



# NATURAL FLOOD MANAGEMENT

**Natural flood management (NFM) involves using various techniques to restore or mimic natural functions of rivers, floodplains and the wider catchment. It aims to store water in the catchment and slow the rate at which water runs off the landscape into rivers, to help reduce flood risk to communities downstream. NFM can also be known as working with natural processes, slow the flow, sustainable land management or upstream management.**

## LEAKY WOODY DAMS

These may also be known as 'leaky barriers' or 'leaky debris dams'. They are constructed in-stream to slow the flow of a river by creating a permeable space that allows water through, but reduces the amount of water in the stream during high flows, such as during a storm. These structures can also encourage out of bank spill over which delays downstream peak flows.

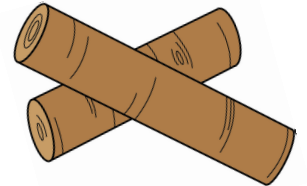
Whilst maintaining banks and removing obstructions from rivers is sometimes essential to reducing flood risk, other times there will be certain areas in the channel where leaving obstructions such as fallen trees or adding leaky woody dams could have multiple benefits.

### Wooden structures

Leaky woody dams consist of trees or logs that fall or are manually placed into a rivers channel. These wooden structures can be designed with varying levels of complexity, from one or two pieces of wood placed across a channel to dozens of stacked logs secured to the bank. They begin to gather debris and create a permeable space that still allows the normal flow of water, but at a reduced flow rate during higher flows. To increase the effectiveness of the dams, it may be recommended to create a series of them along the same watercourse.

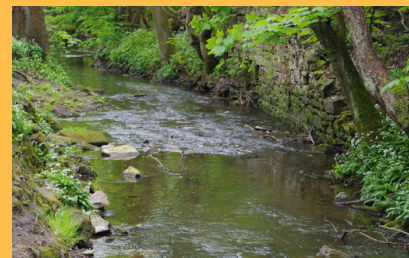
### Benefits

- Reduces flow rates to delay floodwater flows downstream.
- Can create pools and riffles on the rivers bank which provide habitats for fish and aquatic insects.
- Traps or slows the movement of silt and sediment downstream which also improves water quality.



### CASE STUDY: St. Helens Sankey Valley NFM

The aim of the Natural Flood Management project in Sankey Valley was to use hybrid woody dams to attenuate the flow of flood water into downstream Blackbrook and improve the habitat. The project was run in partnership by Natural Environment Research Council, St. Helen's Council, the Environment Agency and the University of Liverpool.



### Issues

- Black Brook in St Helens has flooded three times since 2000 (2000, 2012 and 2015), with the last event on Boxing Day 2015.
- The brook does not function as a natural ecosystem and fails EU directives for natural conditions.

### Solutions

- Four hybrid woody dams built to retain rapid flood flows in Stanley Brook tributary before arriving in downstream Blackbrook.
- Three dams constructed as part of a project to restore Stanley Bank Site of Special Scientific Interest (SSSI).

- Construction of a fourth dam took place by the Environment Agency, giving an overall cost of £2,000 for the four dams.
- Modelling is being carried out to see if further measures (flood relief wetland, de-culverting and further catchment attenuation) will be effective.

### Benefits

- Able to hold back 2,500m<sup>3</sup> of flood water (equivalent volume of an Olympic swimming pool).
- Attenuates runoff and reduces flood risk and floodwater depth.
- Resulted in reduced phosphate and nitrate levels in Blackbrook.