

# SOURCE

Partnership Report Spring 2017



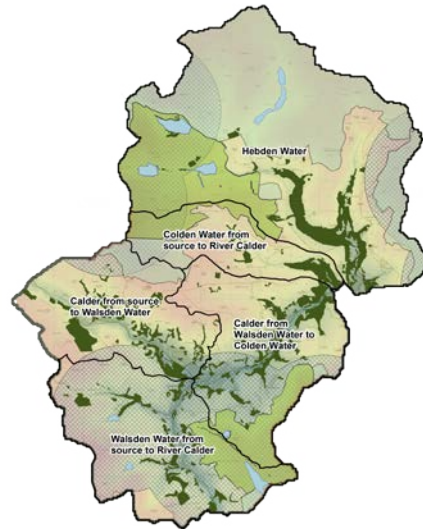
River and Land Stewardship in the Upper Calder Valley

## Introduction

The SOURCE partnership was established in 2010, aiming to:- minimize the risk of flash flooding in the Upper Calder Valley by appropriately sited tree-planting and moorland management; treat damaged land and control erosion; improve the quality of the River Calder; and undertake educational activities and encourage volunteering so that people of all ages and from all walks of life become aware of the value of our rivers and uplands.

In the wake of the 2012 floods, some small-scale **Natural Flood Management (NFM)** interventions were undertaken on treesresponsibility planting sites, but there has been a major step-up in our activities since Boxing Day 2015:-

- We have welcomed **Slow the Flow Calderdale** to the partnership. Over the last 9 months, their volunteers have spent an estimated 1000 hours collecting data at a staggering 1,500 locations along the Calder catchment's watercourses, taking photographs, and carefully measuring data about channel width and depth to inform flood modelling work. Their latest project is to develop technology to monitor river levels in the Calder Catchment. (See <http://slowtheflow.net/>)
- Large landowners have got involved. **The National Trust** and **Yorkshire Water** are particularly significant, as this will allow NFM to be carried out at a "landscape scale".
- **The Environment Agency** has embraced the concept of Natural Flood management as an adjunct to their engineering works. The EA has backed this up by giving us a significant increase in funding, with match-funding coming from the Woodland Trust, Calderdale Community Foundation, SUMA Wholefoods, and Calderdale CMBC.



The Calder Headwaters

This financial backing has enabled us to carry out the wide range of activities detailed in this partnership report.



## Tree Planting

Since the Boxing Day 2015 floods, Treesresponsibility has planted over **15,500 trees** and nearly a kilometre of hedge with the help of **1,200 volunteers**, many of them children from local schools. A big thank you to everyone who took part.

The new woodlands will not stop flooding, but they will minimise the risk, helping to make our valley a safer place:-

- Trees **increase the capacity of soils** to absorb water during heavy rainfall by lowering the water table. Organic matter from leaf litter improves soil depth and structure.
- Trees **improve infiltration**. Living and decaying roots help to minimise surface run-off by creating a network of well-connected channels in the soil (macropores) which allow water to filter down beneath the earth's surface.
- Trees **provide interception**. This is the percentage of rainfall retained by the tree canopy which is either absorbed by the tree, or evaporates back into the atmosphere.
- Trees help to **stabilise hillsides**. Deep-rooted species such as oak and alder, or hedges planted along contours, can help to minimise landslips, keeping soil on the hillsides and out of our watercourses.

All Treesresponsibility's planting sites are checked out by an ecologist from the Upper Calderdale Wildlife Network to ensure that areas of botanical interest or habitats of declining species are not adversely impacted.

The group are continually on the look-out for more planting sites. (See contact details on the back cover).



Volunteer training at lodge farm

## Hardcastle Crags Demonstration Project



In Spring last year, local engineer Stuart Bradshaw undertook a scoping report of Natural Flood Management opportunities in Hardcastle Crags and Crimsworth Dean which found numerous potential locations for installation of leaky dams – some on tributaries, and some in the main watercourse. Following the scoping study, Environmental Geology & Geotechnical Consultants Ltd were commissioned to conduct a geomorphological risk assessment of the in-channel sites in the main watercourses. The purpose of the risk assessment was to assess the geomorphological status of each proposed site location, giving indications of the stability or instability of each reach. As such, it took into account the natural channel processes which are occurring, and highlighted where these might interfere with the installation of NFM techniques. As a result of these studies an extensive programme of works has been drawn up involving gully-blocking on the valley sides, and 14 in-channel interventions in Hebden Water, with a further six in-channel sites awaiting further geomorphological investigation.

Environment Agency funding has allowed work to get under way, including the installation of monitoring devices, which will give “real time” data on river levels.

Craig Best, the Countryside Manager of Hardcastle Crags said:- *“As a significant landowner in Calderdale we have a responsibility to do what we can to slow the flow of water over our land. By working with volunteers and a range of partner organisations, we aspire to be the demonstration site for NFM best practice”*

**Anyone interested in volunteering on this scheme should visit [www.slowtheflow.net](http://www.slowtheflow.net) to sign up.**

As Slow The Flow Calderdale prepare for various natural flood management interventions at Hardcastle Crags, the question of which type of woody leaky dam is coming under consideration. The subject is complicated because it is important to ensure that the right schemes are put into place in the correct locations. The group is learning from the experiences of other NFM projects at Stroud and Pickering about the best methods to use.

The woody leaky dams used at Pickering can be termed the “horse jump” type in that they resemble the tiers of logs used in horse jumping. They rely on what civil and geotechnical engineers term “passive earth pressure” to keep them in situ. One can argue that these are not leaky enough and are subject to large forces - indeed several have failed in practice. The Pickering Beck is not as fast flowing as some of our upland rivers in the Calder Valley. This means that our leaky dams if built this way in the larger streams could have much greater hydrodynamic forces on them than those at Pickering and Stroud.

Since a fact finding visit to Stroud, the Slow The Flow group tends to favour a more random placement of logs, more like a beavers dam than a horse jump. These are leakier and will have lower forces on them. In the Stroud scheme, they pin the logs together with steel pins. They first drill them then drive the pins through into the ground. An improvement on this would be to secure some logs together with threaded dowels, whereby a bar is driven through at least two logs and a plate and washer is installed on each end of the bar clamping them together. Some designs use steel wire to bind the logs however this will rot through before the logs do. These random types of dam gather brash over time, which reduces their leakiness. However the brash washes through under high forces so they are self regulating. The horse jump types do not allow brash to “pop” and open up to let water through, particularly if the logs are straight and quite uniform.



“Horse jump” Type at Pickering



“Beaver Dam” Type at Stroud

## Ditches and Surface Water Runoff



### Plate Weir Study

Following the boxing day floods, engineer Stuart Bradshaw installed plate weirs on his land above Old Town. The picture shows stones placed downstream of the portholes to help protect the bed from scour.



After the installation, Stuart was approached by Alex Clark, a postgraduate student at Leeds Department of Geography who wanted to carry out a study into their efficacy. The study aimed to find some quantitative values for small weirs by working within a small 0.43 acre, flashy upland sub-catchment of the Hebden Water. It found:-

*“a reduction in storm intensity of 11.7%, with a peak stage reduction of 11.5%. Extrapolated findings to the catchment of Hebden Water notice a storm intensity reduction of 1.5%, if the weirs were installed on 1,974 suitable streams or gullies within the catchment area.”*



### Living willow

The picture shows a living willow leaky dam installed by Treesponsibility at Croft House Farm two years ago in order to reduce stormwater surface flow above an eroding bankside at Wittonstall Clough. The benefits of this approach are that the cuttings are firmly rooted, and the leaky dam will grow and improve over time. Maintenance simply involves trimming the willow stems every couple of years and piling the brush in front of the dam – a quick and easy job.



### Wooden leaky dams

On sites where stock are grazing, or deer are present, a different approach to slowing surface water needs to be adopted (the willow cannot thrive if it is browsed). In these locations Treesponsibility has installed timber leaky dams. The ones pictured are at Inchfield Pasture, slowing stormwater flow and redirecting it away from eroding bare ground on the valley side of Gorpley Clough.

## Millponds and Swales



### Stone Booth Farm

An abandoned mill pond at Stone Booth Cottage in Crimsworth Dean has been restored and modified so that it can attenuate up to approximately 1500 m<sup>3</sup> of water during a storm event. The pond had silted up over the years and the restoration required around 1000 m<sup>3</sup> of silt to be dredged out and encapsulated in a nearby excavation. The encapsulation was necessary to prevent the migration of Himalayan Balsam seeds and from silting up nearby watercourses. The clay recovered from the excavation was used to modify and strengthen earthworks around the existing pond outlet.

The existing pond outlet was modified with a smaller piped restriction to allow water above a flow rate of 600 l/s to be retained within the resulting reservoir. A crest weir was constructed to allow any excess water to discharge safely over the crest and away down the existing culvert in the event that the design pond capacity was exceeded. The engineering works utilised techniques that were appropriate technology for realisation of the end product whilst at the same time taking account of the restricted access nature of the site and the limited budget.

The feature is currently being landscaped and should return to its natural state within around two years.

### Swale at Tipside

The Todmorden Riverside Improvement Group has been working on Tipside in Todmorden to protect and manage a biodiverse area of open space in the town centre for people and wildlife since 1998. Tipside is already a flood zone, lying immediately alongside the Calder, with bunds at either end, installed by the Environment Agency. The latest project has been to construct a shallow swale on a particularly wet bit of the site to create a new wetland habitat, prevent water ponding on the existing footpath, and help to slow the flow by taking some surplus water during wet periods.



## Erosion Control - Land Slips



It is important to carry out prompt action to deal with and stabilise landslips after a flooding event before further rainfall transports the soil into the drainage systems below. Since the Boxing Day Floods, Environment Agency funding to the SOURCE partnership has paid for the treatment of nine landslips at six locations:- Meadow's Edge, Crimsworth, Dillscouts Wood, Blake Dean, Broadhead Clough and Hebden Hey. The work has been carried out using brash from woodland management – this is an ideal resource for erosion control as it can be processed into tight bundles called fascines which are then pegged into the ground across the contour to stabilise the soils.



The early part of this work was carried out by BlackBark, with Keith Wilson and friends from Sticks And Stones picking up the work in the latter part of 2016, using material mostly from a hazel coppice restoration project near to Knaresborough.



The installations have gone smoothly and, looking at the older sites, the interventions are speeding up revegetation successfully, keeping soil on the slopes and preventing siltation of river channels.

The first three pictures opposite show Meadows Edge where a major landslide occurred on Boxing Day 2015. The picture bottom left is of a previous erosion control site at South Grain, showing how eroding shales can be re-vegetated with mosses and grasses following installation of fascines.



As ever the SOURCE Partnership is on the look out for new sites to treat. If you have a site that could benefit from fascines or know a landowner with such a site then please arrange a visit by contacting [keith@sticksandstones.work](mailto:keith@sticksandstones.work)

## Erosion Control - Woodland Management



Whilst trees generally protect against erosion, beech trees are different because they shade out the understory and are shallow rooted, which can present an erosion risk on steep valley sides. EA funding has paid for selective felling of beech at Brown Bottom Farm and Hebden Hey.



Similarly, Himalayan Balsam is an annual plant which out-competes native perennials, resulting in bare soils in winter months. The SOURCE Partnership has put effort into balsam eradication in Colden Clough – a programme that will be continued in the next few years.

## Sustainable Drainage Systems (SuDS)

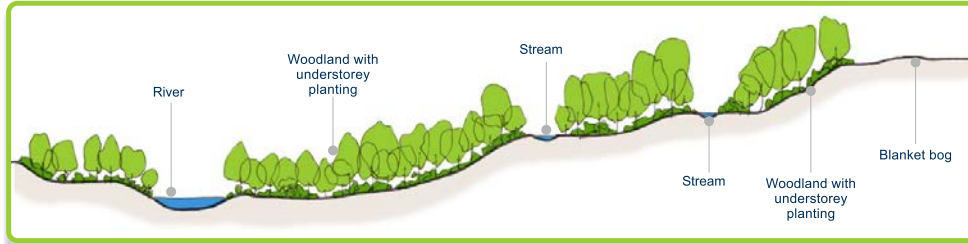
During and after the devastating Boxing Day Flood of 2015, thousands of valley residents gave time and money to help friends, family and neighbours recover. In the aftermath of the flooding, Amanda McDermott of 2b Landscape Consultancy Ltd. had the idea of encouraging people to store water in their own properties when flood warnings are issued. This could help to reduce the threat of similar levels of flooding in the future, and the need to help clean up on such a large scale.

If every person in Calderdale (200,000 approx) stored an average of 0.1m<sup>3</sup> (about a bathtub-full) of water in a flood event, we could store around 20,000m<sup>3</sup> (about 5 m<sup>3</sup> for every property that flooded on Boxing Day 2015). This could make a real difference, especially to water quality in areas which suffer from sewer flooding. Retrofitting urban SuDS (Sustainable Drainage Systems) is also a chance to contribute to local Green Infrastructure, improving wildlife value, air quality and the appearance of our urban spaces.

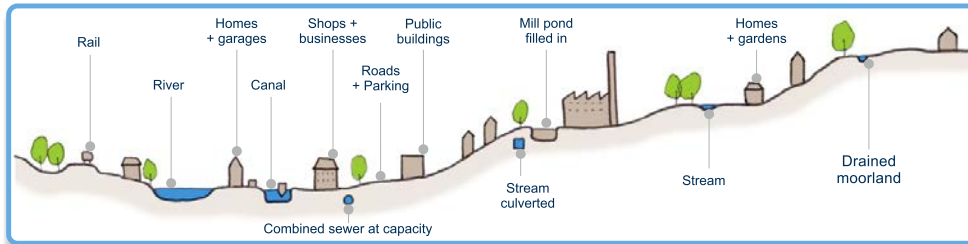
Funding from the Environment Agency through the SOURCE partnership has paid for the following pages of this booklet, which outline ways in which people can help to “Slow the Flow” in urban areas.

## You Can Slow The Flow

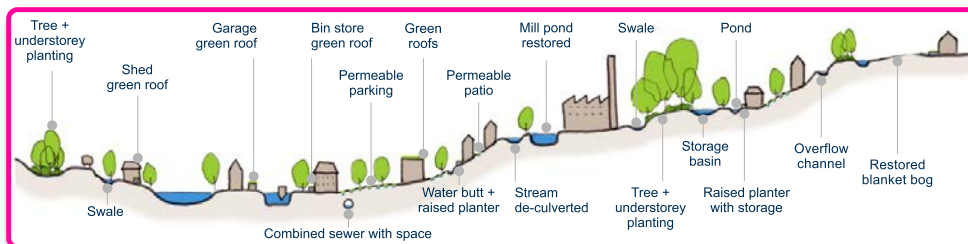
If our valley was **Natural** it would maintain a balance of water circulation through the processes of rainfall, evaporation, leaf interception and **absorption by plants**, surface runoff, and **infiltration to free draining ground**.



Due to human **Development** replacing plants and soils with **hard surfaces** such as roofs, roads, patios and car parking, **rainfall runs off much more quickly**, causing surface water and combined sewer flooding, and higher river levels.

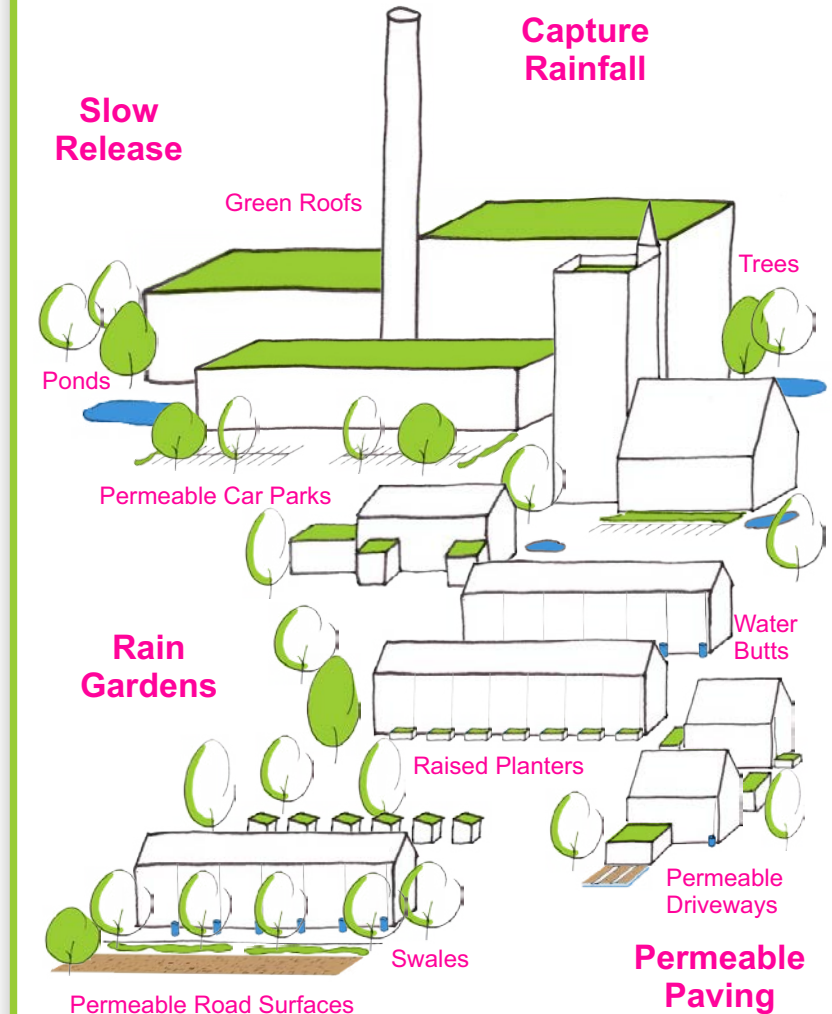


Using SuDS to **Slow The Flow** in our urban areas, as well as upstream, we can **mimic natural water management**. Many small changes can have a big combined effect on **reducing flood water quantity and quality**.



## You Can Slow The Flow

### Ways to Slow The Flow



## You Can Slow The Flow

Think about the space available and where rain water goes - **where are the puddles?**  
How does water behave in a storm?

**'Soft' areas** (planting, grass, earth):

Can you create surface depressions (swales/basins) that will temporarily **store water**, and then soak away?

Consider plants that take up moisture, but don't mind dry spells.

**Plant trees!** They prevent rain reaching the ground, use water as they grow, and break apart the ground with their roots.

**'Hard' areas** (paving, roofs, walls):

Can you **break up the surface** to allow infiltration? (e.g. replace tarmac with gravel + paved tyre tracks)

Could you construct **water storage planters** on top of hard areas?

**Divert drainpipes**, so that instead of going straight into the sewer, the water is temporarily stored / filtered and cleaned, through Slow the Flow methods (known as SuDS elements - see central box)

DIY is OK if changes are small-scale and simple, but get professional advice if you intend to:

- increase the volume at any outfall point
- work very close to a permanent river or stream ( $\approx 10\text{m}$ )
- make change to a listed building or in a conservation area
- create a green roof
- re-use grey water in buildings
- do anything that could affect your neighbours

NB. Remember we have a varied geology, i.e. water runs through sand, but if you are working with clay, it may puddle rather than soak in.



## You Can Slow The Flow

Let us know how you **Slow The Flow!**

We would love to hear your stories and see your photos. We hope to develop a local SuDS case study library.

Email [secretary@slowtheflow.net](mailto:secretary@slowtheflow.net) or search 'Slow The Flow: Calderdale' on Twitter and Facebook.

NB. Remember we have a varied geology, i.e. water runs through sand, but if you are working with clay, it may puddle rather than soak in.



We hope you are able to be proactive and start right away!

However, **you may not have resources to do anything right now**. If so, next time you repair or refurbish property, please consider SuDS.

### Quick Wins

Sign up to receive *Environment Agency Flood Warnings* (even if you're not in a flood zone)

Make *water butts* into 'mini leaky dams' in winter! Leave the tap open slightly.

### Be a Water Hoarder!

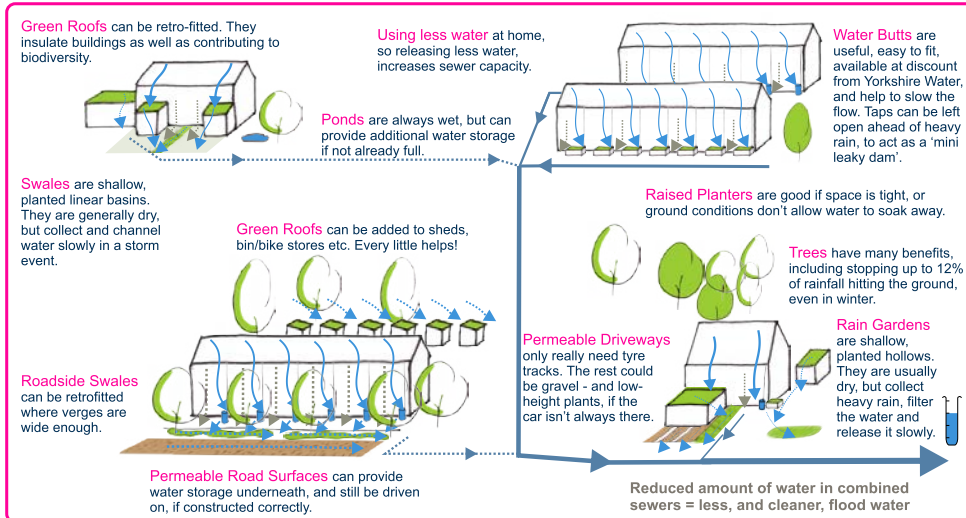
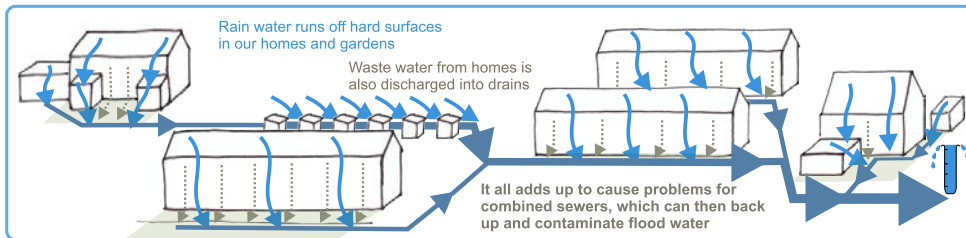
Help to prevent combined sewer overflows by altering your actions during flood events to **discharge less water into drains** (as you might in drought - e.g. shower rather than bath, wait to use the washing machine...) *Yorkshire Water* provide *tips and free water saving packs*.

The Calder Valley is great at holistic thinking. SuDS can also benefit **water quality, wildlife, health and attractiveness**.

Slow The Flow combines well with other **Green Infrastructure**: local resources include *Incredible Edible*, *TOUCH* (biodiversity for wildlife), & *Treesponsibility*

Please take a look at [www.slowtheflow.net/you-can-slow-the-flow](http://www.slowtheflow.net/you-can-slow-the-flow) for further information and larger, printable PDFs for each of the following topic areas.

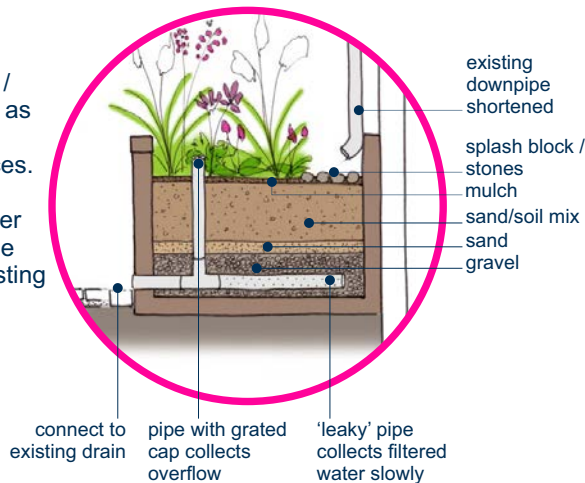
## You Can Slow The Flow: At Home



## Rain Garden Planters

divert water from drainpipes, to slow / reduce the flow into sewers. So long as there is a plan for any overflow, they can be built over existing surfaces.

Excess water can continue into the existing system, as before.



## You Can Slow The Flow: At School

### Swales

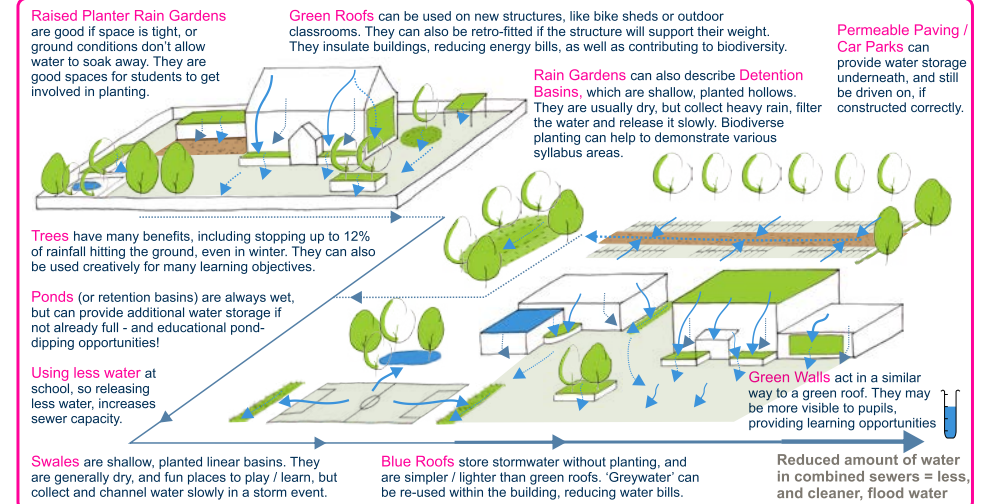
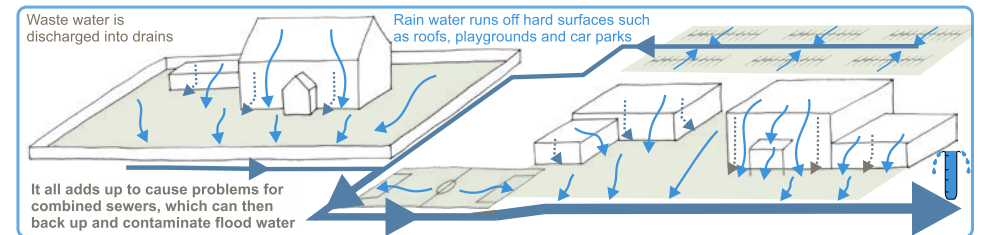
can just be a dip in a lawn, or can be planted with meadow seed and plug plants, to provide an educationally useful biodiversity corner that needs mowing less often. They can direct water to a pond, or allow it to soak away.



### Green Roofs

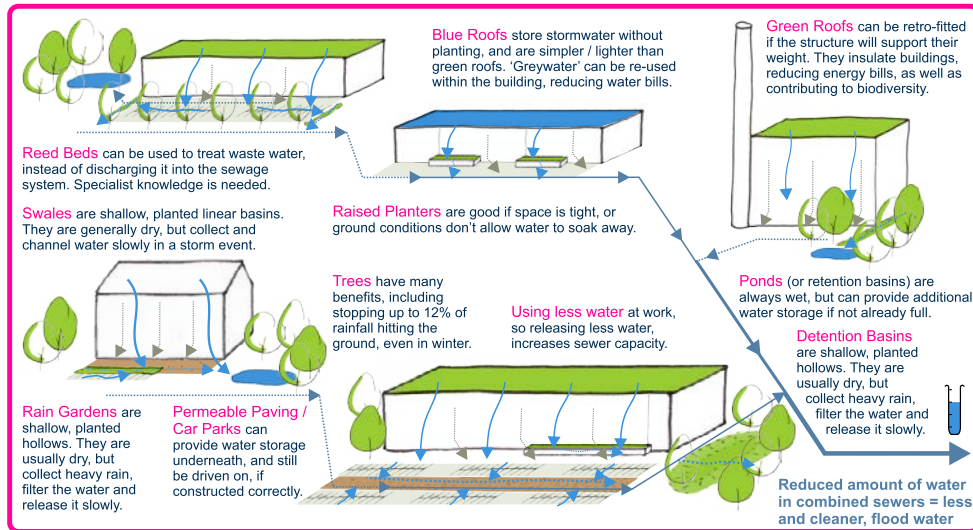
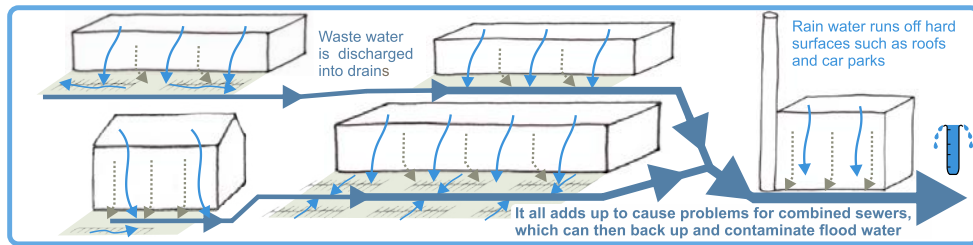
and blue roofs (without vegetation) can be put on all flat / gently sloping roofs, from classrooms to bicycle / scooter / outdoor classroom shelters. Professional advice should be sought, to ensure loading and waterproofing are appropriately handled.

Sedum roofs and blue roofs can be lighter than biodiverse planting schemes, which need deeper soil. All can be designed to need very little maintenance, and green roofs look attractive!





## You Can Slow The Flow: At Work



### Detention Basins

are shallow, planted areas, that are usually dry, but collect heavy rain. They can be any scale, and can either allow the filtered water to infiltrate the ground, or send water slowly to the traditional drainage system via an outfall.



### Permeable Surfaces

can replace car parks and paths with materials that don't shed water, such as:

- gravel
- reinforced grass
- porous surfaces
- permeable paving
- slabs/setts on gravel and without mortar

Extra water can sometimes be stored underneath, using a layer of stone, or in special crates.



## You Can Slow The Flow: Public Spaces

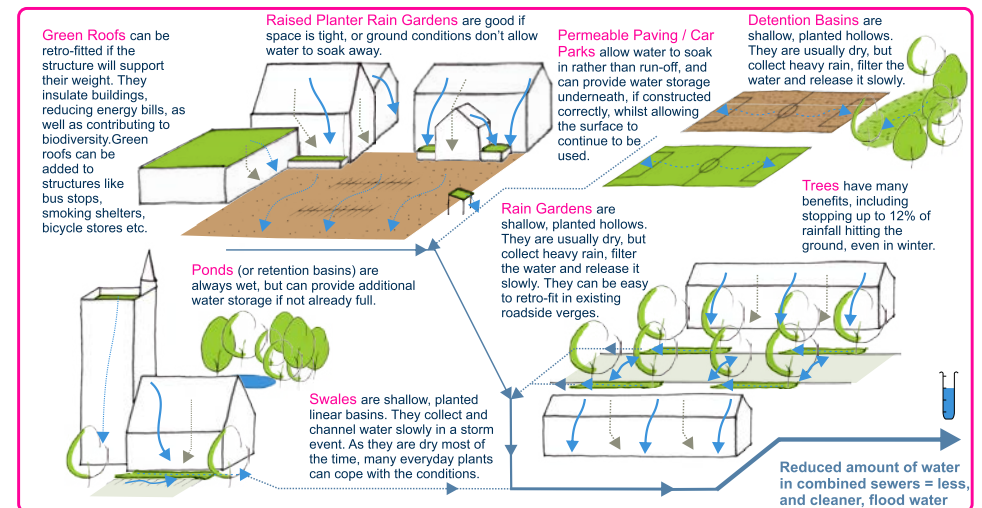
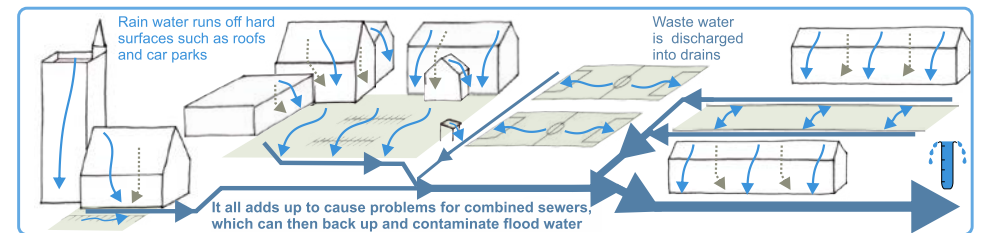
### Trees

have multiple benefits for biodiversity, air quality, aesthetics, health and wellbeing. They also improve the rate at which water infiltrates the soil, and reduce erosion (preventing sediment from blocking water courses). Tree pits in paving can be designed to store and slowly release water.



### Rain Gardens

are planting areas, located where they collect run-off and store it temporarily - they are dry most of the time, but become boggy in downpours. Roadside verge rain gardens are a good way to harness community energy, and can be designed for biodiversity / teamed with Incredible Edible or tree planting.



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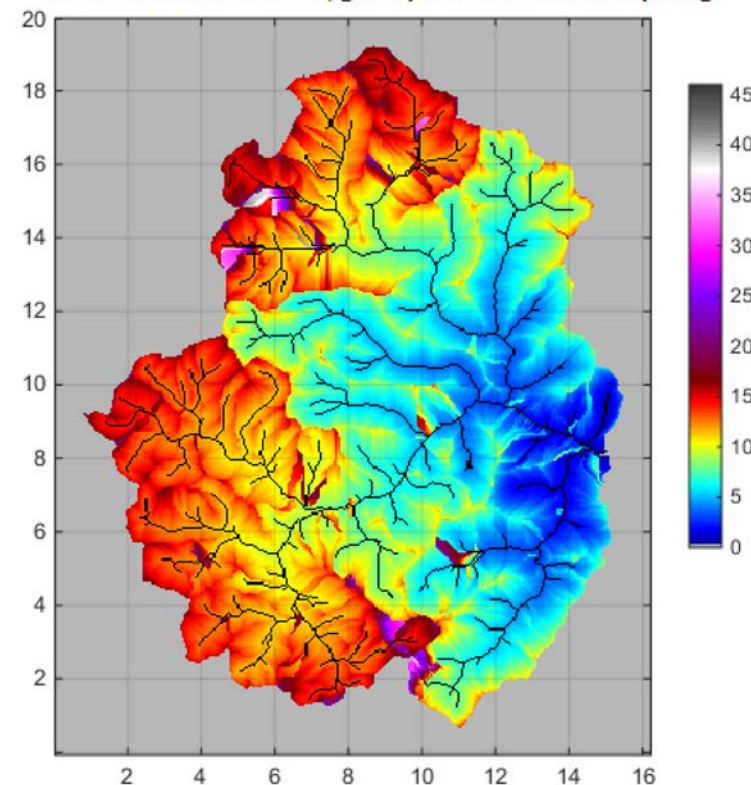
In May 2016 Pennine Prospects invited hydrologists, practitioners and experts from universities and the world of consultancy to a hands on workshop for residents and schools at Hebden Bridge Town Hall to inform the discussion around catchments and flooding. How do catchments respond in flood events? What happens in an extreme event? How can modelling help predict future events? What is Natural Flood Management? How can information collected by residents help improve predicting future events? It is impossible to do justice to the wealth of information at the event within these pages, but the following presentations can be downloaded at <http://www.pennineprospects.co.uk/news/the-science-of-floods>

- **Managing Risk in an Age of Extremes:** Professor Onno Bokhove, University of Leeds.
- **The Natural Flood Management Approach:** Steve Rose, JBA Consulting.
- **Case study 'Slowing the Flow' Pickering:** Dr Nick Odoni, University of Durham and Mike Potter, Pickering and District Civic Society
- **Moorland restoration and 'making space for water':** Dr Jonathan Walker, Moors for the Future.
- **Integrated catchment management and partnership working:** Mike Norbury, Honorary Associate Researcher
- **Local solutions:** Stuart Bradshaw, Geotechnical Engineer

As well as presentations there were physical models and demonstrations to show what actually happens in a flood event. The children pictured below are using a flume provided by JBA Trust to learn about the impact of differing flood management interventions.



'OVERFLOW time map, showing the flow passage time in hours of water to the outlet, here assumed to be just downstream of Mytholmroyd. Base rainfall rate of 20mm, grid squares shown at 2km spacing.



A particular thank you to Dr. Nick Odoni (Honorary Fellow, Department of Geography, Durham University) who conducted a modelling exercise of the Upper Calder catchment. Whilst cautioning against over-reliance on models, Nick said that they could be a useful tool in deciding where NFM interventions would be most effective. NFM would probably not be appropriate in the dark blue areas in the overflow time map, above, whereas interventions in the dark red and purple areas would be most beneficial. Nick also conducted a modelling exercise on Moorland burning which concluded that:- *“management which eliminates burns and encourages conservation and restoration of sphagnum, so that the latter over time replaces some or much of the cotton and moorland grasses and heather, leads to a marked reduction in the flow peak in Hebden Bridge.”*

## Learnings - Soils and Drainage

Aidan Foley of Environmental Geology & Geotechnical Consultants Ltd gave us an overview of soil issues in the Upper Calder Valley.....

There are many stores for rainfall across the upper Calder catchment, and each of them releases water at different rates. The main stores are within SOILS and GROUNDWATER, on FLOODPLAINS, and in other SURFACE WATER BODIES (e.g. ponds and lakes). VEGETATION also intercepts a lot of rainfall and surface runoff. Regarding soils, studies have found that field drainage may either increase or decrease peak drain flows by as much as two to three times. The key factor is the relative importance of two processes:

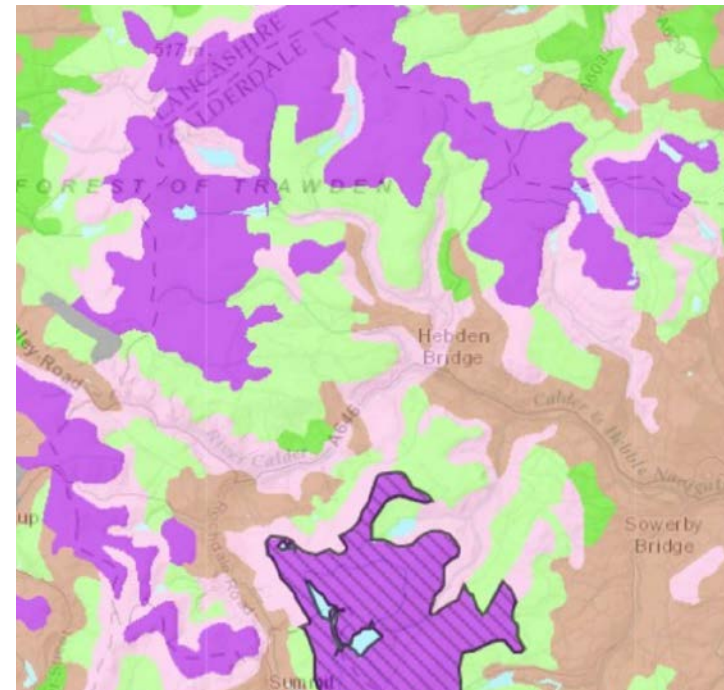
- **Increased** flows due to drains carrying surface water runoff faster than subsurface flow through the soil.
- **Reduced** flows due to an increase in soil storage capacity created by lowering the water table.

In the upper Calder catchment, outside of the immediate river valleys, SOIL types are dominated by Blanket Bog, Peaty Upland Soils, and Clayey/Loamy Soils (see diagram). All of these soils exhibit naturally LOW PERMEABILITY, or in other words, they do not readily transmit water. This means that, even if these soils have a deep unsaturated zone they are still unlikely to absorb a lot of water in heavy rainfall events. This is because the rate of rainfall arriving at the surface exceeds the potential rate of infiltration. This is especially so where burning occurs on blanket bog, or clay soils become 'puddled' or develop 'soil pans' (impermeable near-surface layers) due to livestock trampling. Soil drainage typically only works when these soils are cultivated, as ploughing breaks up poor soil structure and promotes infiltration. Where soils are of low permeability, rainfall tends to generate SURFACE RUNOFF, as opposed to entering storage within the soil or underlying GROUNDWATER. Where this surface runoff can rapidly enter the drainage network, it soon appears in the main stream and river channels, contributing to flooding.

With regards to FLOODPLAIN STORAGE, there is naturally only a small potential volume within upper Calderdale, due to the steepness and narrowness of the valleys, and this is worsened by historical trends of building on floodplains, such as in Hebden Bridge town centre. Thus, there is little opportunity to develop floodplain storage on the main Calder channel, although there are opportunities on the tributaries, such as Hebden Water.

For the above reasons, SURFACE STORAGE and VEGETATION appear to be the best possible areas to develop water storage, and it is exactly these that the Slowing the Flow interventions outlined earlier in this booklet aim to achieve: to create lots of surface water storage on a LITTLE & OFTEN basis across the catchment through leaky dams, large woody debris, hedgerow & tree planting, and temporary storage ponds. Where water becomes trapped at the surface it promotes evaporation and uptake by plants, as well as infiltration to soil and groundwater, where it may take between days and years to emerge as steady baseflow in rivers. By adopting such a LANDSCAPE SCALE management technique, large volumes of water may be temporarily trapped at the surface, evaporated or infiltrated, thus lessening peak flood flows within the main river channel and reducing flood risks to our towns and villages.

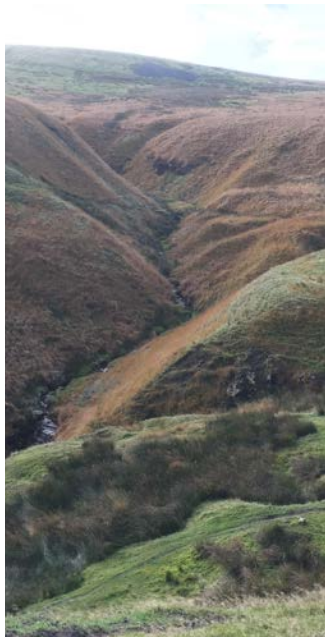
Aidan Foley  
BA MSc PhD FGS



- Blanket bog peat soils
- Slowly permeable wet acid loamy and clayey soils
- Slowly permeable wet very acid upland soils with a peaty surface
- Very acid loamy upland soils with a wet peaty surface

## Gorpley Landscape for Water Project

- Key**
- Footpaths
  - Peat Restoration
  - Wet Grassland
  - Woodland
  - Heath Land
  - Leaky Dams
  - Scattered Trees



Yorkshire Water is planning a major “landscape for water” initiative on their land at Gorpley in partnership with the White Rose Forest.

Sixty hectares of species poor grassland will be planted with trees which will help slow down the rush of rain water to vulnerable locations. Approximately 3,000 trees will be planted per hectare which could mean up to 200,000 trees planted over the next couple of years by local community groups. Other natural flood management measures will also be implemented over the next 5 – 10 years:- 43 hectares of blanket bog will be improved by restoring peatland with sphagnum moss, which absorbs and slows down rain water runoff to act as a natural flood barrier; leaky dams will be installed on some of the smaller watercourses; fascines will be used to reduce the risk of soil erosion; and a patchwork of wetland areas will be created.

## Moors for the Future Partnership

MFF is carrying out conservation works in the upper Calder Valley at Heptonstall and Turley Holes. The work to restabilise and revegetate areas of bare peat, raise water tables by blocking gullies and grips, diversify plant species and re-introduce Sphagnum mosses, contributes to improvements in biodiversity and water quality, retention of carbon in soil, reduction of wildfire and flood risk.



## NFM Potential in Council Woodlands

Scoping surveys have carried out for Calderdale CMBC woodlands in Colden, Lumbutts and Gorpley. The Council will devise schemes appropriate to these sites including leaky dams, gully stuffing, plate weirs and increased woodland management to improve understorey, soil structure and erosion. CMBC will also be looking at NFM options for Norland Moor.



## Treesponsibility’s On-going Programme

So far Treesponsibility has identified sites for about 7,500 trees in the coming year, as well as several potential sites for attenuation ponds, landslip treatment and leaky dams. All the above are subject to approval by the Upper Calderdale Wildlife Network ecologist, Charles Flynn.

## A Demonstration SUDs Garden

The next step for ‘You Can Slow The Flow’ will be demonstration gardens, to encourage implementation of urban SuDS through physical showcase. Plans are developing for a collaboration between Calder & Colne Rivers Trust and Slow The Flow: Calderdale in Hebden Bridge Town Hall Courtyard, demonstrating the creation of retrofitted rain garden planters and riverside biodiversity corridors.



# Contacts

## Treesponsibility

has been active in the Upper Calder Valley for 19 years, and is always delighted to hear from landowners who can offer land for tree-planting, or other small-scale NFM interventions. 07847 815 926, treesponsibility@yahoo.co.uk  
www.treesponsibility.com

## Moors for the Future / MoorLIFE

undertake moorland restoration throughout the South Pennines, including the Calder headwaters. www.moorsforthefuture.org.uk  
t: 01629 816 200

## Slow The Flow Calderdale

was set up to look scientifically at the issue of why and how the Calder Valley floods and to look at natural flood prevention measures and solutions to slow the volume of water which comes down the hillsides into the River Calder. They are a group of dedicated engineers, scientists, landscape experts, and those working in land management. Contact them to help with river surveys or leaky dam construction www.slowtheflow.net

## Sticks and Stones

carries out woodland management work, and treatment of landslides with fascines.  
keith@sticksandstones.work

## Calder and Colne Rivers Trust

focus on water quality and the river habitat, and carry out monitoring.  
judithmilner@outlook.com t:07906 023165

## Facilitation Fund

Farm adviser Ann Blackburn, and woodland manager Matt Taylor are working together with funding from Natural England to build a network of land managers facilitating landscape scale benefits for biodiversity, water quality, and natural flood management. The group currently includes 5000ha of farmland, moorland, and woodland from 25 group members. They hold regular meetings and training events as well as developing funded projects and work programmes with partner organisations. Forestandland@gmail.com

## Calder Future

carries out riverside stewardship and organises river clean up days.  
gavin@calderfuture.org.uk t: 07772 318566

## The Upper Calderdale Wildlife Group

carry out ecological surveys of all proposed tree-planting sites in the Calder headwaters. charles.flynn52@gmail.com