



SOURCE

Partnership Report Spring 2019

The SOURCE is a community led partnership that has been active in the Upper Calder Valley since 2010.

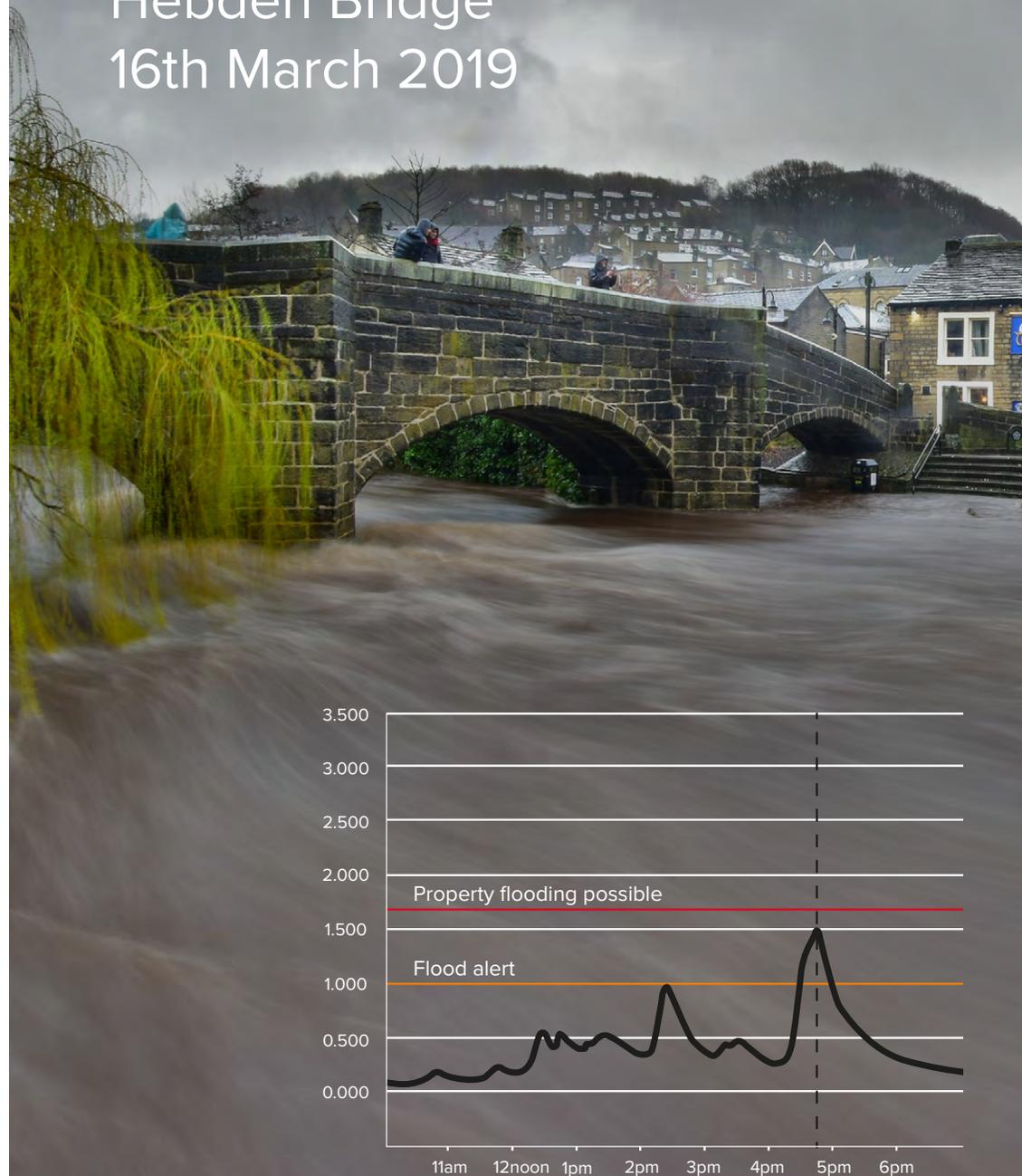
It includes on the ground practitioners as well as statutory authorities (Calderdale Council and the Environment Agency). Partners work co-operatively to minimise the risk of flash flooding, as well as controlling erosion, improving the quality of the River Calder, preserving and enhancing the biodiversity of the area, and undertaking educational activities so that people of all ages, and from all walks of life, become aware of the value of our rivers and uplands.

Highlights of the past year include:-

- The launch of the Council's Natural Flood Management Grant Scheme. This was so well received by landowners that the grant pot was increased to £500k. Most of the 29 funded schemes are still in the planning phase, but when the work is complete they will provide approximately 21,000 m³ floodwater storage in attenuation ponds, nearly 10,000 newly planted trees, over a kilometre of hedgerow, 384 leaky dams, and 715 metres of fascines.
- Work starting on the Gorphey Landscapes for Water Project, thanks to £600k Growth Deal funding from the Leeds City Region Enterprise Partnership, delivered by the West Yorkshire Combined Authority, with match-funding and in-kind support from other partners including The Forestry Commission, Moors For The Future Partnership, the Environment Agency, Woodland Trust, Yorkshire Water, Calderdale Council, Slow The Flow Calderdale, Treesponsibility and other community groups.
- Calderdale Council's successful bid to Europe for the Calder Greening Project.
- Treesponsibility celebrating 21 years since its inception, with its overall tree total passing the quarter of a million mark.
- The Slow the Flow Community Led Natural Flood Management Conference (pp.18-19).
- News that the SOURCE partnership's funding through the Environment Agency's Landscape Management in Rapid Response Catchments programme will be extended for a further two years.

Our natural flood management interventions performed well in the heavy rainfall event of March 16th this year, and they may be starting to make a real difference – it is not too far-fetched to think that our work in the Hebden Water catchment could have prevented flooding in the town centre (see hydrograph opposite). However there is no room for complacency, as the climate article on pages 22-23 clearly demonstrates. If we are going to safeguard our valley against flood damage in the longer term, there is still much to do!

Flooding near miss Hebden Bridge 16th March 2019



Hardcastle Crags Leaky Dams

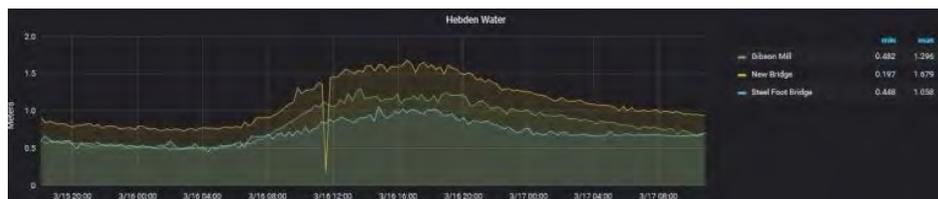
After the recent deluge, it would appear that the 340+ leaky dams built in Hardcastle Crags have done their job, at least in part. Stuart Bradshaw, founder member of Slow The Flow Calderdale, and their Technical Officer, has inspected the sites throughout Hardcastle Crags, and these are his initial thoughts and findings as a result of Storm Hannah.

According to the Walshaw Dean Lodge rain gauge we had the following amount of rainfall on the 16th March 2019:-

12.00am - 4.00am	4.00am – 8.00am	8.00am – 12.00pm	12.00pm –4.00pm	4.00pm – 8.00pm
4.8mm	9.8mm	12.6mm	11.0mm	5.6mm

The river gauge at Gibson Mill, upstream of many of the interventions, peaked at 1:42pm at a height of 1.296 metres. At New Bridge, downstream of all the interventions, at 1:42pm the hydrograph read 1.533 metres. The peak at New Bridge occurred 2 hours and 52 minutes later at 4:36pm which was at 1.672 metres, at the same time at Gibson Mill the gauge had fallen to 1.162 metres. The distance between the two gauges is about 2 km, which would not explain the length of this delay. There is arguably a second peak at Gibson Mill, as after falling from 1:42pm, it rose again to 1.240m at 6:56pm and plateaued until 8:00pm, during which time the New Bridge gauge was falling. I am wondering if this is anything to do with the storage area just beyond Gibson Mill, having reached capacity, over-topping the logs.

The plate weirs installed on the stream without leaky dams (the control stream) were swamped, i.e. water was passing right over them rather than just through the notch. On the stream with leaky dams, the upstream plate weir had pushed over slightly and was leaking badly from the sides. However the downstream one beyond the leaky dams was not swamped and I did manage to time a bowl filling. The flows were markedly slower in this stream.



I was also on site on the 17th March, checking on the dams. None of our logs have moved from where they were placed. This is not surprising as the stream forces in the feeder streams are not strong enough to mobilise logs that are dug in or secured behind stumps etc, as ours always are. In gullies which had been stuffed, all of the material remained in place. There were dams working well, and dams working less well, in this bigger flood event. Some of the dams could do with additional brush, which could be provided, but in many cases will gather naturally with time anyway.

In conclusion a lot has been achieved since April 2017 when the first leaky dams went in. There are now in excess of 340 leaky dams of one sort or another and the results, whilst not conclusive yet, are certainly evident in terms of visible storage, over-bank flow and infiltration. The hydrograph for this bigger flood event, in contrast with those we have observed for smaller events, does appear to have a delay on it at New Bridge compared with Gibson Mill. That has to be a positive because it shows that the dams allow the watercourses to behave normally when there is no threat, and act to slow the flow when there is a risk of flooding.

We will be publishing further results as the year progresses, and will soon be announcing camera points, where you will be able to help us with our 'citizen science' project by taking pictures of the dams from fixed locations – watch this space! For details of leaky dam construction volunteer days at Hardcastle Crags please visit www.slowtheflow.net

In Channel Woody Debris Dams



The SOURCE partnership's first in-channel leaky dams were constructed in Gorpley Clough in January this year as part of the DEFRA funded Midgelden Brook Project. (The leaky dams in Hardcastle Craggs were all installed in small feeder streams).

Undertaking in-channel work involved a lot of careful planning and preparation – we had to consult closely with the landowners (Yorkshire Water and Calderdale Council) and prepare detailed method statements and risk assessments in order to obtain the necessary drainage consents.

In all, six large woody debris dams were constructed. Tree felling works were carried out by Yorkshire Water's contractors Fountains Forestry UK Ltd., with Slow the Flow engineer Stuart Bradshaw advising on exact requirements at each dam location.

Tree trunks were cross cut to manageable lengths and lifted with log callipers or winched into place in the stream bed. The log length in the dams was at least one and a half times the channel width and the placed logs were arranged so that they sat a minimum of 300 mm above stream bed level so that baseflows could pass below them.

Larger trunks (~800 mm diameter) spanned the stream unassisted, smaller trunks (~400 mm diameter) were laid side by side and/or braced by other trunks running obliquely to the stream course. In certain places trunks passed behind other existing downstream trees, and they were also trimmed and dug into the bank sides so any load could be taken into the soils in passive resistance.

Unfortunately we do not have pictures of the woody debris dams during the heavy rainfall on the 16th March because of the theft of a monitoring camera. The photo below was taken later, before water levels had returned to normal. All the dams were examined and found to be intact.



Photo: Jeff Kessler

Living Willow Revetments / Timber leaky Dams



Willow revetments 3 months after planting



Willow revetments 16.03.2019

Living willow revetments are a good alternative to woody debris leaky dams in stock-proof areas where there are no pre-existing trees. Last year Treesponsibility installed 150 metres of revetments in a run-off channel at Rock Nook, as part of the DEFRA funded Midgelden Brook project. The photo above shows water pooled behind them during the heavy rainfall event this March.

Further living willow revetments have been installed this year at Withens End in the Warland catchment, with funding from the Environment Agency's Land Management in Rapid Response Catchments programme.



Timber leaky dams after construction



Upper Timber leaky dam from above 16.03.2019

In areas where there are no trees and no stock-proofing, timber dams can be used. These are slightly permeable gully blocks that are used both to slow the flow of water downstream, and to create pools. They are (deliberately) leaky, such that they can trap water from high rainfall events and then slowly release some or all of it (thereby making an empty space ready to trap the next rainfall event). The ones above were constructed from reclaimed timbers and installed on Inchfield pasture as part of the Midgelden Brook project. As the photo shows they also performed well this March.

Attenuation Ponds



In 2017 an abandoned millpond in Crimsworth Dean was restored and modified so that it could attenuate over 1000m³ of water during a storm event. Silt which has accumulated over many years was dredged out and encapsulated in a nearby excavation (to prevent the migration of Himalayan Balsam seeds from the site). The existing pond outlet was modified with a smaller piped restriction to allow water above a flow rate of 600 litres per second to be retained within the resulting reservoir, and a crest weir was installed to allow any excess water to discharge safely down the existing culvert in the event that the design pond capacity was exceeded.

During the March 16th heavy rainfall event, the pond filled overnight to capacity. The floodwater overflow crested the new weir and was safely channelled down the culvert. The attenuation pond remained full for two days gradually releasing excess water until it returned to its normal, low level.



Photo: Chris Blagg

Erosion Control



Work began this winter to treat areas of serious erosion on the land above Gorpley Reservoir. Growth Deal funding from the Leeds City Region Enterprise Partnership enabled the installation of 363 fascines, by Keith Wilson of Sticks and Stones.



Fascines are tightly packed bundles of brush (branch ends and sticks) made from the felled trees, or coppiced wood. The material used is freshly cut, not old rotten sticks, so that they last as long as possible in situ.

Any species of wood is suitable, although some, by nature of their growth pattern and flexibility, are easier to work with than others. Hazel is ideal, although other species, such as birch, willow, sycamore and oak branches are often incorporated.



The bundles are designed so they can be carried by hand over rough terrain - they are approximately 180cm (6 foot) long and 30cm (1 foot) diameter, tied with 3-ply sisal string in three places to help prevent them snagging on each other in transit. Sisal makes a strong cord, but one which will eventually bio-degrade



The pictures on this page show materials being extracted from a site at Pikeshaw (with the help of Missy the horse), and installation on shaly stream banks at Gorpley.

Fascines are laid out along the contours of eroded slopes and held in place with wooden stakes and by forcing their ends into each other. Three stakes are used per fascine - two below at either end and one in the middle, forced through the fascine to prevent it becoming dislodged. The hazel stakes are strong enough to last longer than the fascine and are typically around 60cm long and between 20mm and 40mm thick.

Installation starts at the bottom of the slope, working uphill. The distance between rows is judged by the severity of the erosion and the angle of the slope. The steeper the slope the nearer the rows are to each other. During installation it is sometimes necessary to shape the slope slightly in places so that the fascines can lie horizontally. This is done with a spade or mattock. Any material loosened by this process is caught by the line of fascines below.

Although the erosion control work above Gorpley reservoir is well underway, there is still more to do – a further 650 fascines need to be installed before December 2020.

Guy Thompson Partnership Manager of the White Rose Forest said:- “The fascines work is excellent and is setting new standards for sustainable erosion control in the South Pennines.”



Tree Planting



After many delays, the tree-planting element of the Gorpley Landscapes for Water Project was finally given the go-ahead in March this year. (Planning for this project began way back in 2017).



During the preparation of this SOURCE booklet, treesresponsibility teams have been working flat-out on site putting nearly 5,000 bare-rooted whips into the ground before the end of the tree-planting season.



None of this would have been possible without the help of volunteers, so thank yous are in order to SUMA Wholefoods and Thompson Reuters who both sent staff teams, as well as the Tibet Support Group, and GAPS reunion crew, who took part in treesresponsibility residential weekends to get the job finished, with additional help from local volunteers joining for the day.

The site is being leased from Yorkshire Water by the Woodland Trust, and a further 100,000 trees will be planted by their contractors in the 2019/2020 planting season.

Photos above:- Andrew Reynolds



Treesresponsibility was originally set up to link tree-planting with education and awareness raising about climate change, and much of our work over the last 21 years has involved local school children coming out to plant trees with us. Each planting day begins with a short talk at the school, explaining the benefits of trees in absorbing carbon dioxide, helping to minimise the risk of flooding, creating woodland habitats, and enhancing the visual amenity of our valley.

This year's school tree plantings were funded through the DEFRA Trees for Learning scheme, and 18 local primary schools participated - Bolton Brow, Castle Hill, Todmorden C of E, Luddendenfoot C of E, Luddendenfoot Academy, Barkisland CE, Ripponden Junior and Infant, Rishworth St. Johns, Sowerby New Road, Sowerby Village, Sacred Heart, Old Earth, St. Josephs, Riverside, Cornholme Academy, West Vale, Holywell Green and Triangle.

The children really enjoy the activity and learning new skills, and we receive excellent feedback from the teachers who speak of the benefits of involving the children in an outdoor teamwork activity. Quite often children who do not thrive in the classroom environment come into their own when given the opportunity to do a physical and meaningful task in the open air. Schools wishing to participate in tree-planting in Autumn 2019 can get more information by emailing treesresponsibility@yahoo.co.uk.



Photo:- Michael Fairless

Moorland Restoration

As part of MoorLIFE 2020, the Moors for the Future Partnership (MFFP) is extending its reach into Calderdale, with work currently taking place at Heptonstall Moor, Ovenden, and Cragg Vale. Numerous other sites in the area are under discussion with local landowners.

Blanket bogs in this area have been badly damaged by 200 years of atmospheric pollution, as well as a host of other factors. This has led to a severe loss of vegetation on the moorland plateaux, resulting in vast areas of bare peat exposed to the elements.

To combat this, a range of work is being delivered to stabilise whole sites. On flat areas and shallow slopes MFFP covers bare peat with cut heather 'brash'. This protects the peat from erosion and creates stable conditions for seed germination and a micro-climate which helps to protect new plants from harsh weather. The brash contains heather seeds as well as moss fragments and spores. As new plants grow, they form networks of roots that help to keep the peat in place.

MFFP also installs heather bale and peat dams to block dams and grips, reversing the drying out of the moors in order to rewet the bogs, helping with fire prevention and benefiting water supply and biodiversity. In time, more permanent plastic dams will also be inserted.

MFFP plants sphagnum mosses, the fundamental peatbuilding plants. Without these mosses, blanket bog cannot sustain itself so it is essential that sphagnum mosses are reintroduced. MFFP usually uses cultivated sphagnum moss in the form of plug plants, which are planted by hand.



Balsam Clearing



Whilst trained contractors are required to control the invasive Japanese knotweed on the main river, volunteer groups can get involved in tackling the Himalayan balsam which has infiltrated all the tributaries of the Calder, and often the wet flushes leading to those waterways too. Hand-pulling (which only needs stout footwear and gloves) has proved quite effective in reducing the amount of balsam - for example, over several years small teams associated with Treesponsibility and local coppicers have been effective in removing large stands of balsam from Colden Clough and nearby Knott Wood.

During the summer of 2018 Calder Future and Calder Valley Clean-up worked with local residents, and with the young people's NCS project, to attack the balsam at various points in the Upper Calder Valley, ranging from Todmorden through to Eastwood and Hebden Bridge and then onwards to Mytholmroyd/Luddendenfoot and up Elphin Brook towards Cragg Vale. There was also a concerted effort against the balsam in Nutclough Woods in Hebden Bridge, following Ibbot Royd Clough up away from the Woods as well. Controlling the invasive weed means extending our remit into the source areas of the balsam, from where it spreads down the watercourse. There will always be some stems which are missed and there is also a seedbank in the ground which remains viable for a few years, and so a sustained programme of activities, year on year, is required.

Although hand-pulling is effective when we have a large group of volunteers, such as a corporate team or the NCS, some sites require more experienced workers (such as the steep slopes of Colden Clough); other sites can be tackled by one person strimming (as per Hebden Water at Salem, which is a quite linear bank and contains a lot of nettles, which are not pleasant for volunteers), and, which is more environmentally-friendly, the group removing the balsam at the top of Nutclough Woods (in Ibbot Royd Clough) have been using scythes to cut swathes of the plant, close down to the root.

Calder Greening project

Following a successful funding bid to the European Structural and Investment Fund (ESIF), funding has been awarded towards a £1.3million programme, to support natural projects as part of the Calder Greening programme. This will be delivered in partnership with the Yorkshire Wildlife Trust and the Environment Agency, and with the Ministry of Housing, Communities & Local Government. Calder Rivers Trust are part of the steering group. The programme will look to create and improve green spaces across the borough, leading to many benefits. The programme is funded through the European Regional Development Fund (ERDF). Starting in spring 2019, the programme will be delivered over three years through various mechanisms including small-scale natural projects delivered by community volunteers, utilising local organisations and expertise and leaving a legacy for future generations to follow. The greening programme is split into six separate projects:

Invasive non-native species treatment programme: This project aims to establish a strategic, sustainable and long-term treatment programme for invasive non-native species (INNS) in the Calder valley.

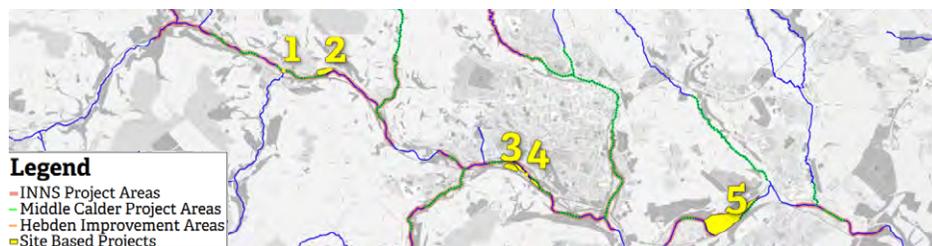
Mytholmroyd public green space: A new public green space in the centre of Mytholmroyd will be developed, including riverside planting schemes in the area to the rear of St Michael's church and along Cragg Brook.

Brearley Fields Wetland Nature Reserve: A wetland nature reserve at Brearley Fields will be created with habitats that seek to reflect the historical meander of the River Calder covering around 4 hectares.

Middle Calder and Tributaries Project: The project is a river rehabilitation and restoration project which aims to address issues with, and improve, ecological connectivity and functional habitat within the river network and riparian zone.

Milner Royd Nature reserve and Copley Valley Green Corridor: The project is to extend Milner Royd LNR by including the Copley Valley Green Corridor, nearly doubling the size of the greenspace to 9 hectares.

Cromwell Bottom Local Nature Reserve: This project identifies a range of works to protect and enhance the biodiversity value of a closed land fill site and former gravel extraction pit locally known as North Loop.



Map showing the individual projects as part of the Calder Greening Program. Works include: 1. Mytholmroyd Greenspace; 2. Brearley Field; 3. Milner Royd LNR; 4. Copley Valley Green Corridor; 5. Cromwell Bottom



Calderdale Tree and Woodland Strategy



In January the new tree and woodland strategy 2019-2029 (updating the Tree Policy of 2009) was agreed by Calderdale Council's Cabinet. The strategy highlights the enormous economic value of this resource to Calderdale and the need to protect, maintain and enhance this for the future and to benefit fully from the ecosystem services provided and to present a unified strategy to achieve this.

Covering both Council and privately owned trees and woodland, the document includes:- planning; enforcement; trees on private land; active management of council owned tree stock; woodland management and enhancement; biodiversity; targeting of tree planting; natural flood management; funding; community involvement and partnership working; access; education; and the role Calderdale has to play in leading the White Rose Forest partnership locally to help deliver wider initiatives such as the Northern Forest. This is due to comprise around 50 million trees over 25 years, stretching right across the North of England.

Critically, a key issue that has been addressed in the new strategy is that of consultation with communities around the processes of tree removal. Therefore a clear decision making process is included in the strategy. In any tree removal situation, the Council would consult with local communities and replace where possible and appropriate.

Calderdale Council's Cabinet Member for Communities and Neighbourhood Services, Cllr Susan Press, said: "The many trees and areas of woodland around Calderdale are so important. They not only provide an attractive environment, improve air quality and offset carbon emissions; they also can create a habitat for wildlife. This new strategy will support the management of our trees, benefiting residents and visitors to the borough. It will also enable us to apply for more external funding and would offer opportunities for communities to get further involved in the management of trees in their area." More details:- moy.cash@calderdale.gov.uk

Slow the Flow Conference



As the chosen charity of Hebden Royd Town Council's Mayor for 2018-19, Dr Carol Stow, Slow The Flow Calderdale were invited to stage a national conference to exchange knowledge with other NFM groups. Particularly following the Calder Valley's latest flood event in March 2019, and the apparent success of Slow The Flow's leaky dams at Hardcastle Craggs, there is a refreshed interest in how the community can pursue NFM, both in Calderdale and other areas.

The 'Community-led NFM' conference weekend was well attended, by a diverse audience, including flood groups, statutory bodies, and professionals from across the country, including delegates from Kent, Worcestershire, Merseyside, East Yorkshire, and Scotland. Excellent speakers and engaging discussions on Saturday at Hebden Bridge Town Hall were followed by a lively ceilidh evening at Mytholmroyd Community Centre.

On Sunday, a tour and working session at Hardcastle Craggs NT built four more leaky dams. Simultaneously, others viewed the film 'High Water Common Ground' at Hebden Bridge Picture House, with a talk from Alan Gardner on the post-flooding restoration of the building, and a panel discussion. We thank all of the venues, organisers, delegates and sponsors for a highly successful and enjoyable weekend.

Sponsors: Hebden Royd Town Council, National Trust, Marshalls, Green Blue Urban, British Recycled Plastic, JBA Trust, Environment Agency, Fleur De Lys.

After a welcoming address by Dr Carol Stow, Mayor of Hebden Royd Town Council, the conference had the following presentations, all of which are available on www.slowtheflow.net

The response to Boxing Day 2015: Cllr Josh Fenton Glynn: Calderdale MBC. An insight into effective working with local authorities and politicians, including kind words about why Slow The Flow Calderdale have proven an easy and effective partner.

Slow the Flow Calderdale: Lessons Learnt – the first three years: Adrian Horton and Stuart Bradshaw: Communications and Technical Officers, Slow the Flow Calderdale. The talk provided a review of projects to date, including gaining support for a new local initiative from the local public, politicians and statutory agencies. It also gave a technical insight into monitoring processes, including early results, and described how the management team's professional backgrounds continue to inform our work and give it credibility.

Delivering Natural Flood Management: Chris Uttley: Senior Advisor, Flood and Coastal Risk Management, Environment Agency. Chris's previous work on the pioneering Stroud Rural SuDS project has inspired many other projects around the country. He explored lessons from that, and explained how this experience is guiding his work nationally in the Environment Agency.

You Can Slow the Flow – Sustainable Urban Drainage Schemes: Bill Blackledge & Amanda McDermott: 2B Landscape Consultancy. (See overleaf)

Insight into the new National Flood & Coastal Erosion Risk Management Strategy (FCERMS): Wendy Brooks: National Strategy Manager, Environment Agency. A look at the Environment Agency's new collaborative approach to the FCERMS, due for publication in 2019, and how it will shape FCERM looking forward to 2050.

National Flood Management – Simple methods to quantifying the benefits and making leaky dams last: Mike Norbury: Project Manager at Mersey Forest, National Flood Management. Lessons from Mike's involvement in the design and build of different NFM features in various catchments, including ensuring their longevity.

Let's Talk About Flooding: Paul Cobbing: Chief Executive, National Flood Forum. Paul discussed the National Flood Forum's work, as a charity assisting individuals and groups who have been affected by flooding, guiding flooding-related legislation, and their 'Let's Talk About Flooding' campaign.

Sustainable Urban Drainage Systems



Photo: Matt Radcliffe Photography

Cllr Carol Stow, Mayor of Hebden Royd Town Council, officially opens the rain garden planters with her ceremonial watering can.

In heavy rainfall events, many urban SuDS interventions can help to reduce flood levels. In particular, these types of systems can help to reduce the impact of overflow from Calderdale's combined surface & foul sewers. This reduces the risk of contaminated flood water entering our homes and rivers.

The opening event of our demonstration rain garden planters at Hebden Bridge Town Hall was well attended with an afternoon of excellent entertainment provided by Calder Valley Youth Theatre and Hebden Bridge Junior Band. In a rainfall event, water from the downpipes is taken through the soil/plants, before making its way more slowly back into the drainage system.

This project was developed and built in collaboration with a fantastic team, including the Calder Rivers Trust, Hebden Bridge Community Association, Green Future Building, 2B Landscape Consultancy Ltd, Calder Valley Clean Up, The Basement Project – and kindly funded by the Postcode Local Trust.

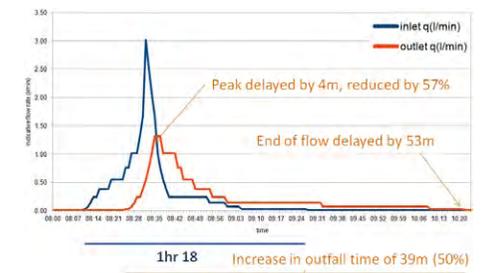
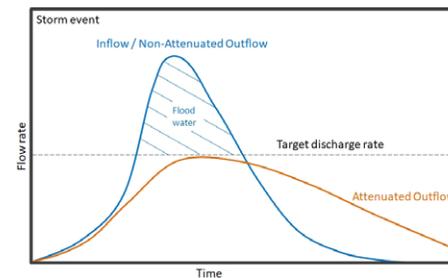
The planters will remain in the courtyard at the Town Hall for the foreseeable future, and form one of the case studies on Slow The Flow Calderdale's website.

We are always looking for more case studies to help inspire others – if you have been involved in an urban SuDS scheme, however small, please contribute at <http://slowtheflow.net/case-study-submissions/>

The Town Hall planters have been monitored, using a bespoke system to gain scientific evidence about just how much they help to slow the flow of storm water.



Data from a rainfall event in March 2019 (the week before the flooding on 16th) shows a 57% reduction in peak level, and 50% increase in outfall time, comparing inlet to outlet flow rates over time. This suggests significant implications for flood alleviation if we can all take action to retrofit SuDS extensively in the Calder Valley.



The graph above shows the ideal outcome that SuDS and NFM aim to achieve – a reduction in peak flow and lengthening of the curve on the hydrograph during a potential flood event.

Initial results from the planters (above) are very encouraging, and the resulting graph not dissimilar to that 'ideal outcome' graph.

For inspiration on the many ways to help in urban areas, please visit our 'You Can Slow The Flow' pages: - <http://slowtheflow.net/you-can-slow-the-flow>

New set of UK climate projections published

Our climate is changing. We are already seeing changes in our weather patterns and feeling the effects of extreme weather events. The floods in 2015 and the drought of summer 2018 were both made more likely because of the carbon emissions released by humans burning fossil fuels. These types of events are becoming more frequent and pose a real risk to our communities and to our environment. Even if we stopped emitting all carbon tomorrow, we are locked into an inevitable amount of climate change already. We therefore need to make sure that we are aware of the types of changes we can expect, and we need to make sure that our decisions and plans account for these so we can adapt and build resilience to mitigate the impacts on our communities, economy and environment. We also need to continue and expand strenuous efforts to reduce and ultimately, eliminate carbon emissions.

UK Climate Projections 2018 (UKCP18) is the result of a three-year project led by the Met Office with support from BEIS and Defra, with scientific scrutiny provided by a panel of international climate science experts. It delivers a major upgrade to the range of UK climate projection tools and uses cutting-edge climate science to provide updated observations and climate change projections out to 2100 in the UK and globally. The headline message is that our weather patterns are becoming more variable, more extreme and more unpredictable. Our winters will be warmer and wetter, summers will be hotter and drier. Sea levels will continue to rise. Droughts like the one we have just had will have a 50/50 chance of happening every year by mid-century.

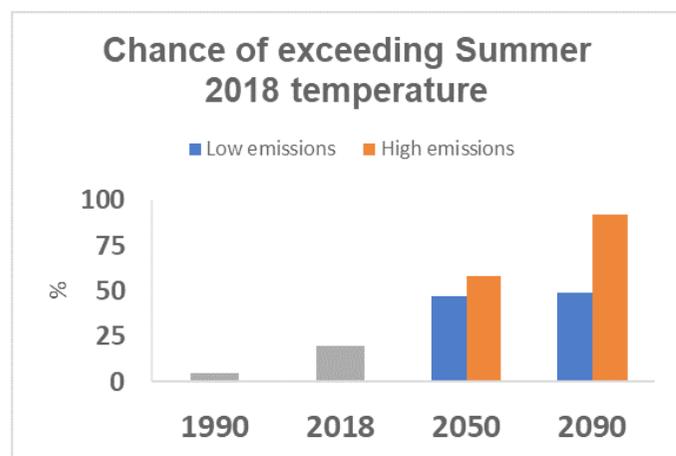
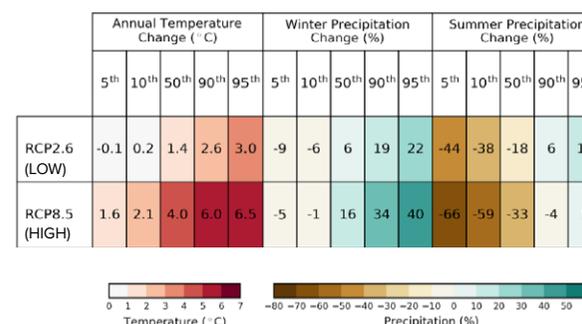


Figure 1. Chances of exceeding summer 2018 temperature under low or high emissions scenario.

Source: The Met Office

The scale and volume of change we will see is dependent on how much carbon we emit. UKCP18 provides projected changes in climate for four different emission scenarios ranging from one where there is no reduction in carbon emissions (RCP8.5 - high) to one where there are concerted global efforts to limit carbon emissions in line with the Paris Accord (RCP2.5- low) and maintain global temperatures at no more than a 1.5 degree rise by the end of the century. To access the data, start at the Met Office website which has key findings, pre-prepared maps, graphs and factsheets. You can select different regions (administrative or river basins), variables (rainfall, temperature), seasons (summer, winter) and years into the future (2040s, 2050s, 2080s) as well as different emission scenarios. There is also a data catalogue where you can download the raw climate model runs and a whole range of other detailed information.



Probabilistic changes over region to end of century

Figure 2. Changes in temperature and precipitation for the Yorkshire region under different emissions scenarios (compared to a 1981-2000 baseline).

Source: The Met Office

Figure 2. shows the changes we in Yorkshire can expect in precipitation and temperature under the high and low emission scenarios (compared to the 1981-2000 baseline). This type of data may be useful to help your organization understand how the climate is likely to change, and how you may need to alter or adapt your plans to accommodate these changes.

A regional climate change network is being established with the support of the iCASP forum and Yorkshire Water. This network aims to bring users of climate data together, to share knowledge and build capacity, creating a community of practice and helping to drive adaptation and resilience efforts across the region and beyond. For info please contact Amanda.Crossfield@yorkshirewater.co.uk

Treesponsibility

has been active in the Upper Calder Valley for 21 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

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 Rivers Trust

as a part of the national network of Rivers Trusts, they are working to deliver improvements to the River Calder, Colne and Holme and their tributaries. They focus particularly on improving and monitoring water quality, improving river habitats, and working with communities to promote the enjoyment and understanding of rivers. geoff.sweaney@calderandcolneriverstrust.org

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

Calder Greening Project

More information will be available on www.eyeoncalderdale.com
Middle Calder and Tributaries Project officer:- alec.boyd@ywt.org.uk

Moors for the Future / MoorLIFE

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

