Sussex Flow Initiative Case Study:
Natural Flood Management at Hillsdown Farm

Project summary

In the upper reaches of the River Ouse (Sussex) catchment and with headwater streams flowing from the site, Hillsdown Farm represents a fantastic opportunity to deliver numerous Natural Flood Management (NFM) interventions. A combination of water storage scrapes/shallow ponds, land drain interception and hedgerow planting were delivered in 2018. Aside from contributing to flood risk reduction, this work will provide multiple other benefits, including important temporary freshwater habitat with high water quality adjacent to the Ashdown Forest. Due to its potential wildlife sensitivity, an ecological consultant provided baseline data for the site.

Figure 1. Water storage scrape intercepting a land drain

Site & catchment characteristics

National Grid Reference	TQ 40550 31365
Catchment, catchment size (fluvial extent)	River Ouse, 510 km^2
Land use	Semi-improved grassland
Soil type	Sandy with underlying clay
Annual rainfall (Met Office Standard Average Annual Rainfall 1961-1990)	851mm

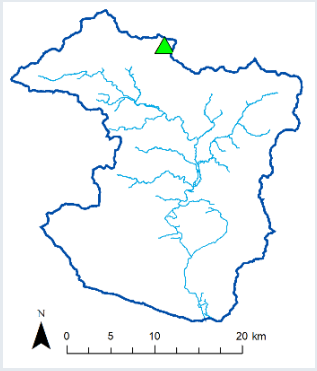

Figure 2. Location of Hillsdown Farm in the Ouse catchment

Background information

Situated on the edge of the Ashdown Forest, Hillsdown Farm comprises ~36 ha in the upper headwaters of the River Ouse, with abundant springs (largely piped into sub-surface drains) and three small ghylls feeding wooded streams on neighbouring properties. The land consists of steeply sloping acid grassland with some existing hedgerows and shaws.

Prior to work commencing an ecological survey was commissioned to ensure that any of the proposed work would not detrimentally impact on the farm's biodiversity.

Historic maps indicate that the site was entirely wooded in the 1860's and therefore the new hedgerows were primarily positioned to intercept overland water flow (rather than taking into account historic hedgerows) and to provide the landowner with important shelter for livestock, where possible utilising existing field boundaries.

Project work

Tree & hedgerow planting

A native species hedge mix was obtained from the Woodland Trust, and the shrubs/trees were planted with the help of contractors and volunteers. In the winter of 2018/2019, 500 m of hedgerow was planted, with a further 1.25 km of hedgerow planned for 2019 - 2021 (see Figure 3).

Re-wetting

The land is heavily sub-surface drained by a network of land drains approx. 1 m below the ground surface (see Figure 4), resulting in the rapid loss of water from the site. Where land drain collapses were visible, pipes were excavated for 1-2 m, then backfilled and compacted. Water storage ponds and scrapes were also created to intercept land drains, surface water flow pathways and springs. This work will restore the ability of the farm to hold water during droughts and reduce flood risk downstream following storm events. It is estimated that these scrapes and shallow ponds will store approximately 520,000 L of water following storm events, and the blocking of land drains will dramatically slow the transport of water from the site.

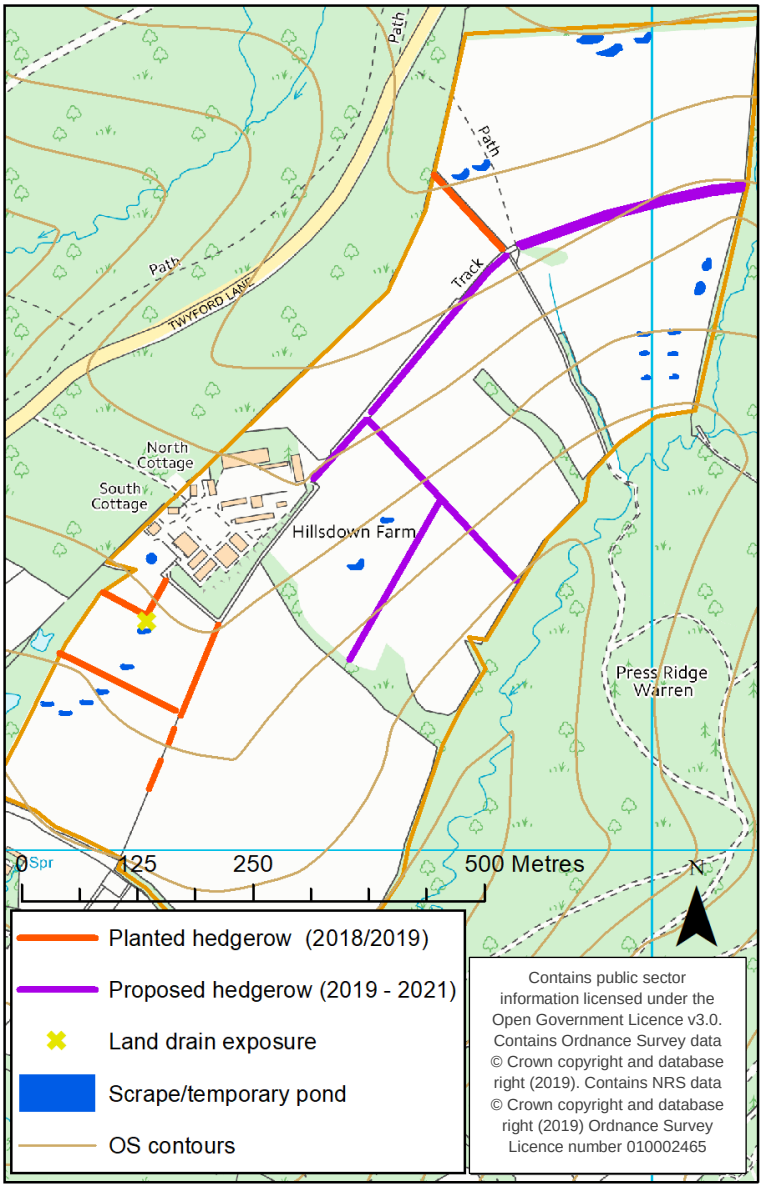

Figure 3. Map of NFM work at Hillsdown Farm

Figure 4. Sunken land drains (top-left), excavated land drains (top-right) and a series of scrapes to intercept the drains and overland flow paths

Multiple benefits

Natural Flood Management can provide a wide range of natural capital services to people and wildlife. The NFM work delivered at Hillsdown Farm will contribute to reducing flood risk in downstream communities by slowing down land drainage and surface water runoff, and by increasing water infiltration into soils. It will provide multiple additional benefits including CO^2 sequestration (up to 21 tonnes of carbon dioxide-equivalent p.a[1]), contribute to soil formation and air purification, and act as important temporary (water storage areas) and permanent (hedgerows) habitat for wildlife. The hedgerows will also provide shade and shelter for livestock as well as extra fodder for them, and will enhance local ecological networks. The blocking of the land drains will reduce sediment transport, create more wetland habitat, and make the farm more resilient to drought.

Figure 5. Cross-slope hedgerow

Collaboration & funding

The project relied on a strong relationship with the landowner, and was a partnership project between Sussex Wildlife Trust, the Woodland Trust, and the Environment Agency. The Sussex Flow Initiative was brought to the attention of the landowner via the regional Catchment Sensitive Farming newsletter, prompting them to make contact.

Project funding	Funding for the work was provided through the Woodland Trust's MoreHedges scheme, a grant from the Banister Fund, a significant contribution from the landowner and in kind contributions from SFI for Project Officer/Manager time and volunteers.
Overall cost and cost breakdown	**The total cost of the project was £19,735 (£13,910 excluding in kind)** Planting materials (incl. VAT): £1,812 Contractors (incl. VAT): £1,848 (planting), £5,180 (fencing materials [incl. locally coppiced chestnut] and installation), £3,630 (machinery and excavations) Ecological survey: £1,440 Project Officer & Project Manager: £3,375 & £900 Volunteer hours: > 60 hours (£1550) ***NOTE : This does not include costs for 2019/20***

Consent

For fields in Countryside Stewardship, Natural England were consulted for permission to create temporary wet areas (up to 0.1 ha was permitted in the CS fields) and to plant new hedgerows.

Future work

A further 1.25 km of hedgerow will be planted in 2019 – 2021, and opportunities for intercepting other land drains will be explored with the landowner.

[1] Natural England. Carbon Storage by Habitat: 13.7 $tCO2\text{-}e\ ha^{-1}\ yr^{-1}$ sequestered when land is changed from improved grassland to woodland (year 2 – 21). At £5 to £10 per tonne of CO^2 that's £105 - £210 per annum benefits.

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