Sussex Flow Initiative case study:

Leaky dams & Washlands at Powdermill Wood

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Project summary

Powdermill woods Nature Reserve has been drying out in recent years, with negative impacts on its ecology. Significant opportunities were available to hold back flood water in the wet woodlands above and below a fishing lake, with further opportunities to open up floodplain washlands, so they can fill with floodwater during high rainfall. This would also help to reverse the ecological decline associated with the site drying out.

At least 50 opportunities to install NFM measures were identified in Powdermill wood. These include :-

- ‘Leaky dams’ in ditches and streams, including gulley stuffing and ditch top diverters
- Blocking surface water flow paths with brash bundles and other natural woody material
- Improving flood flow into washland storage areas

Background information

Powdermill wood is located 1 mile south-west of Battle, East Sussex, off the B2095, and a few kilometres north of Crowhurst. It is a privately owned woodland, made accessible to the public. This 6 hectare Nature Reserve is managed by the Powdermill Trust - a group of naturalists wishing to safeguard natural landscapes. As its name suggests, the site has a history linked to local charcoal and gunpowder manufacture. Because of historic land use, drainage channels divert scarce water around the edges of the site, so that the central site has limited water for much of the year.

Powdermill wood NR is designated as rare ghyll woodland, and includes patches of Ancient Semi-Natural Woodland. It is a good local example of tussock sedge, alder carr boggy woodland, with open fen and open pools, and is home to many different fern and sedge species. It is part of the larger Powdermill wood and lakes, which is a Local Wildlife Site (LWS), which has semi natural ancient woodland dominated by sweet chestnut coppice surrounding fishing lakes with areas of marginal alder carr habitat.

The site is within the High Weald Area of Outstanding Natural Beauty (HW AONB).

Site & catchment characteristics

Approximate Grid Ref	TQ 75637 12806
Catchment	Powdermill Stream, Combe Haven
Land use	Ancient Woodland Nature Reserve with tussock sedges.
Soil type	Ashdown beds with an overlay of Wadhurst Clay.

Consents

Ordinary Watercourse Consent was obtained from East Sussex County Council at a small cost. Consent was also required from the landowner. A report was commissioned on the archaeology of the wood prior to commencing work to ensure no archaeological features were damaged.

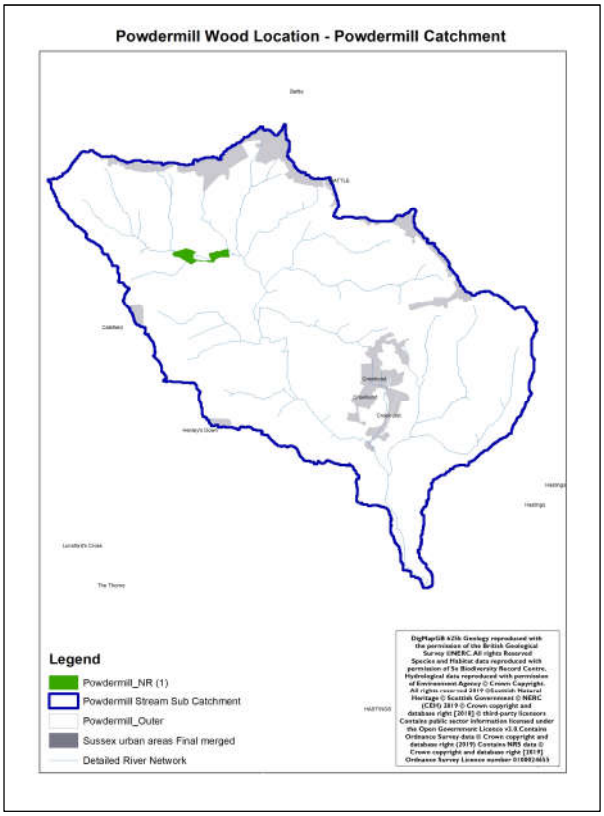

Figure 1. Location – Powdermill wood

Project outputs

Using volunteers with spades, a small breach, approximately 3 feet wide was made in a bund between the ditched channel and the wet woodland. A leaky dam was placed in the path of the main ditch flow, diverting water during high flows back into the floodplain washland. (see main picture above).

We estimate that if only 8" of water is stored across this 1 ha+ wet woodland site during a flood (we think it's a lot deeper), it is providing at least 2 million litres of additional natural flood water storage, or around 2,000 tonnes of water on every flood event. This is probably the cheapest and largest natural flood management benefit we have created so far!

Additionally, at least 40 leaky dams were installed across the site, to prevent water draining out of the washland area, to slow surface water flow pathways, and to increase washland interaction between streams and their floodplains. We estimate that each dam can slow around a tonne of water per rainstorm.

Further work is planned on pond and washland restoration, and leaky dams.

Figure 2. Volunteers installing leaky dams

Multiple benefits

Natural Flood Management provides a huge range of 'natural capital' benefits to people and wildlife. As well as storing and slowing water, "leaky dams" and washlands provide important habitat for aquatic and terrestrial species. They help to improve water quality by filtering sediment and pollutants, and they help streams to naturalise and regenerate more heterogeneous habitat for fish and other species. They help to regulate local and regional climates by storing carbon, mitigating drought, and cooling stream water. There are additional community health benefits provided by access to nature and volunteer days.

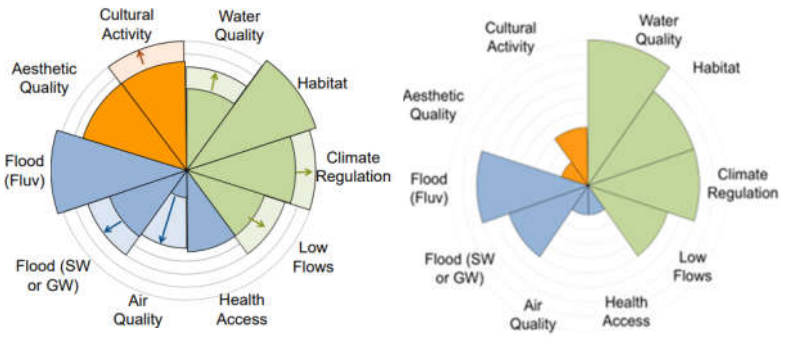

Figure 3. Types of benefits provided by Leaky Dams[1] (right) and Washlands (left). EA multiple benefits wheels

Collaboration & funding

The project relied on a good relationship with the landowner and SFI working closely with a range of partners including Sussex Wildlife Trust, the Powdermill Trust and the County Council.

Project funding	Funding was provided by Sussex Flow Initiative & the Powdermill Trust
Overall cost and cost breakdown	The total cost of the project was :- **SFI Project Officer time**: 5 days = £1,200 & **Travel** = £180 **Contractor time**: = £330 & **Travel =** £58.50 **Equipment and tools**: = £260 brash bundles + Delivery = £30 **Volunteer costs**: = £20 + Powdermill Trust volunteer costs **Other**: = £50 OWC land drainage consent **In kind contributions**: Landowner / Partner staff hours = £555 **Volunteer time**: 15.9 x £150 and 1 x £250 (chainsaw trained) = £2,635 IN KIND Cost. £3,220; CASH Cost. £2,128.50 **TOTAL Cost. £5,348.50**

Future work

SFI will continue to work with landowners in the Combe Haven and Cuckmere catchments to identify other opportunities for NFM. If you own land locally and want to learn more about using leaky dams to prevent flooding please contact us.

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

For more information please visit our website here.