **1** large spring-fed drinking trough
- **7** small earth bunds (<10m)
- **2** large and long earth bunds (> 40m).

Capital costs

- **10** leaky dams – 12 FTE days plus tractor and winch at total cost of **£2,800 = £280 per structure.**
- Fencing and installation of trough: **£5,000**
- Construction of **9** earth bunds at total cost of **£2,750 = £305 per bund**

Why have you allowed this work on your farm?

"We have seen the soil and rain erosion get steadily worse over the recent years with heavier downpours and our landlord, the National Trust, were keen to see if there was a way of tackling this. We heard about the works on other parts of the NT estate and were interested to see what impact similar work might have on the farm."

What impact has it had on the farming or the land?

"Its a bit too early to tell what benefits the work will have downstream. When the earth works at Old Overtown were done, we had to shut the cattle out for a while to let the grass establish, but once they were grassed over, the impacts have been minor. It's interesting to see the young alder starting to grow now the cattle are fenced out of the stream at Flock mill, and the cattle used to get stuck in the boggy sections, so its good to have a proper fence in place now. We also used to get the odd case of liver fluke, so hopefully this will reduce now the cattle have a proper trough."

Martin Whitaker
Tenant