

You Can Slow The Flow!

Exploring how we can all help to reduce
flooding, with small actions

at **Home, Work, School** and in **Public Spaces**

www.slowtheflow.net

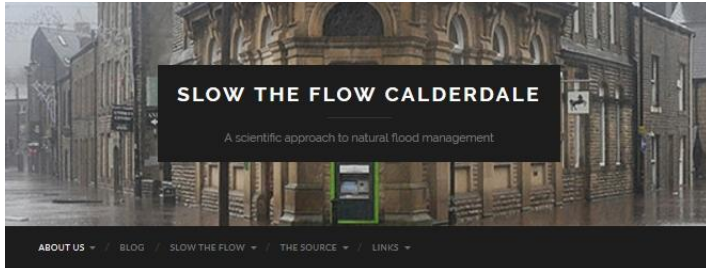


@slowtheflow_UK



Slow The Flow: Calderdale

Slow The Flow: Calderdale

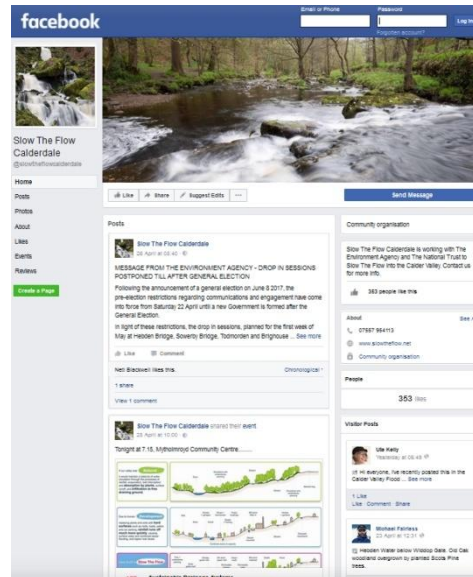


About Us

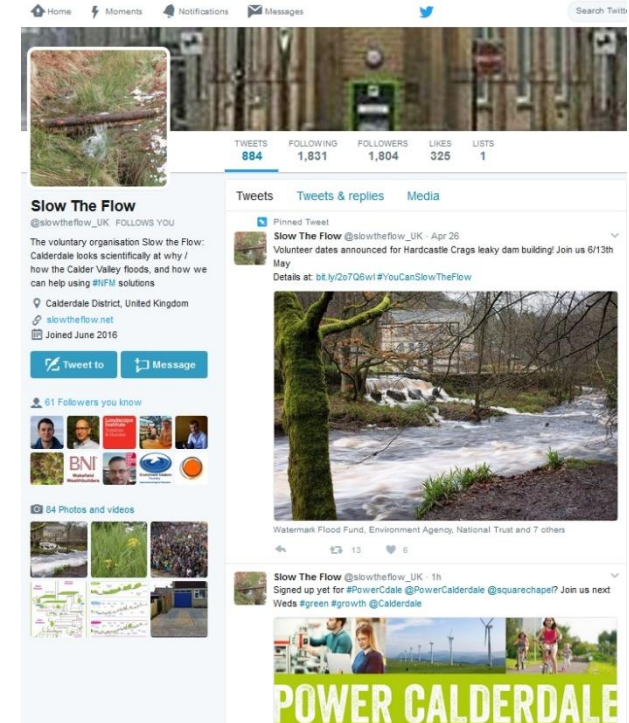
Over Christmas and Boxing Day 2015, Pennine areas in the North of England had over 60mm of rain fall in 24 hours and some locations had over 100 mm. During this time, the Calder Valley suffered the most significant flooding event in recent times. 2,781 homes and 4,416 businesses were flooded all along the Calder Valley causing unparalleled and significant damage.

Recorded flooding events in the Calder Valley go back as far as 1615 so it is evident that some action needs to be taken to look at why this is happening.

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. We are a group of dedicated engineers, scientists, landscape experts, and those working in land management. We are working with Government, The Environment Agency, Calderdale Council, The National Trust, Natural England, Treesponsibility, The Source Partnership, The Calder & Colne Rivers Trust, Pennine Prospects, Calder Futures and the Flood Wardens along the Calder Valley to seek a solution to this continuing and growing problem.



"The Government has relied on flawed planning policies: sub-standard sustainable drainage system approaches have led to far too few schemes being installed in new developments and too



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Slow The Flow: Calderdale

Calder Valley Flooding Collaboration

SOURCE

Partnership Report Spring 2017



River and Land Stewardship in the Upper Calder Valley

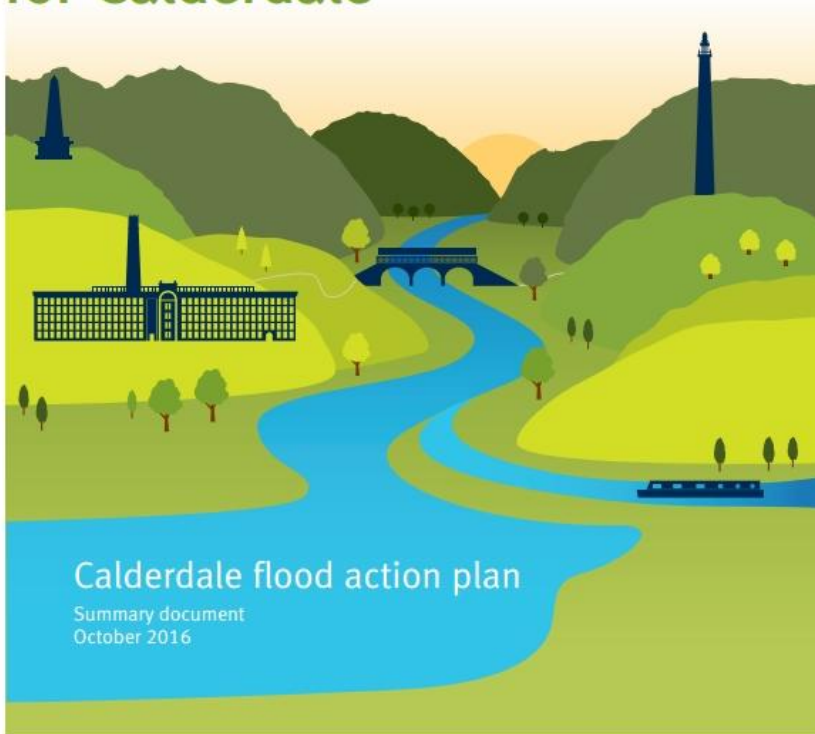
- Slow The Flow: Calderdale
- Treesponsibility
- Yorkshire Water
- The Calder and Colne Rivers Trust
- The Upper Calder Valley Wildlife Network
- Todmorden Moor Restoration Trust
- Calder Futures
- Calderdale MBC
- The Environment Agency, Pennine Prospects
- The White Rose Forest.

Calder Valley Flooding Collaboration

Working with the
Calderdale Flood Partnership



how we're reducing
the risk of flooding
for Calderdale



Aire & Calder Catchment Partnership	Northern Gas Network
Calder and Colne Rivers Trust	Partnership Community Resilience
Calder Catchment Flood Studies Group	Operational Group
Calder Future	Pennine Prospects
Calderdale flood groups	Northern Powergrid
Calderdale flood warden groups	Royd Regeneration
Calderdale Metropolitan Borough	Todmorden Pride
Council	Treesponsibility
Canal & River Trust	The Source Partnership
Forestry Commission	Upper Calder Valley Flood Prevention
Hebden Bridge Partnership	Group
Hebden Royd Town Council	Water@leeds
Moors for the Future	West Yorkshire Local Nature Partnership
National Farmers' Union	West Yorkshire Local Resilience Forum
Natural England	White Rose Forest
Network Rail	Yorkshire Water

Flooding and Climate Change

River basin district	Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Northumbria	Upper end	20%	30%	50%
	Higher central	15%	20%	25%
	Central	10%	15%	20%
Humber	Upper end	20%	30%	50%
	Higher central	15%	20%	30%
	Central	10%	15%	20%
Anglian	Upper end	25%	35%	65%
	Higher central	15%	20%	35%
	Central	10%	15%	25%



90th percentile

70th percentile

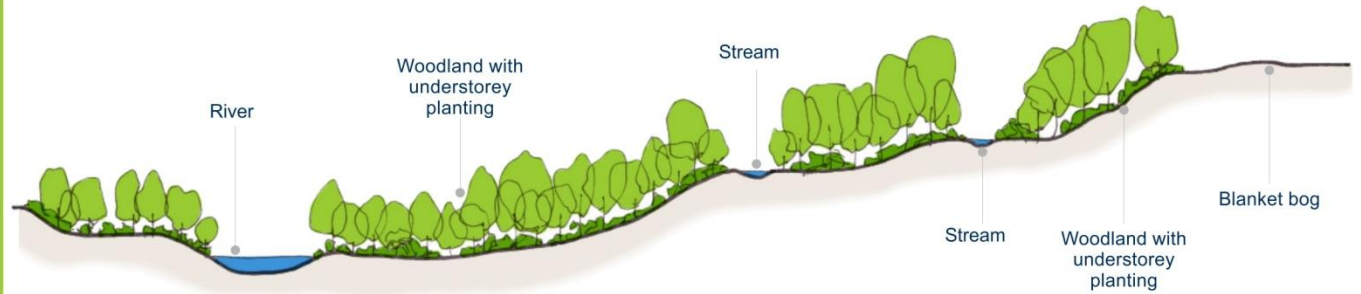
50th percentile

You Can! - general principles of SuDS (Sustainable Drainage Systems) and NFM (Natural Flood Management)

If our valley was

Natural

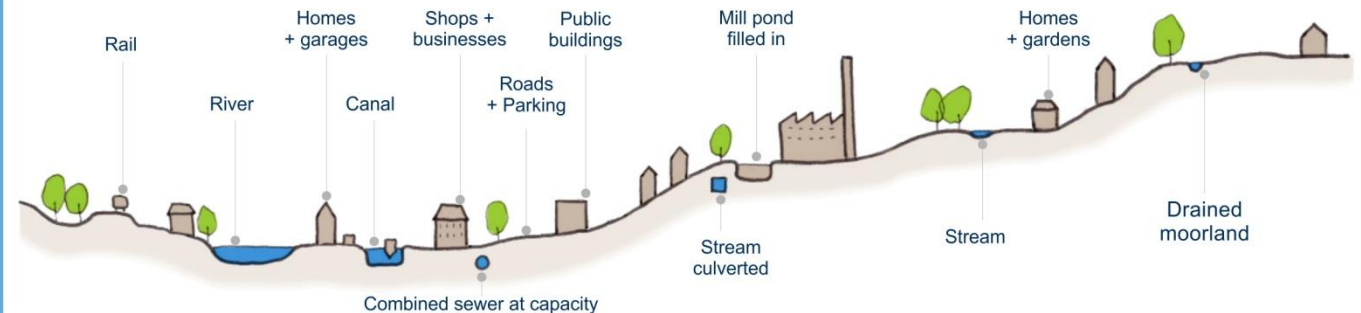
it would maintain a balance of water circulation through the processes of rainfall, evaporation, leaf interception and **absorption by plants**, surface runoff, and **infiltration to free draining ground**.



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.



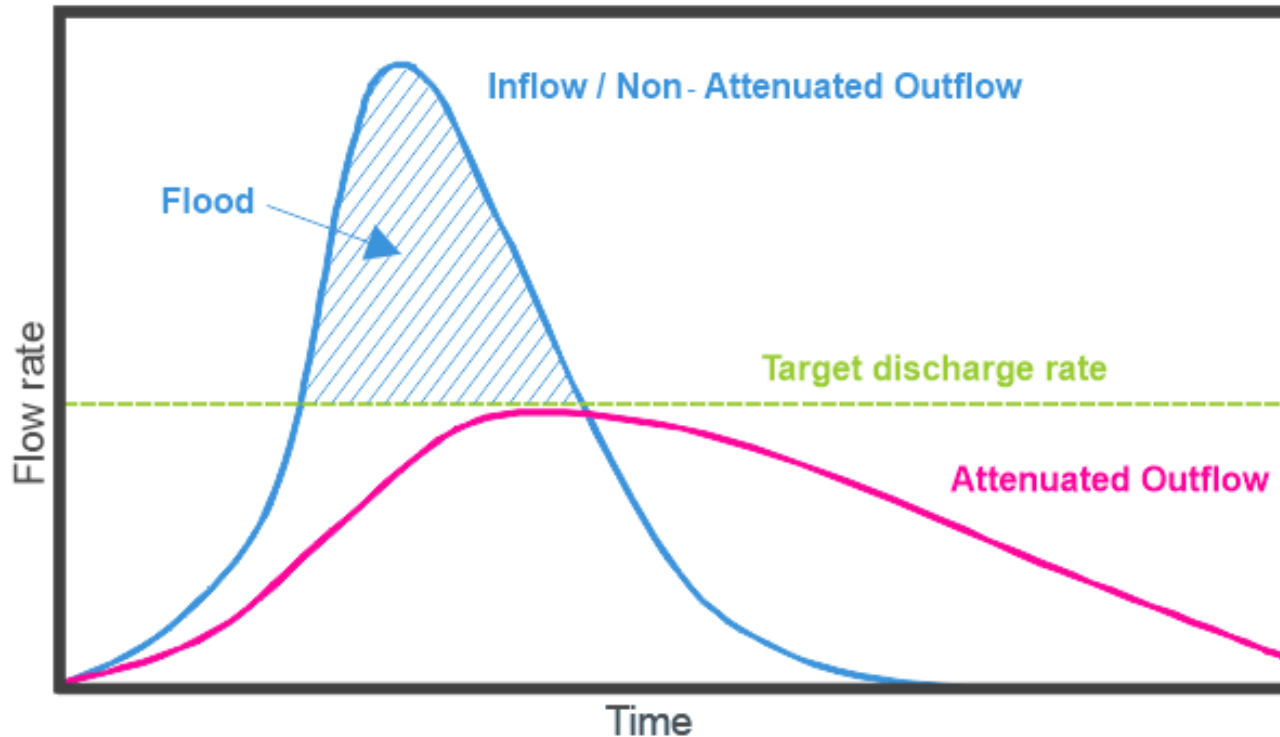
Using SuDS to

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**.



The storm hydrograph



If every person in Calderdale (200,000 approx) stored an average of 0.1m^3 (about half a bathtub-full) of water in a flood event, we could store around $20,000\text{m}^3$ (about 5 m^3 for every property that flooded on Boxing Day 2015).

You Can! – At Home / At School / At Work / In Public Spaces

Slow The Flow: At Home! - how to help in your house and garden

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.

It all adds up to cause problems for combined sewers, which can then back up and contaminate flood water

Using SuDS to Slow The Flow

In our urban areas, as well as upstream, we can make natural water management. Many small changes can have a big combined effect on reducing flood water quantity and quality.

Green Roofs can be retro-fitted. They insulate buildings as well as contributing to biodiversity.

Using less water at home, so releasing less water, increases sewer capacity.

Water Butts are useful, easy to fit, available at discount from Yorkshire Water, and help to slow the flow. They can be left open at night, or used as a 'mini heavy dam'.

Ponds are always wet, but can provide additional water storage if not already full.

Swales are shallow, sheltered linear basins. They are generally dry, but collect and channel water slowly in a storm event.

Green Roofs can be added to sheds, garages etc. Every little helps!

Raised Planters are good if space is tight, or ground conditions don't allow water to soak away.

Trees have many benefits, including stopping up to 12% of rainfall hitting the ground, even in winter.

Permeable Driveways only really need type 1 gravel. The rest could be gravel - and low height plants, if the car isn't always there.

Rain Gardens are shallow, sheltered hollows. They are usually dry, but collect heavy rain, filter the water and release it slowly.

Roadside Swales can be retro-fitted where verges are wide enough.

Permeable Road Surfaces can provide water storage underneath, and still be driven on, if constructed correctly.

Reduced amount of water in combined sewers = less, and cleaner, flood water

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.

For more detail on how to Slow The Flow: Generally / At Work / At School / Public Spaces, go to: www.slowtheflow.net/you-can-slow-the-flow

Slow The Flow: At School! - how schools & colleges can help & learn

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 bio-diverse planting schemes, which need deeper soil. All can be designed to need very little maintenance, and green roofs look attractive!

Ground-level Rain Gardens

(detention basins) are shallow planting areas that are deliberately located where they collect run-off and store it temporarily - they become boggy in downpours. As they are dry most of the time, many everyday plants can cope with the conditions. A layer of gravel below the topsoil helps increase storage capacity.

Rain gardens can collect run-off from paved areas, or take water from the roof via diverted drainpipes. Water conveyance can be creatively used as an attractive play / learning feature.

Trees

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

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 moving less often. They can direct water to a pond, or just allow it to soak away.

Permeable Surfaces

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

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

If constructed correctly, extra water can be stored underneath, whilst allowing the surface to continue to be used.

Quick Wins

Free trees for schools!

The Woodland Trust give away trees to schools. You can apply each March and November for 30, 105, or 420 saplings.

Whether you have space to plant in your own grounds or not, you can also get in touch with:

Responsibility, who work with schools in Calderdale to provide tree-planting days and education, tailored to children of all ages.

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 a car park / bus stop / use rainwater butts) Yorkshire Water have information for schools, as well as water saving tips.

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.

Larger Schools

Interventions for larger school premises are more likely to need professional advice - particularly if you intend to:

- increase the volume at any outdoor point
- work very close to a permanent river or stream (within about 10m)
- make changes to a listed building or in a conservation area
- create a green roof
- re-use grey water in buildings
- create feed beds to treat waste water
- do anything that could affect your neighbours

The charity **Learning Through Landscapes** provides resources to help you make the most of school grounds. SuDS principles provide multiple educational and wellbeing benefits.

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.

Rain garden planters are easily accessible features, that can be used to enhance environmental studies for pupils.

existing downpipe shortened splash back stones

sand/silt mix sand gravel

'leaky' pipe collects filtered water slowly

pipe with grated cap collects overflow

connect to existing drain

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Slow The Flow: At Work! - how businesses can contribute

Swales

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

SMEs

Take a look at our 'At Home' information as well, for ideas that might be applicable to businesses with smaller-scale premises.

Green Roofs

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

Detention Basins

are shallow, planted areas, that are usually dry, but collect heavy rain. They can be used to store water and release it slowly.

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 on gravel and without mortar

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

Trees

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

Quick Wins

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

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 a car park / bus stop / use rainwater butts to clean vehicles, dry-cleaned instead of hoses.) Yorkshire Water can provide water audits for businesses.

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.

Larger Premises

Interventions for larger business premises are more likely to need professional advice - particularly if you intend to:

- increase the volume at any outdoor point
- work very close to a permanent river or stream (within about 10m)
- make changes to a listed building or in a conservation area
- create a green roof
- re-use grey water in buildings
- create feed beds to treat waste water
- do anything that could affect your neighbours

SuDS also have multiple Green infrastructure benefits for health, economy, recreation, wellbeing, biodiversity, air quality, etc.

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.

For more detail on how to Slow The Flow: Generally / At Home / At School / Public Spaces, go to: www.slowtheflow.net/you-can-slow-the-flow

Slow The Flow: Public Spaces - reduce flooding using our common 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.

It all adds up to cause problems for combined sewers which can then back up and contaminate flood water

Using SuDS (Sustainable Drainage Systems) to Slow The Flow

In our urban areas, as well as upstream, we can make natural water management. Many small changes can have a big combined effect on reducing flood water quantity and quality.

Green Roofs can be retro-fitted if the structure will support their weight. They insulate buildings, reducing energy bills, as well as contributing to biodiversity. Green roofs can be added to structures like bus stops, smoking shelters, bicycle stores etc.

Raised Planter Rain Gardens are good if space is tight, or ground conditions don't allow water to soak away.

Permeable Paving / Car Parks allow water to soak in rather than run-off, and can provide water storage underneath. If constructed correctly, whilst allowing the surface to continue to be used.

Detention Basins are shallow, planted hollows. They are usually dry, but collect heavy rain, filter the water and release it slowly. They can be easy to retro-fit in existing roadside verges.

Trees have many benefits, including stopping up to 12% of rainfall hitting the ground, even in winter.

Ponds (or retention basins) are always wet, but can provide additional water storage if not already full.

Swales are shallow, planted linear basins. They collect and channel water slowly in a storm event. As they are dry most of the time, many everyday plants can cope with the conditions.

Reduced amount of water in combined sewers = less, and cleaner, flood water

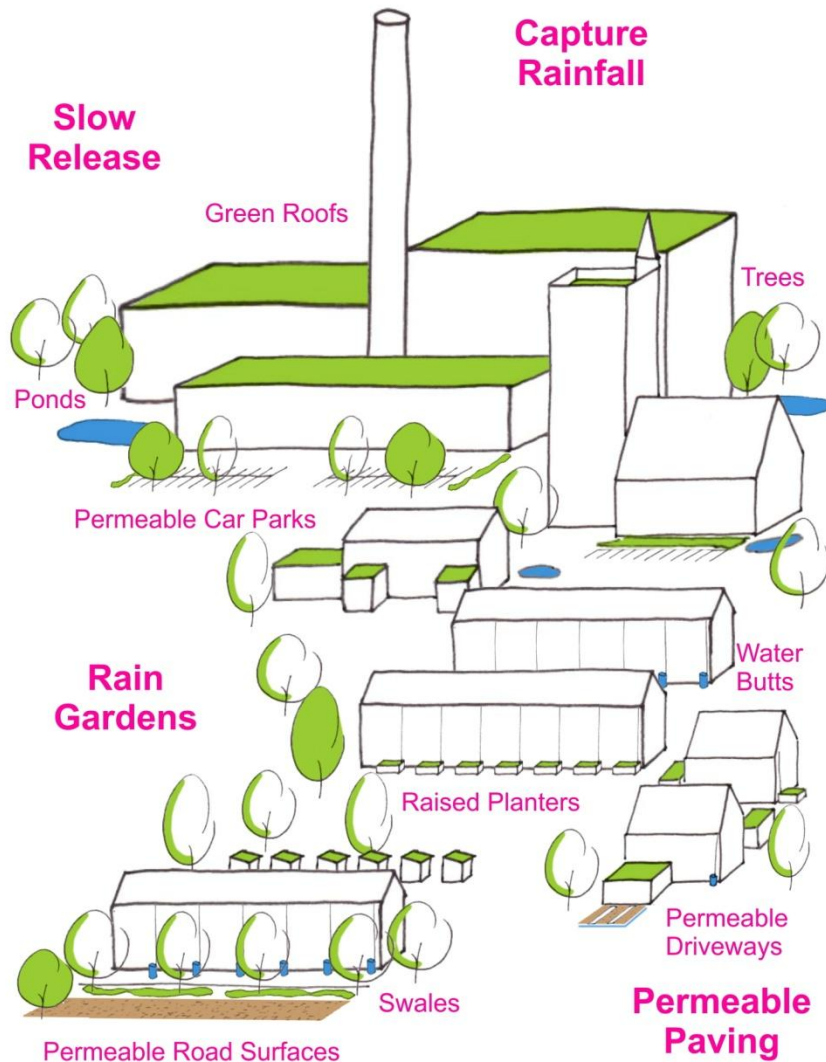
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Web page per topic, and printable PDFs – at www.slowtheflow.net

Ways to Slow The Flow



SuDS Management Train

Locations such as:

- Back Gardens
- Front Drives
- Sheds
- Bin stores
- Roadside verges
- Public spaces
- Central reservations
- School grounds
- Car parks

Quick Wins

- Sign up to receive Environment Agency Flood Warnings (even if you're not in a flood zone)
- Get water butts
- Make water butts into 'mini leaky dams' in winter/potential flood events! Leave the tap open slightly.

Be a Water Hoarder!

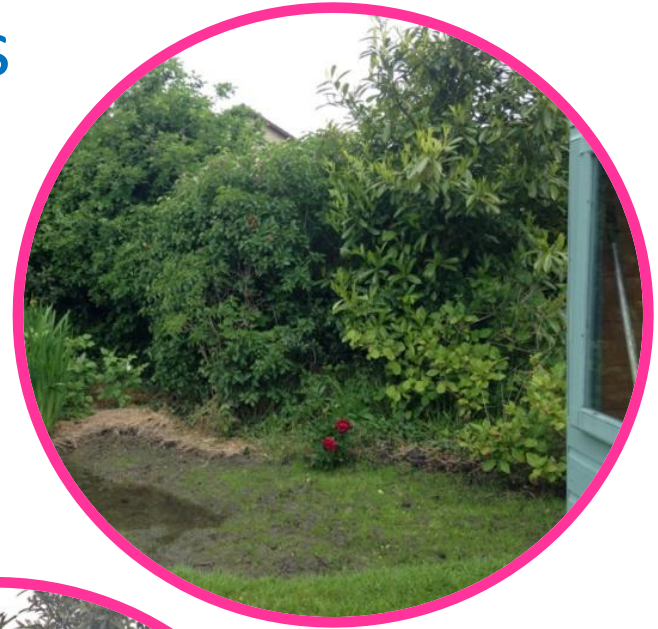
- Alter your actions during flood events to discharge less water into drains (as you might in drought - e.g. shower rather than bath, wait to use the washing machine...)



Rain Gardens



Rain Gardens



Permeable Paving



Swales



Detention Basins



Trees

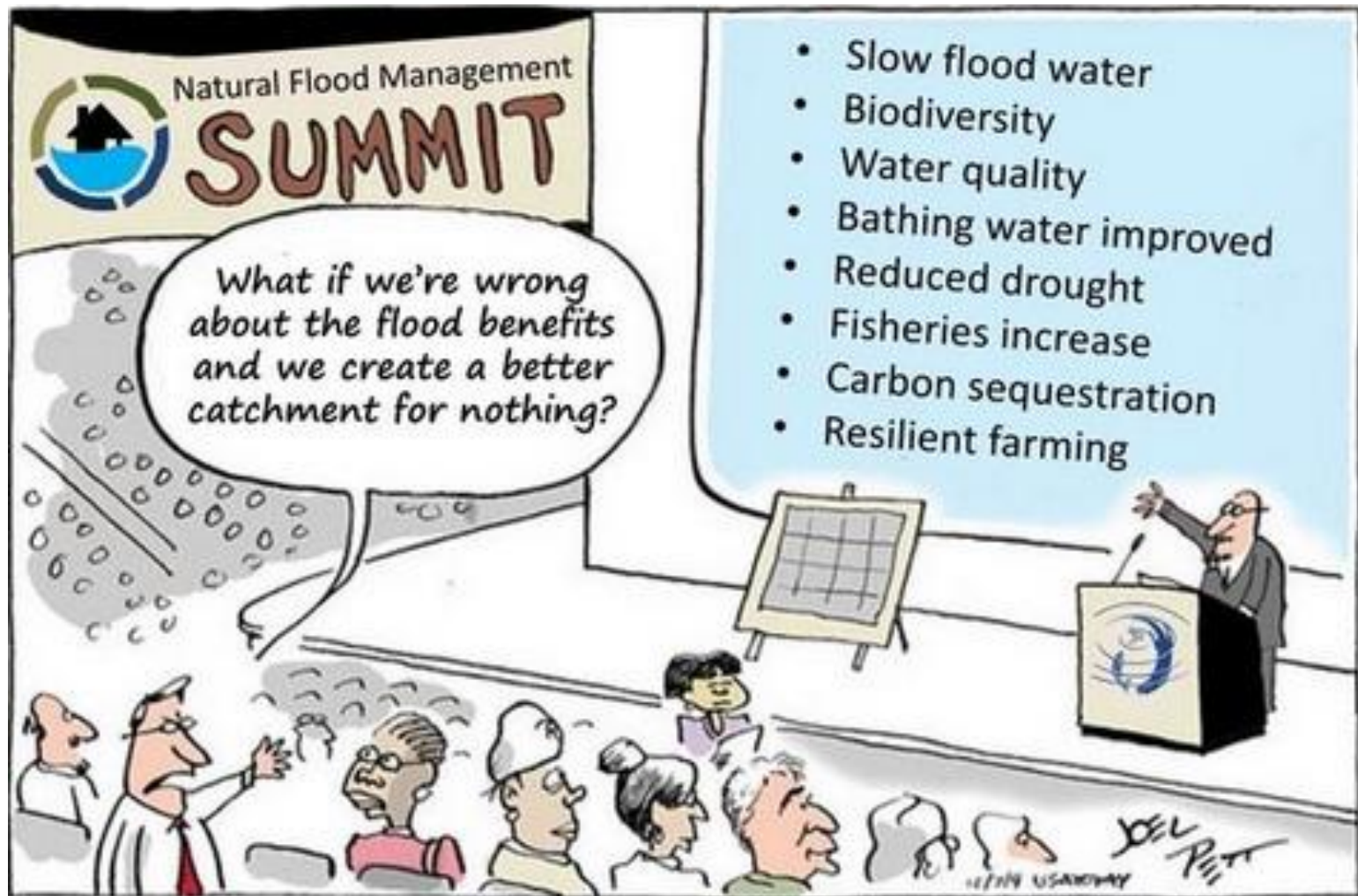


Green Roofs



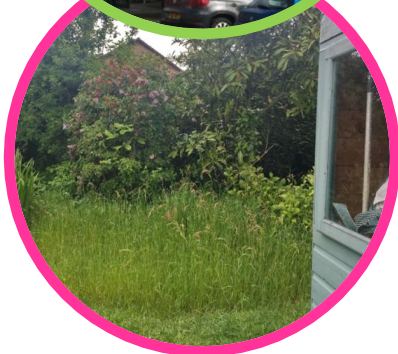
Green Roofs





From a tweet by @LaurenceWRT

Phyiscal demonstrations... Next steps for **You Can Slow The Flow**



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