

Case study

Focusing on flow in Sussex

September 2016



WOODLAND
TRUST

Focusing on flow in Sussex

Natural flood risk management heads South

The potential for natural flood risk management (NFM) is being explored in the lowlands of southern England. We have been identifying ways to slow and store water higher up the catchment using floodplain woodland, hedgerows and a range of other measures in partnership with Sussex Wildlife Trust (SWT) and the Environment Agency (EA).

Communities at risk

In 2012 the Trees on the River Uck (TrUck) project was established to explore the potential for NFM measures in the 105km² Uck sub-catchment, which is part of the wider Ouse catchment in East Sussex. Flooding here is due to a combination of factors:

- the impermeable clay soils and steep-sided gills in the upper catchment which cause the river to react quickly to storm events with high rainfall;
- the extensive and effective network of field drains and ditches;
- urban fringe estates and floodplain development;
- historical modifications and engineering resulting in deepening and straightening, particularly of main river channels.

There have been a number of severe floods in the catchment mainly impacting Uckfield town centre. Water from an area of 72km² flows through the channel here and, in extreme weather, it is unable to cope with the volume and speed of water. The most recent extreme flood in 2000 caused a great deal of damage to local housing and infrastructure.

Since then a traditional flood defence wall has been built in the town, but it was felt that the NFM measures should also be explored, in particular:

- planting floodplain woodland to increase surface 'roughness' (resistance to flood flow);
- planting woods and hedgerows to slow the flow of surface water and increase ground water infiltration;
- installing woody debris dams to encourage out of bank water movement in low impact locations;
- creating washland meadows - land adjacent to streams which can be used for short term flood water storage, such as species-rich hay meadow; and
- land drainage modification plus promoting positive soil stewardship and land management with landowners.

Project officer Sandra Manning Jones set out to find the best areas in the catchment to create additional riparian and floodplain woodland. This was done using a variety of data and GIS mapping techniques (*see box overleaf*) as well as using the results of Durham University research, which was commissioned some years previously by Uckfield Flood Forum.

The research used the 'OVERFLOW' model to assess the likely impact of various Catchment Riparian Intervention Measures' and produced a 'top 20' list of sites where they could potentially help slow the flow. The list was used to target landowner engagement, however, one of the early lessons was the need for ground truthing, as Manning-Jones points out. "As we have learnt more about the Uck catchment a number of places indicated by the OVERFLOW model were found to be unsuited to such changes due mainly to existing land use – a fishery at one site for example, but also in some cases due to a lack of landowner interest in making changes."

The human element

TrUck was not directly linked to any of the partners' landholdings so encouraging local landowner participation was vital. Since the start of the project it has consulted on around 2,000 hectares of the Uck catchment and engaged with over 50 landowners.

Wider landowner contact was also made using targeted mailings, articles in local media, links to partnership organisations, and also through attending local events.



Environment Agency staff helping to plant trees.

Sandra Manning-Jones

So far the project has planted nearly 23,000 trees, including four hectares of new floodplain woodland, and over 3km of new species rich hedgerows. "Landowners are often more amenable to hedgerow creation than woodland, as they provide many useful functions and do not mean a loss of land for farming," says Manning-Jones.

The project has also initiated a trial site in the Woodland Trust's Views Wood, near Uckfield, for woodland ditch blocking using woody debris dams, with the aim of developing a methodology for monitoring of further sites. Five woody debris dams were created by volunteers, using materials from the woodland, and placed in key locations along a deep woodland

ditch to help channel water into the wood and retain sediment and surface water run-off from the upstream housing estate. "This trial site has helped us understand the processes at play, how and where to install these dams, and also highlighted areas for further research focus. We are now working with local academic institutions to get more research projects in place," says Manning-Jones.

The project continues to build links with other NFM projects and practitioners as well as academics, in order to build knowledge in the field of NFM. It has established an Expert Forum to provide guidance and is publishing its own technical guidance, starting with one on the installation of woody dams and deflectors/diverters.



Sandra Manning-Jones

Ditch top flow diverters.

Project plans

The project was established with funding from the Environment Agency and the Woodland Trust, support from SWT, and also funding from the Royal Bank of Canada's Blue Water Project (rbc.com/bluewater).

After two years, with some additional support from the Adur and Ouse Catchment Partnership, it was expanded to cover the entire Ouse catchment and subsequently re-named 'Sussex Flow Initiative'.

More recently, the project alongside the Ouse and Adur Rivers Trust, has secured £300,000 of funding over three years from Lewes District Council. Funding will support education events as well as delivery of projects ranging from tree and hedgerow planting to the creation of attenuation ponds and the re-connection of the river to its floodplain at strategic locations.

"We know that the trees and hedgerows that we've planted will not by themselves save communities from all further flooding. But we are raising awareness of the way land use can impact flood risk and we hope to make a real contribution to flood risk management in the Ouse catchment," says Manning-Jones.

Diving into the data

The project used a variety of datasets, models and maps in order to help target areas including:

- Adur and Ouse Habitat Potential Model – produced by SWT to assess the potential to accommodate different wetland habitats in the catchment, including wet woodland, using a range of parameters such as soils, gradient and water inputs.
- Tithe mapping – SWT created digitised tithe maps from the 1840s that provide details of past land use and features now lost, such as woodland or river meanders, helping to highlight restoration opportunities.
- An analysis of the river hydrology – done in partnership with EA, which found that the synchronicity of the flood peak from each tributary could be a key factor in flooding and that the northern tributary streams were contributing to rapid runoff.
- A Flood Plain Woodland Potential Model – a simple model that excluded areas where there was a high risk associated with the backing up of water behind NFM measures or that were unsuited to woodland planting.
- Hedgerow Targeting – working with the Sussex Hedgerows Project a methodology was developed to prioritise areas for hedgerow creation, to reduce surface water flow, protect soils and enhance wildlife and connectivity between habitats.
- River Habitat Survey (RHS) – delivered in partnership with the Ouse and Adur Rivers Trust, this survey found bank erosion is occurring in many locations; arable land located near the river frequently lacks buffer strips; and much of the riparian land is used for agriculture.
- Compound Wetness Index – highlights those areas of the catchment that get wet first and drain last, in order to target locations for natural water retention measures such as leaky dams or ponds.

FOR MORE INFORMATION:

Contact: sandramanningjones@gmail.com
or conservation@woodlandtrust.org.uk

Visit: treesontheriveruck.org.uk and sussexflowinitiative.org



WOODLAND
TRUST

The Woodland Trust, Kempton Way, Grantham, Lincolnshire NG31 6LL.

The Woodland Trust is a charity registered in England and Wales no. 294344 and in Scotland no. SC038885. A non-profit making company limited by guarantee. Registered in England no. 1982873.

The Woodland Trust logo is a registered trademark. 861108/16