Sussex Flow Initiative
River Ouse

Sussex Flow Initiative

Celebrating 5 years of Natural Flood Management 2017-2022

The Sussex Flow Initiative (SFI) is a Natural Flood Management (NFM) project whose aim is to work with natural processes to reduce flood risk within a lowland River catchment – The Sussex Ouse.

Formed in 2012, SFI is now a multi stakeholder partnership between Sussex Wildlife Trust, the Woodland Trust, the Environment Agency and Lewes District Council.

This report celebrates the project's achievements over the last five years.

Further details about the project can be found on our website, where you can find detailed end of year reports, and the case studies and guidance documents mentioned in this report.

www.sussexflowinitiative.org

Sussex Flow Initiative: 5 year summary of achievements 2017-2022

Sussex Flow Initiative
River Ouse

- Trained **24** staff and contractors in leaky dams, scrapes and ponds.
- Constructed **568** leaky dams, to hold back approximately **586k** litres of water per rainfall event
- Produced **9** case studies sharing knowledge from delivering different Natural Flood Management measures
- Planted **65,000** native trees including **500** Black Poplars, creating **8.7**ha of woodland - **1.32**ha in floodplain
- Planted **10.2**km of native hedgerow - **77.3%** within Buglife's B-Line area
- Reconnected **4.95**ha of floodplain, which will store approx. **9.9**million litres of water at a depth of **0.2**m
- Volunteers gave **2,668** hours with an approximate value of **£53,360**
- Given advice to **11%** of the catchment area, **7.8%** within Flood Zone 2, and adjacent to over **18.4**km of watercourse failing to meet Water Framework Directive (WFD) standards
- Created **16.8** million litres of seasonal water storage - providing **1**ha of wetland habitat for wildlife
- Won a CPRE award for our work with landowners
- Had positive influence on over **190.2**km of waterway (**17%** of the catchment)
- Delivered Natural Flood Management upstream of **18** properties deemed at significant risk of flooding
- **20,474** tonnes of CO^2 sequestered annually through created woodlands & hedgerows
- Produced **2** Sub catchment reports on Natural Flood Management potential within the Longford and Slaugham to Ardingly sub catchments.

@SussexFlow • **680,938** Twitter impressions

sussexflowinitiative • Reached over **9,500** people via Facebook

sussexflowinitiative.org • **3,381** unique website visitors

Working with natural processes to make resilient river catchments for people and wildlife

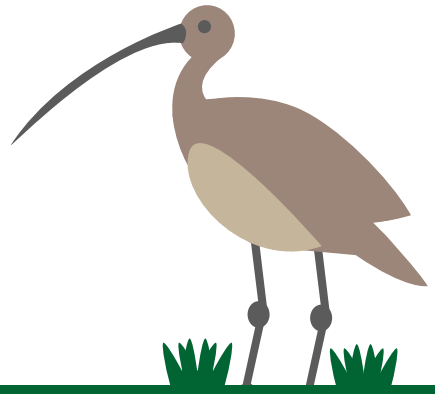
SFI began as a pilot project in 2012, with the aim of investigating whether catchment-wide NFM interventions can help to reduce the impact of flooding on vulnerable communities and homes, whilst increasing biodiversity and providing multiple societal benefits at a catchment scale.

Ten years on, and SFI is leading the field in demonstrating that there are many positive ways that NFM can work alongside traditional flood risk management to create resilient landscapes. Through a holistic approach to water and land management, the project has shown that it is possible and desirable to deliver landscape-scale restoration of natural processes for flood mitigation, in collaboration with a diverse range of organisations, local communities, farmers and landowners.

This document shows how SFI has made the Ouse catchment more resilient to climate change, flooding and drought, better for biodiversity, and has supported local communities to understand how they help with flooding too.

It is an exciting time for the integration NFM with other Nature Based Solutions to Climate Change, with significant changes to national policy which support this. The past five years, which this report celebrates, builds upon the previous five years of exploring NFM potential, illustrating how we have delivered meaningful change over time at a large scale.

The SFI project has added to the evidence base for the Governments 'Working with Natural Processes' natural flood initiative.
Working with Natural Processes



The SFI project showcases and delivers working examples of NFM best practice. Over the past five years SFI has delivered a large number of NFM projects, demonstrating a range of different NFM techniques. These provide case studies for others of how NFM can be practically applied in lowland catchments. In the last 5 years we have:

- Planted >65,000 native shrubs and trees. Increasing the 'surface roughness' of the catchment to help slow the flow of water. This includes planting and naturally expanding woodland and hedgerows, across slopes and in floodplains.
- Reconnected 4.95 hectares of floodplain. Restoring natural processes through reconnecting river channels, meanders and floodplain washlands.
- Built 568 leaky dams. Using and managing natural woody material in watercourses to slow down flood flows and increase wildlife habitat.
- Stored over 17 million litres of flood water (or around 17,000 tonnes) – much of which is held back each time there is a new flood event.
- Created 1.92 hectares of new freshwater habitat. Increasing space for water within the catchment, through creating seasonal and permanent ponds and scrapes that store rain and flood water.
- Given advice to 11% of the Ouse catchment area (101 landowners across 6,826.6 hectares), supporting communities and landowners to restore nature whilst creating flood and drought resilience.
- Restored essential natural capital services including pollinator habitat, air purification, improved access to nature, water purification and natural flood storage.
- Helped to make the catchment climate resilient and beaver ready – with up to 20,474 tonnes of CO_2 p.a. stored.

Rewilding: The Potential of Nature, bringing Beavers back to Sussex

Floodplain reconnection and increase water storage.

Restoring flow path corridor with ponds and hedgerow planting.

Catchment wide influence of SFI

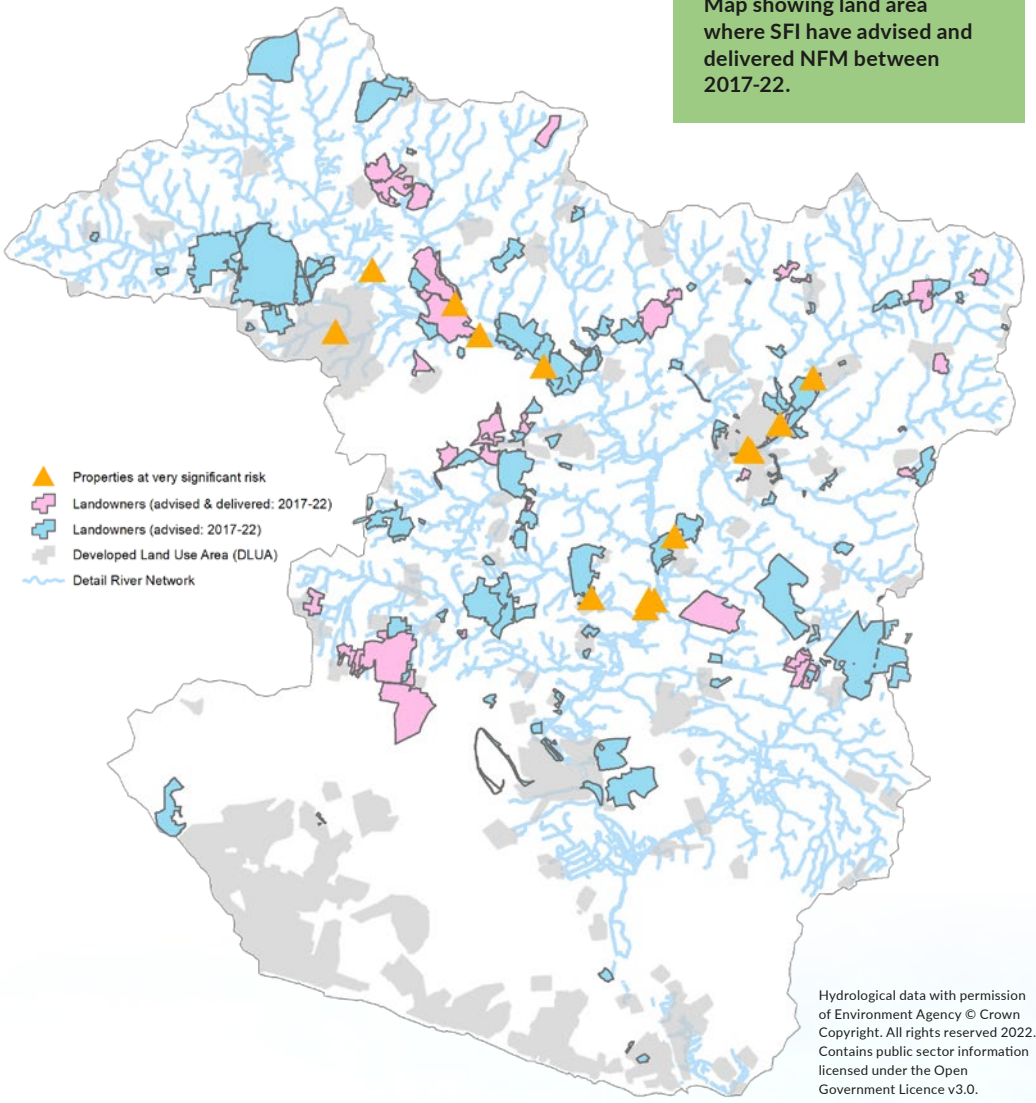
One of the greatest assets of this project is that we develop long term relationships of trust with landowners, stakeholders and communities. They are provided with the advice and support that they need to be able to deliver complex, and sometimes risky projects in the knowledge that they are safe, beneficial and legally compliant. They are also able to feel as if they have made a real and positive difference, at a time when climate change and wildlife declines are leaving many feeling disempowered and disenchanted.

Over the last 5 years:-

- Our NFM delivery has taken place upstream of 18 properties considered to be at "very significant risk" of flooding, according to the Environment Agency – for whom we have (hopefully) reduced their flood risk.
- We have given advice to 11% of the upstream of Lewes catchment area (7,419.8 hectares), including delivering NFM on approximately 2,213.1 hectares of land, of which approximately 577.4 hectares is in the main floodplain (Flood Zone 2).
- We have influenced at least 28.4 km of the river network with our in-stream work, and at least 44.8 km through land based activities[1]. Our advice has been given across 192.2 km of river and stream.
- We have created/restored 42.55 hectares of priority habitat (40.63 ha of woodland[2] and 1.92 ha of open/ standing water) – contributing to National Environmental Targets.
- We have given advice on land adjacent to 18.4 km of watercourse failing to meet Water Framework Directive (WFD) environmental quality standards for phosphorous – in the knowledge that our work is helping to improve failing waterbodies.

1 Only including waterbodies downslope and adjacent to tree planting (i.e. not including downstream effects)
2 Including hedgerow (320 m of hedgerow is equivalent to 1 ha of woodland in terms of number of trees/ shrubs planted)

Map showing land area where SFI have advised and delivered NFM between 2017-22.



Woodland and Hedgerows

The trees and shrubs that we plant help to increase the surface 'roughness' of the landscape, slowing the passage of rain run off across the soil, and increasing the infiltration of water into the ground.

Practical Delivery

- We have planted >65,000 native shrubs/trees as cross-slope hedgerows (10,225m) and woodland (8.7 ha), of which 1.32ha is floodplain woodland.

Woodland creation

Floodplain woodland creation

Ecosystem Services

Provisioning Services: Our trees produce food from nuts, pollen and berries, as well as opportunities to generate tree hay for livestock.

Regulating Services: We have planted 50,245 native flowering trees and shrubs within National Buglife B-line pollinator corridors alone. This greatly improves pollination services across the project area.

Up to 20,474 tonnes of CO2 p.a. is stored by the trees we have planted, helping to regulate climate change.

The work we do increases natural water purification and flood water storage. When mature we estimate that our hedgerows will help to store and slow down at least 30,675 m3 of water (30,675,000 L).[3]

Cultural Services: Our work benefits human health and welfare by increasing healthy green spaces, and it helps to restore historic landscape features.

Supporting Services: Biodiversity, nutrient cycling, soil formation and water cycling are all enhanced by our work.

3 Ptes: https://bit.ly/3JCeHUp [accessed 2022] - A 50m hedgerow at the bottom of a 1ha field can store between 150 and 375 cubic metres of water during rainy period.

Volunteer group planting a woodland across a slope.

One of a series of mini ponds created to capture water by intercepting land drains.

Reconnected floodplain during high flow event

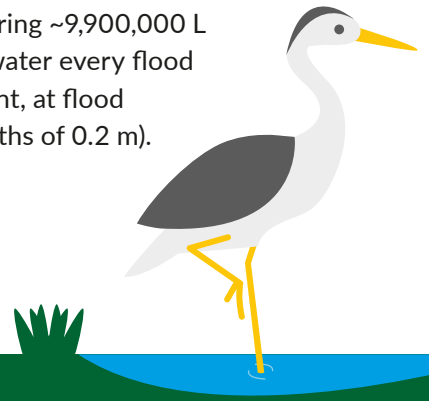
Scrapes, ponds and temporary flood storage

The natural dips and hollows in our landscape cumulatively create vast temporary reservoirs in which flood water can be held, as a flood peak passes through the landscape. By creating and restoring more naturally ponding areas, each time a flood occurs, we can store huge amounts of water which would otherwise head rapidly down the river system.

Practical Delivery

- We have created a network of seasonal scrapes and ponds across the catchment which hold approximately 16,796,277 L of floodwater, whilst providing important habitat for wading birds, amphibians and other wildlife.

- We have lowered unnecessary embankments, reconnecting the floodplain and opening up approximately 4.95 ha of additional washland storage (storing ~9,900,000 L of water every flood event, at flood depths of 0.2 m).



Ecosystem Services

Provisioning Services: This increase in seasonal freshwater habitats supports biodiversity, whilst providing water supply during drought conditions.

Regulating Services: These seasonal water storage features deliver water purification and flood water storage, as well as climate regulation.

Cultural Services: With high aesthetic values, these freshwater habitats support mental and physical health.

Supporting Services: Our seasonal water features help to moderate the impacts of extreme weather events, and are colonised by (aquatic) plants and insects, which aid photosynthesis and nutrient cycling.

Leaky Dams

These naturalistic structures emulate the natural process of windblown trees or the natural dams that would have been created by beavers. Leaky dams kick start natural processes in previously canalised rivers, resulting in an increase in habitat diversity and climate resilience in rivers and streams. Leaky by name, leaky by nature, during both high and low flows, they only let a certain amount of water through, slowly draining the trapped water to reduce the flood peak, but allowing low flows through during a drought.

Practical Delivery

- In the last 5 years we have constructed 568 leaky natural woody dams, which hold back an estimated 568,000 L[4] of water per flood event.

4 Based on 1 m^3 being attenuated per woody structure.

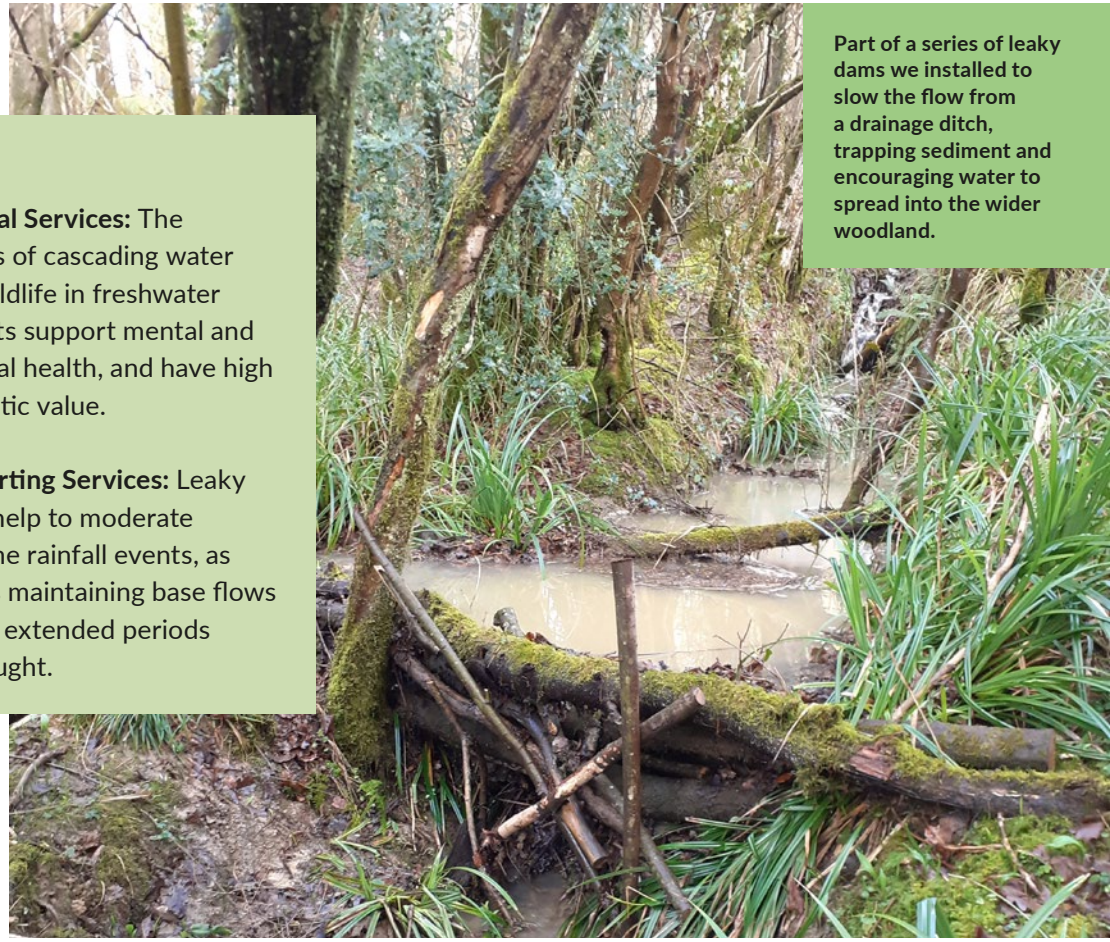
Ecosystem Services

Provisioning Services: Leaky dams help provide flood storage and more resilient water supplies, whilst also increasing habitat diversity and thereby supporting biodiversity.

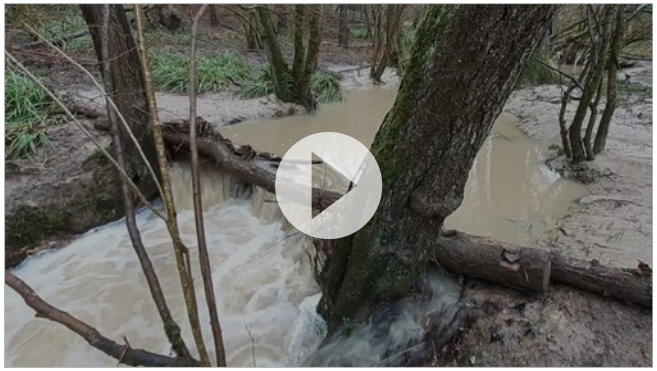
Regulating Services: Leaky dams help with climate, water and erosion regulation, as well as assisting with water purification.

Cultural Services: The sounds of cascading water and wildlife in freshwater habitats support mental and physical health, and have high aesthetic value.

Supporting Services: Leaky dams help to moderate extreme rainfall events, as well as maintaining base flows during extended periods of drought.



Part of a series of leaky dams we installed to slow the flow from a drainage ditch, trapping sediment and encouraging water to spread into the wider woodland.



Leaky dam during a flood event

Leaky dam slowing the flow

Volunteers planting cross-slope hedgerow.

Tour for NGOs of NFM measures undertaken by SFI.

Working with Communities

One of the key roles of the project is to be an advocate for the use of NFM measures, and to support and enable people to implement them. SFI has shared our technical expertise with thousands of people, supporting communities to cope with flooding, and to help them make a real difference to reducing flooding in and around their homes and communities. We have done this through:

Engaging with landowners

- Visiting 101 landowners of 226 sites, covering approximately 16% of the catchment upstream of Lewes, on a total of at least 6,828.6 hectares of land.
- Of these 226 sites, 89 included floodplain areas on 'main river' or 'ordinary watercourses'.

Working in partnership

- Upskilling and training local people through workshops and leaky dam days.
- Sharing ideas and creating communities of collaboration, such as the Upper Ouse Cluster farm event.
- Attending local events to highlight issues around flooding and participating in and presenting at public debates and forums.
- Our volunteers have contributed over 2,668 volunteer hours to the SFI project over the last five years, with a value in excess of £53,360[5].
- Working with over 23 local and national groups and stakeholders.

5 Based on £100 per day for volunteers

Local schools taking climate action

Inspiring and Informing Others

As an advocate of NFM and Nature Based Solutions to Climate Change, SFI ensures that as many people as possible can access our advice and expertise for free. We aim to support, inspire, inform and innovate in NFM, and to pass on our knowledge wherever we can.

Our advocacy for NFM over the last five years includes:

Events, conferences, websites and social media

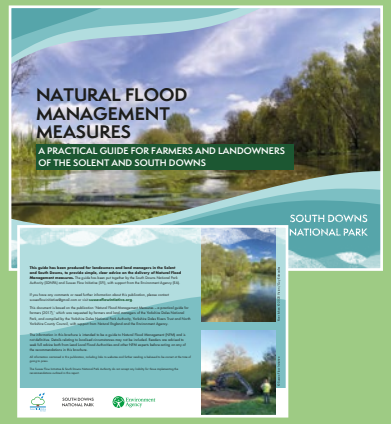
- Presenting at national and local events reaching audiences of over 400 people.
- Through the project's website and social media channels we have reached at least 693,819 people.
- Collaborative workshop with the Lost Woods of Low Weald and Downs project on 'Wilder Woodlands' for woodland owners.
- Supporting other projects such as Wilder Horsham District with our NFM skills and advice.

Producing NFM Guidance documents

We have produced a number of print and e-advice leaflets to help people understand and use NFM. These include:

Practical Guide to NFM

A Practical Guide for Farmers and Landowners for implementing Natural Flood Management – from the quick and simple to more complex multiple benefits schemes. Includes information on costs and consents required, and ecosystem services provided. Jointly produced with the South Downs National Park Authority.



The 'Practical Guide to NFM Measures for Landowners and Farmers'.

NFM Case Studies

SFI have produced a series of case studies that illustrate real examples of NFM collaboration, funding and delivery. These case studies focus on a range of NFM measures including leaky dams and wood in rivers, woodland and hedgerows, washland restoration, and using GIS for mapping NFM potential.

SFI's series of Case Studies on Natural Flood Management Delivery.

Practical Guide to Leaky Dams

Using ten years' experience of leaky dam construction within a lowland environment, SFI has produced an easy guide to a range of different naturalistic woody structures which help to slow the flow.

SFI's practical guide on 'Restoring Wood to Watercourse for Natural Flood Management'.

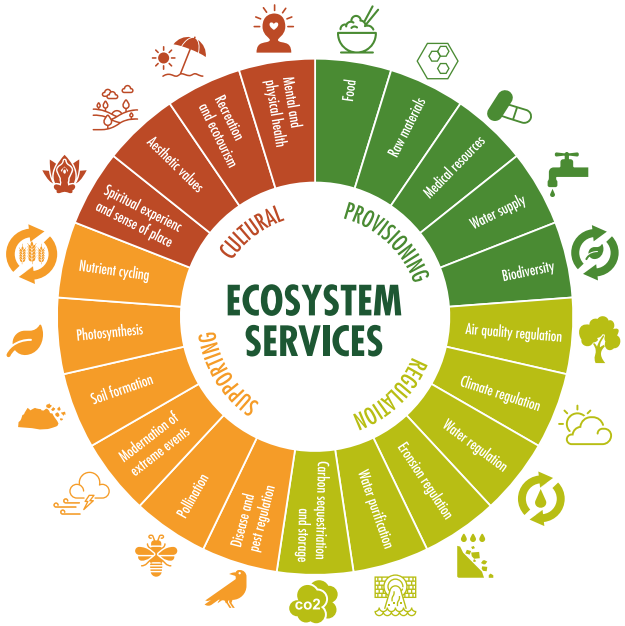
Other Achievements

We have achieved a great deal in the last five years. Some of our more notable achievements include:

Social and Natural Capital Impact Report

We worked with the New Economics Foundation to document the additional social and environmental benefits that SFI delivers, beyond our core NFM work. The report highlighted that SFI delivers at least a £2 for £1 cost benefit to society – multiplying the value of what we do by enhancing natural capital across a range of themes including increasing pollination services, carbon storage, access to nature and water quality.

The report highlighted a number of headline social impacts of SFI including:



- A documented increase in understanding of flood risk (58% of participants in survey).
- A documented increase in people's understanding of NFM issues and techniques (16% and 15% respectively of participants in survey).
- Increased feelings of empowerment to make positive changes in the environment (+39% of participants in survey).
- Positive impact on enhancing people's skills to undertake NFM (20% increase).
- Demonstrating that our support translates into a greater ability and clearer motivation for people to take action to help mitigate flooding and climate change. Strong intentions to undertake future NFM actions (+61% of participants in survey).

Many of the survey respondents also felt they derived personal well-being from participation in the project, including:

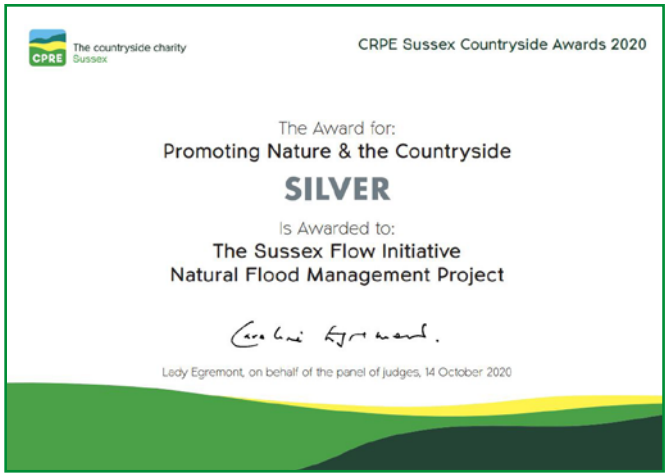
- Stating that their perception of their physical health improved and felt more positive in general (+25% of participants in survey).
- Reporting a feeling of being inspired and motivated (+48% of participants in survey).

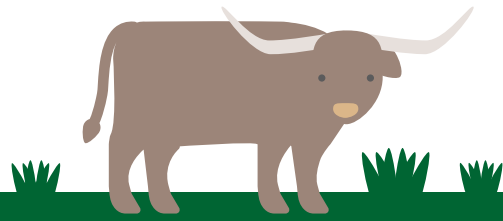
Our NFM work increases people's awareness about flooding and climate change. The findings of this report show the importance of helping people to manage their anxiety linked to that. The full report can be found on the SFIs website, we'll continue to keep engaging with local people and helping them take action to reduce local flooding.

The NEF report 'Exploring the social and natural capital impacts of the Sussex Flow Initiative', published in May 2020.

Receiving the CPRE Award for Promoting Nature and the Countryside

SFI were hugely honoured to be given a Silver award at CPRE's Sussex Countryside Awards in 2020.





Sub Catchment Reports

Working with the Ouse and Adur Rivers Trust, SFI have written detailed sub catchment plans for:

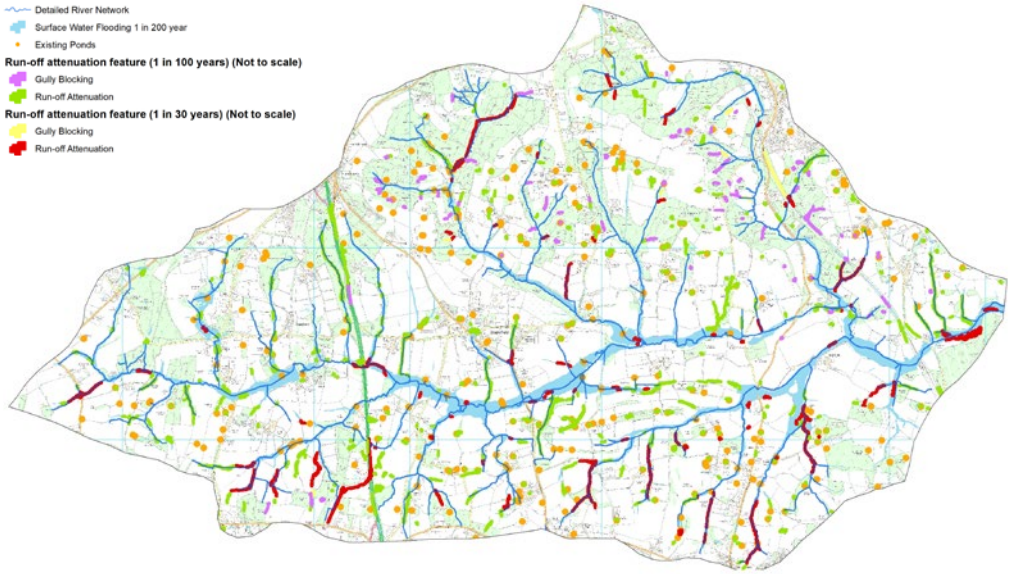
- Bevern
- Slaugham to Ardingly, &
- Longford stream

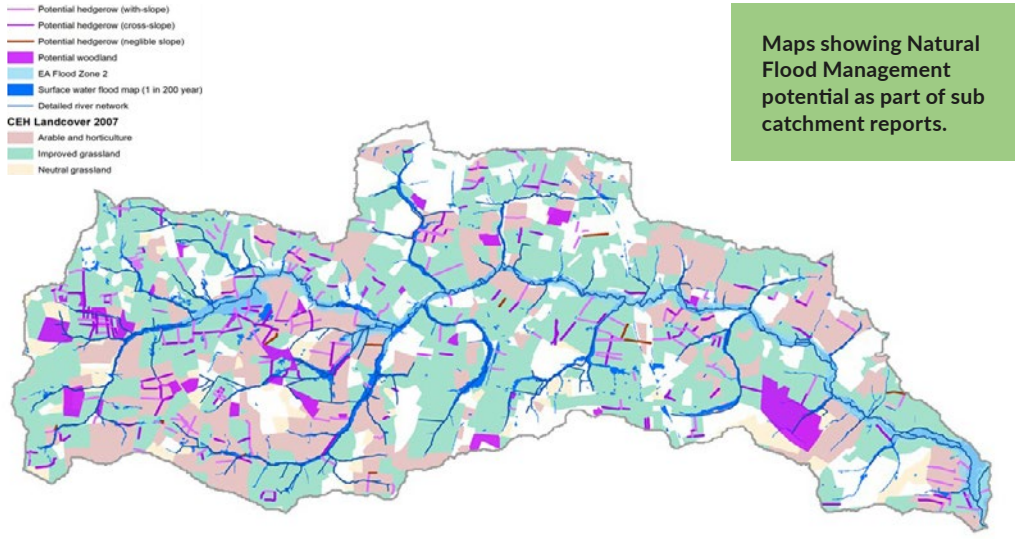
These reports help to prioritise areas for work and highlight where opportunities exist for NFM.

Training and Upskilling

Through workshops, talks and taster days, SFI has trained at least 49 staff and contractors in delivering NFM.

Volunteers creating leaky dams on a seasonal water flow path.





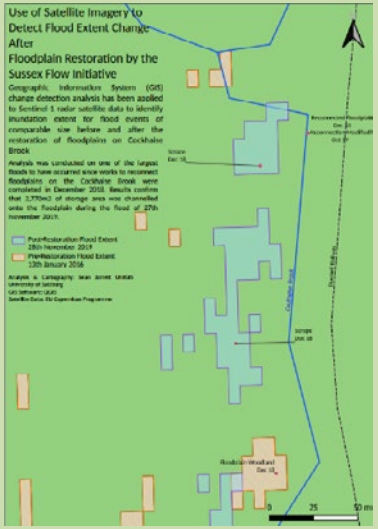
Maps showing Natural Flood Management potential as part of sub catchment reports.

Developing Scientific Evidence

SFI works with academics and students from a number of universities to gather evidence about the impacts of our NFM work. Examples of research we have supported includes:

- University of Brighton monitoring the hydrological effects of leaky dams.

- Sean Jarrett of Salzburg University using Satellite Imagery to detect changes in Flood Extent after Floodplain Restoration work that SFI carried out. Sean found that an increased area of 2,770m² flooded following our work. That's over 7,000 tonnes of extra water stored for every inch of flooding. ↗



- Josh Wolstenholme of the University of Hull who generated a 3D model of leaky dams showing the material accreted and erosion features. ↓

Woodland management generating materials to construct leaky dams.

University of Exeter · Universität Salzburg · University of Brighton · University of Sussex · Newcastle University · University of Hull · University of Reading · University of Cambridge · Queen Mary University of London · UCL

The added value of community based NFM work

A large part of the success of the SFI project in reducing flooding at a landscape scale is thanks to the supportive, passionate, skilled and talented people that we work with.

The strength of the partnerships and collaborations that we forge with other organizations, communities, land owners and farmers, enables us to have a much greater impact than we would otherwise have. Many of the people we work with provide their time and expertise for free.

We would like to say a particular thank you to our project partners; Sussex Wildlife Trust, Woodland Trust, Environment Agency and Lewes District Council for their continued support.

In addition, there are a number of organisations who have worked closely with us over the last 5 years, including the Ouse & Adur Rivers Trust, South East Water, SDNPA, HWAONB, ESCC and WSCC.

We estimate that our partners, landowners and other organisations have contributed at least £347,201 of their time in kind to this project in the last 5 years.

Community day, creating leaky dams in their local wood.

Wild Ouse – Our Evolving Delivery

The NFM work that we do is essentially a proxy for the work that Beavers would be doing if they were still here to do so. The absence of naturally occurring Beavers in Sussex, through human induced extinction, and the over drainage of our landscapes, is one of the key reasons why we suffer from the dramatic flood impacts that we see now. In the face of climate change and more erratic weather patterns, with increasing numbers of high intensity rainfall events, now more than ever we need to work with our natural environment to create natural flood and landscape resilience.

Beavers are natural ecosystem engineers who instinctively create Natural Flood Storage as part of their behaviour. Until recently, it was not realistic or legally possible to consider the restoration of beavers to their lost landscapes across Sussex. However, this year, the England Beaver Management Strategy went out to consultation, paving the way for the potential restoration of beavers to Sussex, and the Ouse River Catchment.

Landowners, Stakeholders and our own organisations are now asking for more. In the face of climate change, we need to be more ambitious in our delivery of multiple benefits to society through the restoration of resilient and adaptable wild nature. This year we are investigating how we can transition from NFM only, into a project which delivers multiple nature based solution to climate change, promoting and restoring a thriving nature recovery network at a landscape scale.

In Summary

These infographics provide a visual summary of our achievements each year between 2017 & 2022.