Sussex Flow Initiative case study:

Natural Flood Management at Pickeridge Farm

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Project summary

In the winter of 2019/20, Sussex Flow Initiative (SFI) with the help of volunteers and local contractors installed 70 leaky dams in the upper part of the Ouse Catchment. A Sussex Lund grant from the High Weald AONB Partnership enabled Natural Flood Management (NFM) through the utilisation of natural woody material to 'slow the flow' within the Cob Brook and its' tributaries.

In this project a variety of woody material was strategically placed and secured in small headwater streams running through Pickeridge Farm, Ardingly (West Sussex). These leaky dams slow and store water in the channel and engage flows out into the woodland during high flows, leaving low flows to pass unimpeded.

Figure 1: Leaky dam constructed to engage with high flows and engage flood waters into the wider woodland.

Site & catchment characteristics

National Grid Reference	TQ 350 301
Catchment, catchment size (fluvial extent)	River Ouse, 510 km^2
Land use	Semi-improved grassland and deciduous woodland
Soil type	Loamy and clayey soils with impeded drainage, with areas of slow permeability.
Annual rainfall (Met Office Standard Average Annual Rainfall 1981-2010)	727.7mm

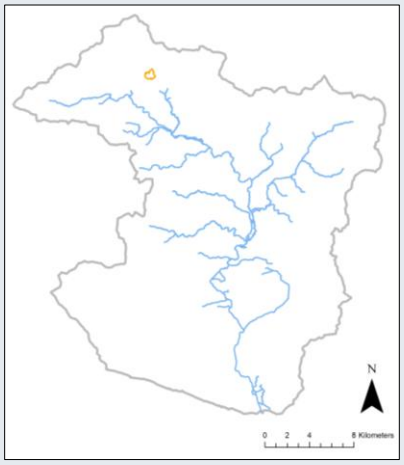

Figure 2: Location of Pickeridge Farm within the Ouse catchment.

Background information

Pickeridge Farm is approximately 47 hectares situated within the High Weald AONB, in a valley between West Hoalthy and Ardingly. Positioned in the upper reaches of the River Ouse catchment, the Cob Brook flows within this valley on the western side of the farm, fed by several smaller tributaries. The majority of the waterbodies and springs that form their sources, are located within broadleaf woodland, some of which are stunning Alder Carr. The reminder of the farm comprises of open pastures divided by a network of hedgerows, and home to outdoor pigs and a flock of sheep. It hadn't been farmed for 30 years when the current owners purchased the farm back in 2016, and they sought to re-establish a working farm, whilst increasing the sites biodiversity and its' wider landscape value.

Project work

A walkover of the site, allowed the opportunities for NFM to be identified and mapped. Leaky dams were identified as the primary NFM technique for Pickeridge Farm. A variety of different types of woody structures were used to slow and store water, and push water out of the channel and into the wider woodland. The increase in roughness of the woodland floor will further reduce water velocity. We ensured there was a 'buffer' area of stream immediately downstream of bridges, gateways and public rights of way. This was ensure there was no risk of backing up flood water onto the public footpaths or farm infrastructure.

The range of leaky dam techniques used makes Pickeridge Farm a fantastic demonstration site, to train people in NFM techniques and to educate and inform landowners and other stakeholders on what practical implementation of NFM can look like. A total of 70 structures have being installed, including banktop diverters, in-channel deflectors, woody dams, brash barriers and gully stuffing.

Pickeridge Farm Owner - *"The project has taught us about how effective natural flood management can be at holding back significant amounts of water even on relatively small waterways. "*

Figure 3: The variety of woody structures used to slow the flow, trapping sediment and debris.

Consent

Ordinary Watercourse Consent application was submitted and granted by the Lead Local Flood Authority, West Sussex County Council.

Training

The site provided an excellent opportunity to train volunteers from the local community, the Environment Agency and Sussex Wildlife Trust through a number of practical task days. Additionally the site was utilised to train local contractors (Wild Sussex and Miscellaneous Adventures) in the delivery LWD and to appreciate their benefits.

Monitoring

Funding from Lewes District Council and Brighton University has enabled the installation of depth gauges and other monitoring devices. The data collected will quantify the collective impact of the structures, as well as some of the individual structure impacts on both water quality and quantity. This information will add to the national evidence based for NFM within a lowland environment.

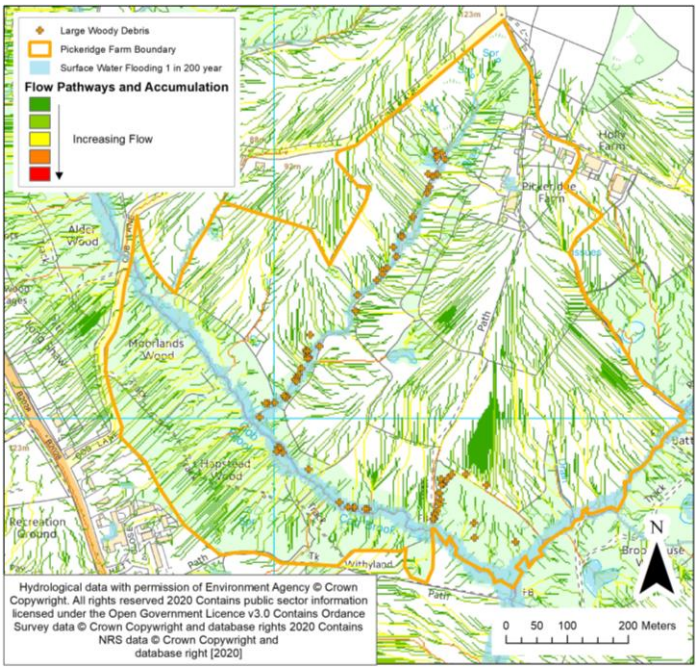

Figure 4: Map of Pickeridge Farm showing locations of woody structures.

Multiple benefits

Natural flood management provides a huge range of additional 'natural capital' benefits to people and wildlife. In addition to storing and slowing water for flood reduction, woody material, or "leaky barriers" provide important habitat for a range of aquatic species. They also help improve water quality by encouraging sediment and pollutants to settle out, and they help streams to naturalise and generate more heterogeneous habitat. Natural wood in streams also helps to regulate local and regional climates by storing carbon and cooling stream water. We estimate that our natural woody structures will be slowing and storing around 70,000 liters of water[1] per flood event, as well as large amounts of sediment.

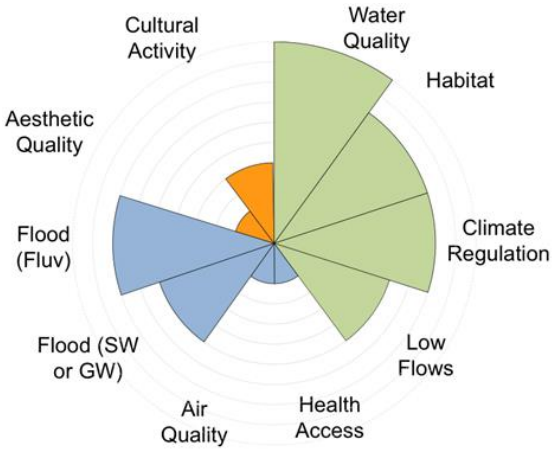

Figure 5. Types of benefits provided by 'leaky barriers'[2]

Collaboration & funding

This project relied on a strong relationship with the landowner, and was the result of SFI working closely with partners including Sussex Wildlife Trust, the Woodland Trust, the Environment Agency and High Weald AONB.

Project funding	Funding for the work was provided by a grant from the Lund trust, as well as from the Sussex Flow Initiative for staff time and in-kind contributions from land owner.
Overall cost and cost breakdown	**The total cost of the project was £2,572.06 (excluding £4,380 in kind)** Materials: £624.50 Contractors: £882.20 Interpretation design and production: £435.36 Ordinary Watercourse Consent: £150 Project Officer & Project Manager: £1280 + £1,000 Volunteer hours: 91 hours; £1,300 based on £100 per day

Future work

The existing network of hedgerows will be expanded with 150 m of cross-slope hedgerow that will intercept surface water flow and increase habitat connectivity. This planting is planned for the planting season 2020 - 2021. Opportunities of further NFM work, particularly increasing the number of leaky dams are being explored with the landowner, along with other nature based solutions.

[1] Based on each structure storing 1,000 L of water per flood event

[2] Environment Agency (2017) Working with Natural Processes: One page summaries [accessed here: http://bit.ly/2nTyDg8]

For more information please contact sussexflowinitiative@gmail.com or visit our website here