Working with Natural Processes – the evidence behind Natural Flood Management

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14 Evidence Thumbprints

Research Gaps and Monitoring

NFM Potential

Natural Flood Management

Evidence Directory
Here are the 14 interventions we can make:

1. Soil and land management
2. Salt marsh, mudflats and managed realignment
3. Floodplain restoration
4. Catchment woodland
5. Runoff pathways
6. Leaky barriers
7. Cross-slope woodland
8. River restoration
9. Offline storage
10. Floodplain woodland
11. Riparian woodland
12. Salt marsh, mudflats
13. Sand dunes
14. Beach management

Salt marsh, mudflats and managed realignment are key elements in this landscape.
The Evidence behind Working with Natural Processes to reduce flood and coastal erosion risk

What is it?

Working with Natural Processes to reduce flood and coastal erosion risk is about restoring and emulating the natural functions of catchments, floodplains, rivers and the coast (Environment Agency, 2013).

It is an approach which can be applied in urban and rural locations, on hillslopes, rivers, floodplains, estuaries and the coast.

It takes many different forms such as:

- Click on the text here to access 1 page summary for each measure

River Restoration

What is it?

Historically, rivers have been modified for many reasons (e.g. navigation, development, flood risk management).

River restoration is the reinstatement of the natural physical processes and features (e.g. pools, riffles) that are characteristic of a river.

It can help reduce flood risk, by slowing the flow of water within the channel.

Flood Risk Benefits

Summary

- Can slow flood flows and decrease conveyance through the reinstatement of features and emulates the flow to evacuate water to the ocean when flood peaks occur and allows flood-time effects (e.g. hydraulic impact, sediment transport, etc.)
- Restoring river banks can reduce peak flows of 20-75%, reduce flood volumes and peak discharges of 20-90%, lower water levels in floodplains, and restore habitats and biodiversity
- The multiple benefits of river restoration are significant over time and are difficult to quantify. More case studies are necessary to determine the true benefits
- Should require limited maintenance

Multiple Benefits

Summary

River restoration can provide a wide range of benefits which are almost always negative (see benefits wheel).

- Multiple benefits:
  - Recreation benefits of improving the river and surrounding path of rivers, which value at £2.5 billion over 100 years, based on the uplift to property prices (Brown et al., 2011).
  - By the River Project society's river restoration is expected to enhance the value of property and the public health benefits associated with the floodplain, estimated at £1 billion on the floodplain

Knowledge gaps

- The evidence base to inform best practice is limited.
- More information needed:
  - Analysis of potential costs and benefits by scale restoration.
  - Potential benefits, opportunities and risks of restoration on different scales.
  - Economic analysis, scenario planning.
  - Further steps and implementation

Key reading and maps

Reading:
- [Source: Modifications in river engineering]
- [Source: Floodplain management practice]

Maps:
- [Source: River polygons]
- [Source: Potential catchment areas and flood risk]

Terms of reference

[No information provided in the text regarding terms of reference]
Case study 6. Chelmer Valley Local Nature Reserve
Author: Trevor Bond
Main driver: Habitat improvement
Project stage: Completed spring 2016

Project summary:

The Chelmer Valley Local Nature Reserve (CVLNRR) is a small, lowland, semi-natural floodplain located in Basildon, Essex. The reserve is a Site of Metropolitan Importance and is managed by the Essex Wildlife Trust. The site is a haven for wildlife, including rare plants and animals. The reserve is a key site for nature conservation in Essex. The CVLNRR project aimed to improve the habitat for wildlife by restoring the floodplain and creating new habitats.

Key facts:

- CVLNRR is a Site of Metropolitan Importance.
- The reserve is managed by the Essex Wildlife Trust.
- The reserve is home to rare plants and animals.

Case study 11. Low Stanger Floodplain Reconnection Project
Authors: Ian Dregagola
Main driver: Flood risk management
Project stage: Completed 2015

Project summary:

The Low Stanger Floodplain Reconnection Project is a flood risk management scheme in the Low Stanger area of County Durham. The project aimed to improve the floodplain's ecological connectivity and biodiversity by reconnecting floodplain habitats. The project involved creating new habitats, improving existing ones, and enhancing the area's flood risk management capacity.

Key facts:

- Low Stanger is a flood risk management scheme in County Durham.
- The project aimed to improve floodplain connectivity and biodiversity.

Case study 12. Slowing the Flow at Pickering
Authors: Tom Mottol, Tom Thomas, Phil Roy
Main driver: Flood risk management
Project stage: Multi-species target, demonstration study

Project summary:

The Slowing the Flow at Pickering project is a demonstration study aimed at reducing flood risk in Pickering, North Yorkshire. The project involved creating new habitats and improving existing ones to enhance the area's flood risk management capacity. The study aimed to demonstrate the effectiveness of slowing the flow of water and improving habitat connectivity.

Key facts:

- Slowing the Flow at Pickering is a demonstration study in Pickering, North Yorkshire.
- The study aimed to reduce flood risk and improve habitat connectivity.

Case study 16. Bedford Natural Flood Management Scheme, Northumberland
Authors: Alan Witham (Hug), Paul Quinn (Newcastle University), Mark Wilkinson (James Aitchison Landcare)
Main driver: Flood risk management - repeated flooding in the community of Bedford
Project stage: Completed 2015

Project summary:

The Bedford Natural Flood Management Scheme is a flood risk management project in Bedford, Northumberland. The scheme involved creating new habitats and improving existing ones to enhance the area's flood risk management capacity. The project aimed to reduce flood risk and improve habitat connectivity in the community of Bedford.

Key facts:

- Bedford Natural Flood Management Scheme is a flood risk management project in Bedford, Northumberland.
- The project aimed to reduce flood risk and improve habitat connectivity in the community of Bedford.

Case study 17. Blackbrook Slow the Flow, St Helens
Authors: Mike Norbury, Nick Rogers, David Brown
Main driver: Flood risk management - repeated flooding in the St Helens area in St Helens (October 2016, September 2017 and 26 December 2016)
Project stage: Concept designed to implement a future flood risk management plan

Project summary:

The Blackbrook Slow the Flow project is a flood risk management project in St Helens. The project involved creating new habitats and improving existing ones to enhance the area's flood risk management capacity. The project aimed to reduce flood risk and improve habitat connectivity in the St Helens area.

Key facts:

- Blackbrook Slow the Flow is a flood risk management project in St Helens.
- The project aimed to reduce flood risk and improve habitat connectivity in the St Helens area.

Case study 21. Lutrum Beck Flood Alluviation Scheme: Phase 2
Authors: Joe Read, Tom Thomas
Main driver: Flood risk management
Project stage: Detailed design

Project summary:

The Lutrum Beck Flood Alluviation Scheme Phase 2 is a flood risk management project in Lutrum Beck. The project involved creating new habitats and improving existing ones to enhance the area's flood risk management capacity. The project aimed to reduce flood risk and improve habitat connectivity in Lutrum Beck.

Key facts:

- Lutrum Beck Flood Alluviation Scheme Phase 2 is a flood risk management project in Lutrum Beck.
- The project aimed to reduce flood risk and improve habitat connectivity in Lutrum Beck.

Case study 47. North Norfolk Coast
Authors: Ben Niles and Olly Birks
Main driver: Habitat creation, improved and more sustainable defences
Project stage: Concept designed to implement a future flood risk management plan

Project summary:

The North Norfolk Coast project is a flood risk management project aimed at creating new habitats and improving existing ones. The project aimed to enhance the area's flood risk management capacity by creating new habitats and improving existing ones to reduce flood risk and improve habitat connectivity.

Key facts:

- North Norfolk Coast is a flood risk management project.
- The project aimed to create new habitats and improve existing ones to reduce flood risk and improve habitat connectivity.

Case study 50. Modemmy Managed Realignment
Author: Rob Kelly
Main driver: Improved defences and habitat creation
Project stage: Completed 2013

Project summary:

The Modemmy Managed Realignment project is a flood risk management project in Modemmy. The project involved creating new habitats and improving existing ones to enhance the area's flood risk management capacity. The project aimed to reduce flood risk and improve habitat connectivity in Modemmy.

Key facts:

- Modemmy Managed Realignment is a flood risk management project in Modemmy.
- The project aimed to reduce flood risk and improve habitat connectivity in Modemmy.
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RUNOFF ATTENUATION + GULLY BLOCKING

RIPARIAN WOODLAND

FLOODPLAIN WOODLAND

CATCHMENT WOODLAND

FLOODPLAIN RECONNECTION
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NERC NFM Programme Award Decision September

These are our evidence gaps

And here's our monitoring guidance
CIWEM LAUNCH
LONDON, 31 OCTOBER
LEEDS, 1 DECEMBER
CARDIFF, TBC 2018

AREA ROADSHOWS
EARLY 2018