

# What we've learnt from the £15m NFM Programme

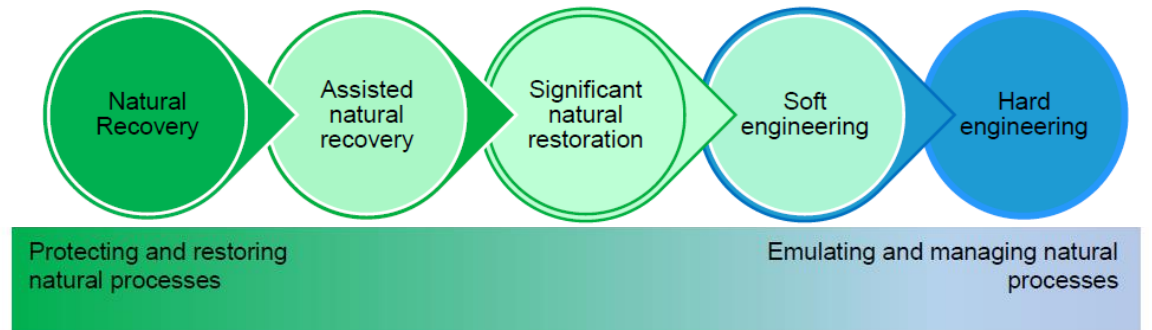
Jon Hollis  
Natural Flood Management  
Programme Manager

January 2021

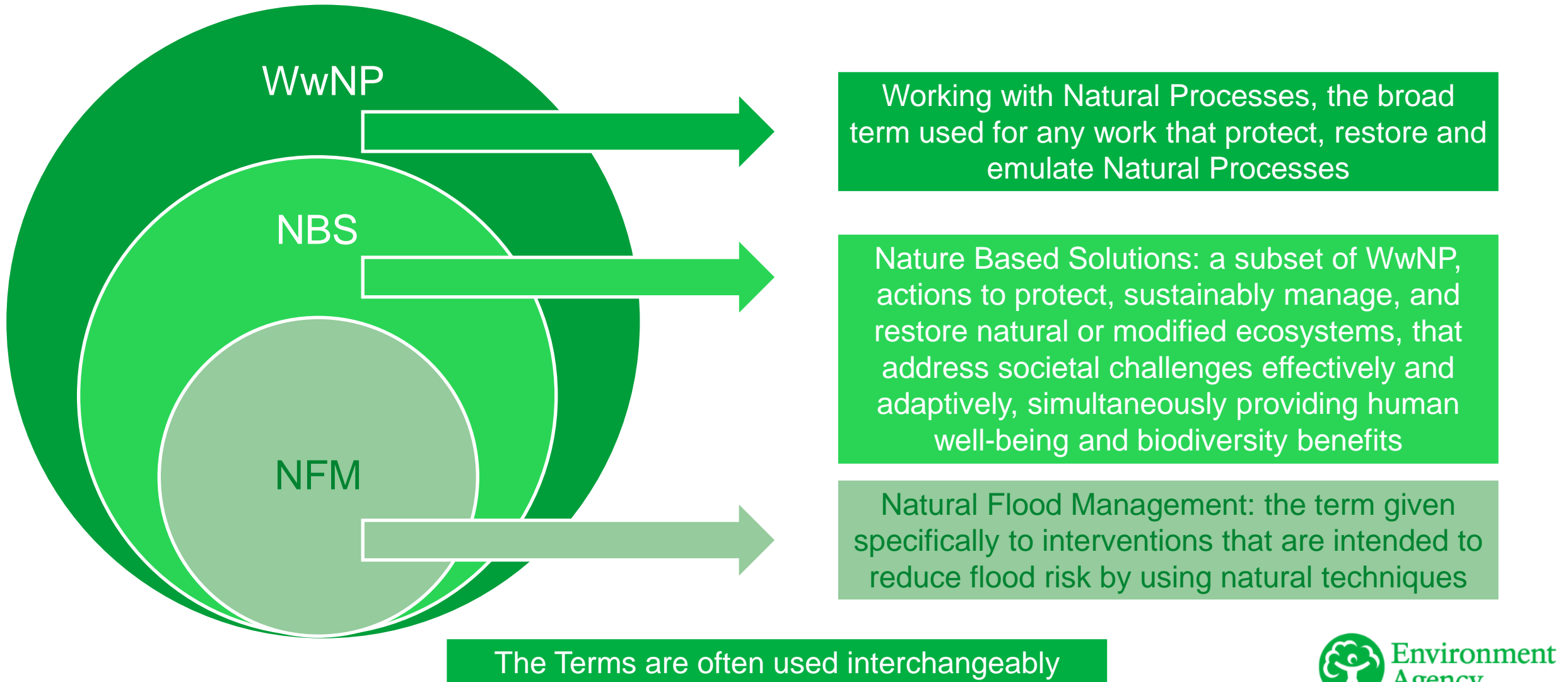


# Presentation outline

- The NFM programme
- Strategic context



# The connection between WwNP, NFM and NBS



# Before the NFM Programme

- Handful of NFM Projects
  - Holnicote
  - Pickering
  - Belford
  - Stroud
- Small Areas
- Not much confidence



Woody dams and riparian woodland upstream of Pickering (source: Forest Research)



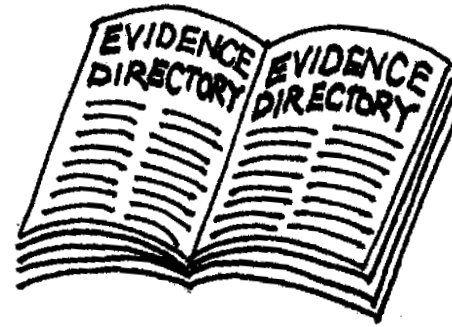
Stroud valley leaky barrier (source: Chris Uttley)



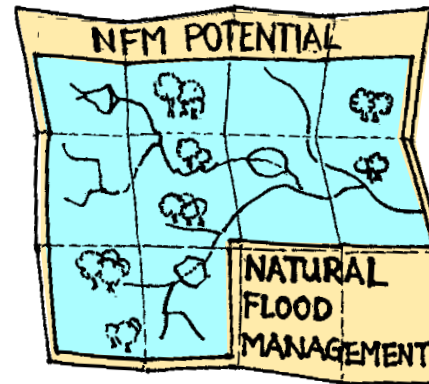
Holnicote storage area (source: National Trust)



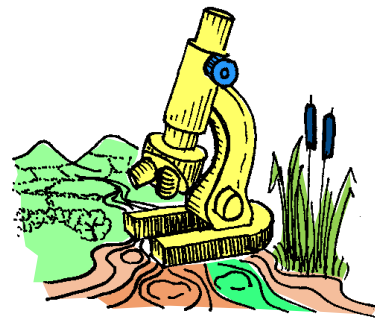
Runoff attenuation feature, Belford (source: Newcastle University)



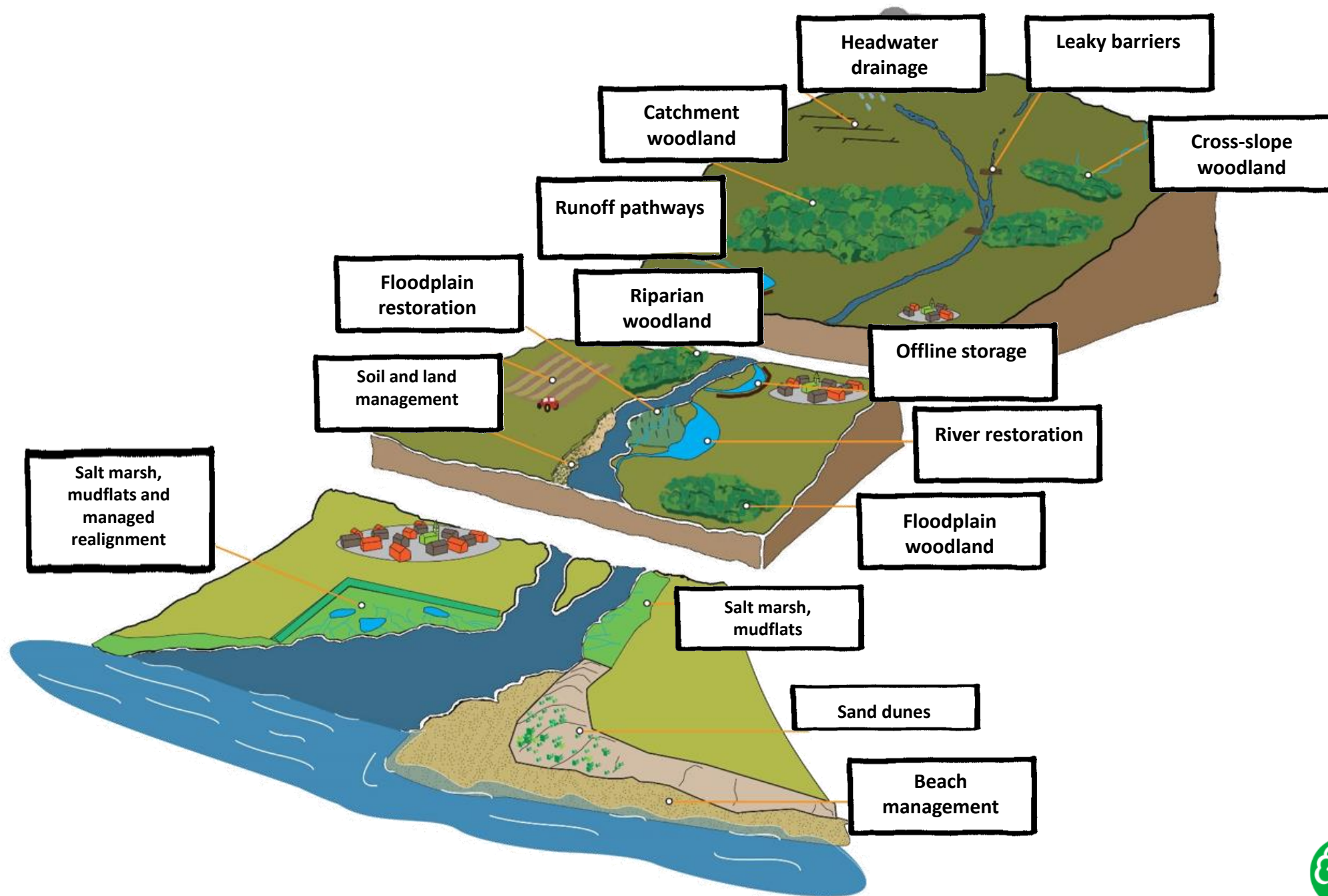
## 1. Evidence Directory



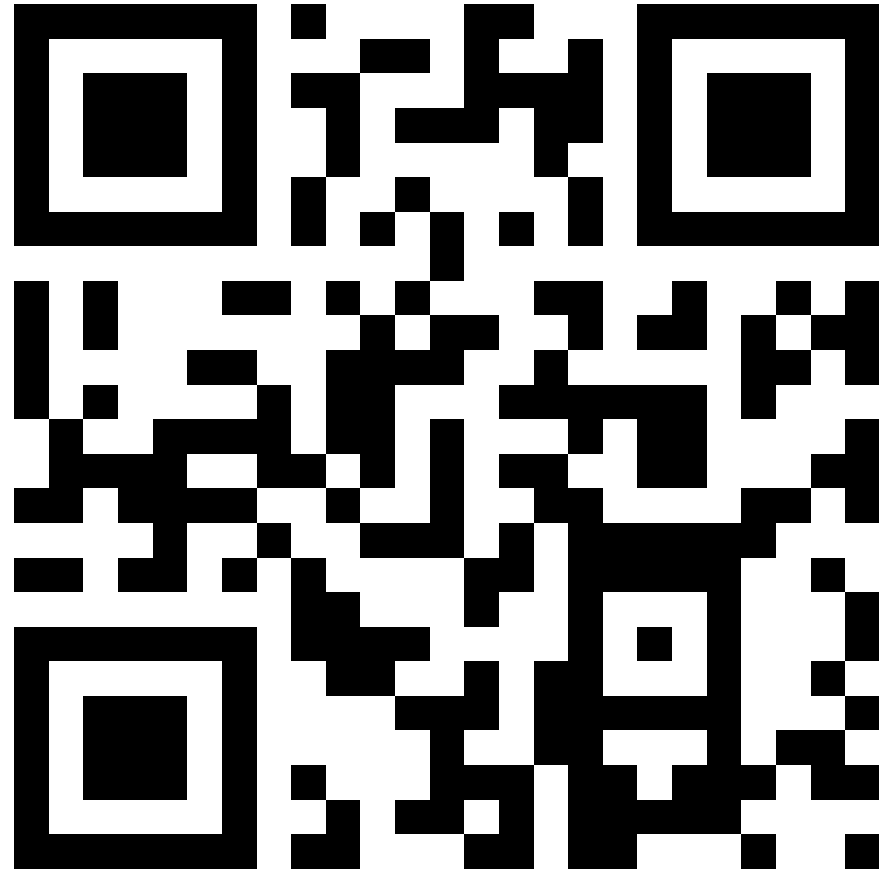
## 2. The Maps



## 3. The Gaps



# Evidence Directory





But its not just about flooding

### 3.4.3 Multiple benefits

The benefits wheel shows that floodplain woodlands benefit all ecosystem services.

#### Multiple benefits of floodplain woodland



#### Multiple benefits summary

Environmental benefits	
<b>Water quality</b> Floodplain woodland reduces diffuse pollution by enhancing sediment deposition (Jeffries et al. 2003), removing phosphates and nitrates, and fixing toxic metals (Gambrell 1994). Environment Agency (1996) measured reductions in sediment and nitrate concentrations in water flowing through the riparian areas.	
<b>Habitat provision</b> Wet woodland is listed as a priority habitat in both the NERC Act and the EU Habitats Directive. Floodplain forests have high biological diversity, high productivity and high habitat dynamism (Girel et al. 2003). Features created by woodland such as woody detritus, bank stabilisation, braided channels and linear connectivity enhance the biodiversity of floodplains (Pretty and Dobson 2004). They support a range of	
<b>38. Sussex Flow Initiative – East Sussex</b> Project stage: In progress (2012 onwards) WWNP measures: Floodplain woodland, hedgerows, shelter belts, flood storage ponds, woody dams, washland meadows Cost: £235,000 Key facts: This project has planted over 30,000 trees incorporating 6ha of new woodland and over 5km of new hedgerows, all designed to slow the passage of water, and increasing river shade along 5km to help the watercourse adapt to the impacts of climate change.	

#### Environmental benefits

flora and fauna, providing a spawning ground for fish and food for herbivores. The Sussex Flow Initiative (see box) is an example of a multiobjective project that includes floodplain woodland planting.

#### Climate regulation

Floodplain woodland has a cooling effect on the local climate. Increased canopy shading prevents lethal water temperatures and restricts weed growth, protecting fish and other organisms (Broadmeadow et al. 2010). It also functions as a substantial carbon sink. One study showed that mature hardwood and cottonwood forests have the highest total carbon stocks (474 tonnes per hectare and 403 tonnes per hectare respectively), followed by softwood forests (358 tonnes per hectare) and young reforestations (217 tonnes per hectare) (Cierjacks et al. 2010).



#### Low flows

Floodplain woodland helps to restore natural hydrological processes. Low river flows can be boosted by the slow release of water stored in pools, side channels and floodplain soils (McGlathlin et al. 1988). In cases where there is a gradient below a river or a floodplain to groundwater, wooded floodplains can encourage groundwater recharge through infiltration as a result of their higher roughness which slows the flow, and also because their roots provide macroporosity (Girel et al. 2003).



#### Social benefits

##### Health access

If floodplain woodland is made accessible to the public, it could have similar physical and mental health benefits to wider catchment woodland.



##### Air quality

As in other types of woodland, floodplain trees 'scavenge' pollutants from the air. This service is likely to be particularly beneficial in urban floodplains.



##### Surface water or groundwater flood

Floodplain woodland can have high water use, as it can reduce groundwater levels, freeing up space/capacity to store more floodwater at depth. However, in sequences of winter events this may not always be the case unless the infiltrated water can drain away. A study in the USA demonstrated that hardwood forest had 16% greater evapotranspiration and 28% more groundwater storage capacity than agricultural land (Zell et al. 2015).



##### Fluvial flood

Floodplain woodland creates hydraulic roughness and woody debris, which can reduce medium to large size flood flows in medium to large catchments. However, evidence on the magnitude of effect is mixed. A study examining the planting of native woodland along a 2.2km reach of the River Cary in



# Strategic Context for NFM



## 25 year environment plan

### We will:

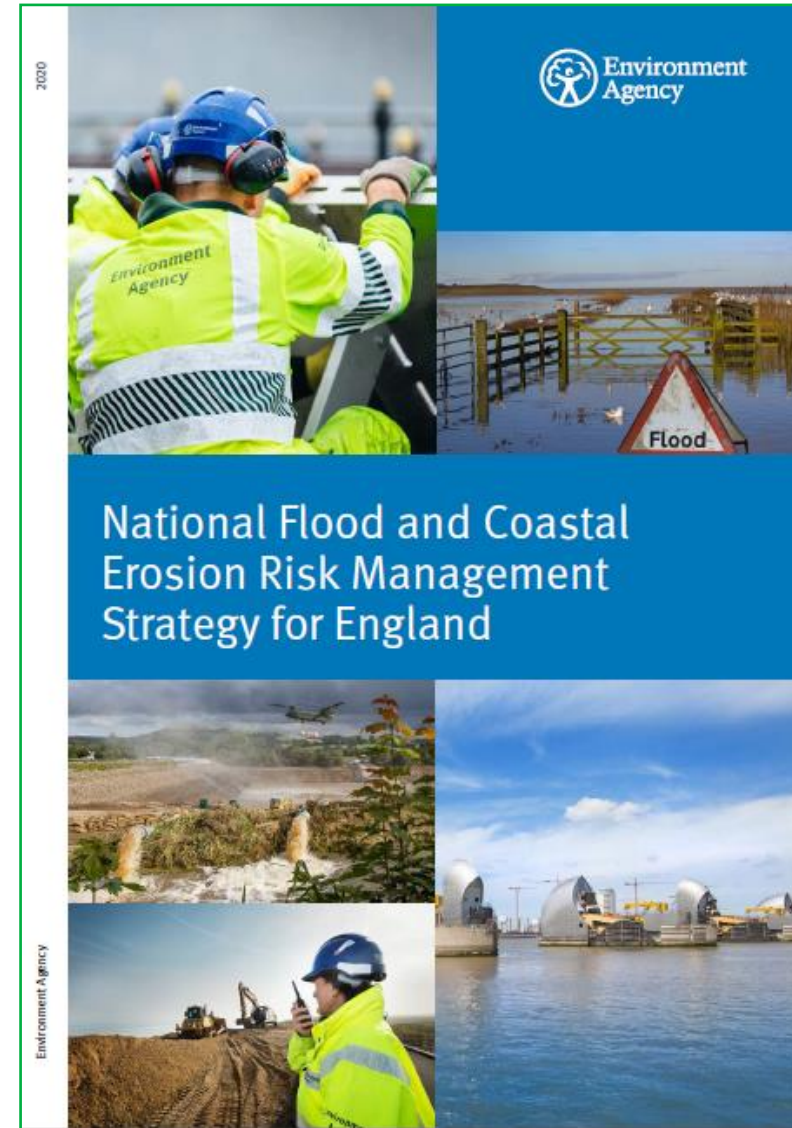
Take action to reduce the risk of harm from flooding and coastal erosion including greater use of natural flood management solutions.

### In addition, we will also focus on:

Using more natural flood management solutions where appropriate.

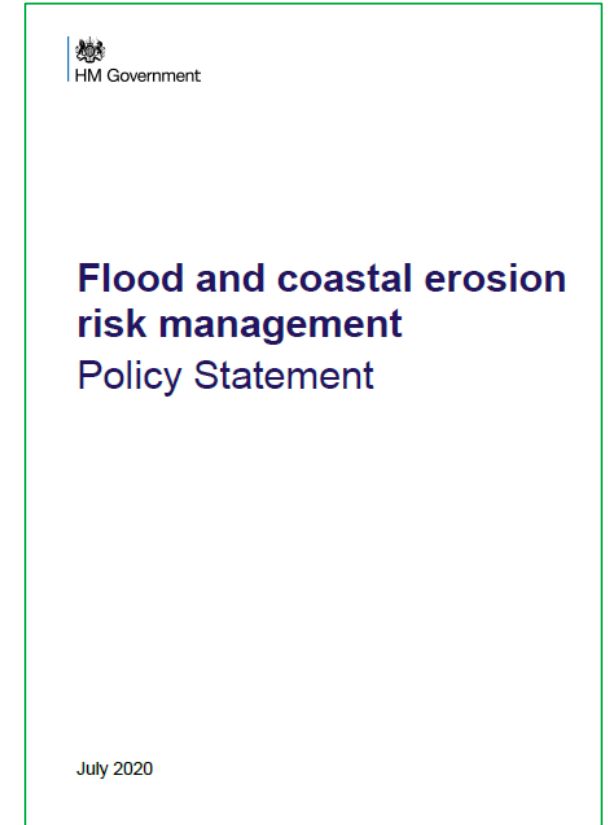
# FCERM Strategy

- Climate resilient places:
- Today's growth and infrastructure resilient in tomorrow's climate
- A nation ready to respond and adapt to flooding and coastal change



# Defra's FCERM Policy Statement

- Published in July 2020, features NFM throughout
  - *Harnessing the power of nature to reduce flood and coastal erosion risk and achieve multiple benefits*
- **It also notes:**
  - *Whilst natural flood management measures alone will not mitigate the risks of severe flooding or coastal erosion they do contribute, alongside other actions, when managed together and across catchments.*



# Important Bills

## Agriculture Bill

- To Authorise expenditure for agriculture
- To be able to continue payments after EU Exit
- To replace CAP

## Environment Bill

- Improving the natural environment
- Create the Office for Environmental Protection
- Nature and biodiversity

# What integration of NFM means

- Including stand-alone NFM projects in our programme
- Projects that use both NFM and Hard engineering



March 2020



May 2020



July 2020



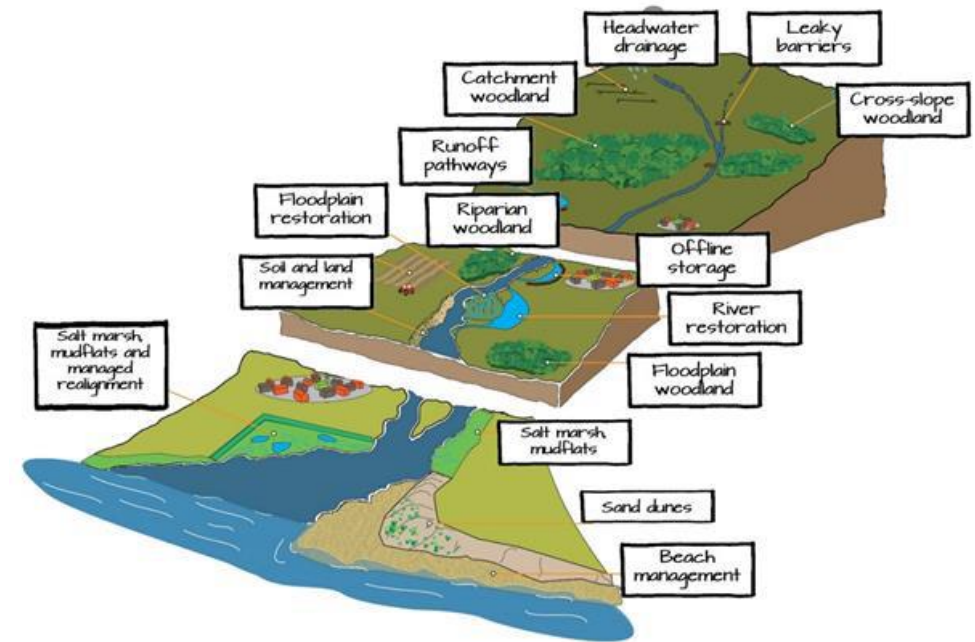
# Natural Flood Management Programme

- £15m to put NFM in the toolbox
- Aims
  - Reduction in Flood and Coastal Erosion risk
  - Improve habitats and increase biodiversity
  - Contribute to Research & Development; reducing the evidence gap for NFM
  - Promote partnership working



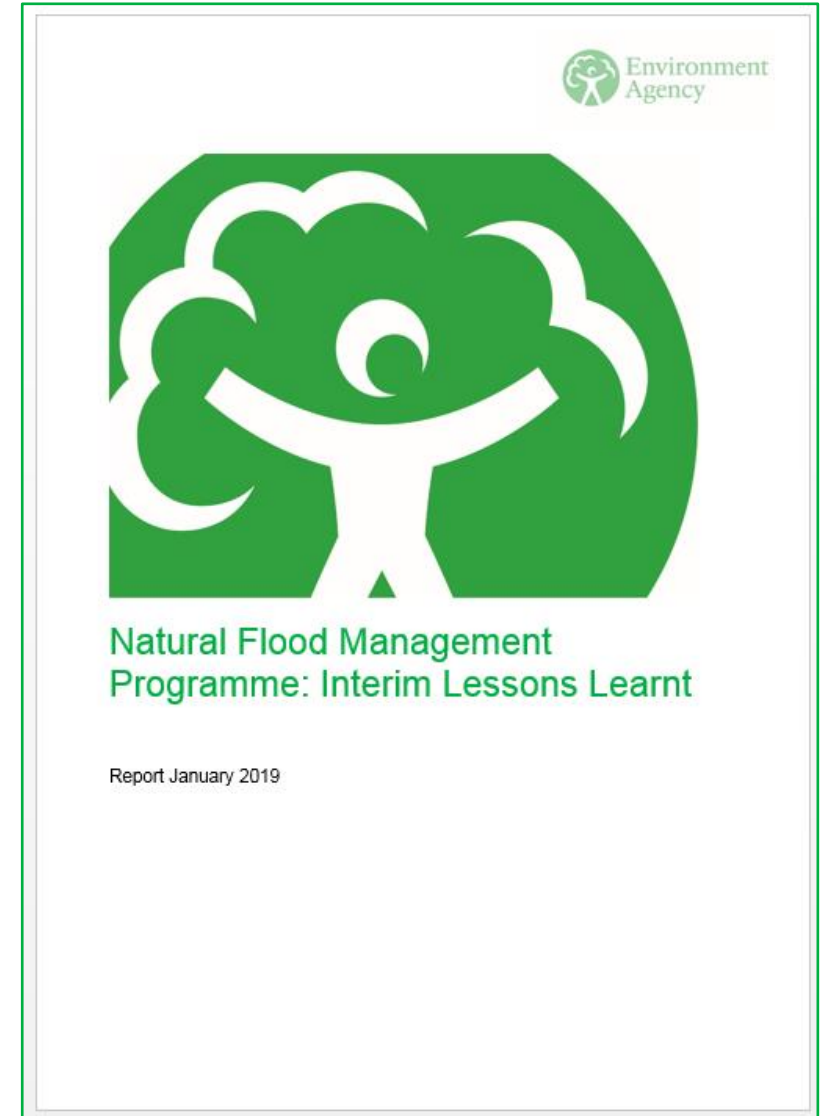
# Learning from the programme

- NFM programme
  - Lessons Learnt Part 1 and 2
  - Case studies
  - AGOL/ Data collection
  - Method assessment
  - Project reports



# Interim Lessons Learnt Report

- Project teams require clarity on how projects proposals will be assessed.
- Timetables should not be fixed before practicalities are agreed with partners.
- Teams want information to assess and value the benefits and costs of NFM.
- Engagement is crucial to form and sustain partnerships needed for NFM.
- Engagement to clarify long responsibilities is critical.



# Interim Lessons Part 2

- Permits and Consents
- Monitoring
- Legal Agreements
- Maintenance



- More time, early engagement
- Landowner, Maintenance, Funding (and procurement)

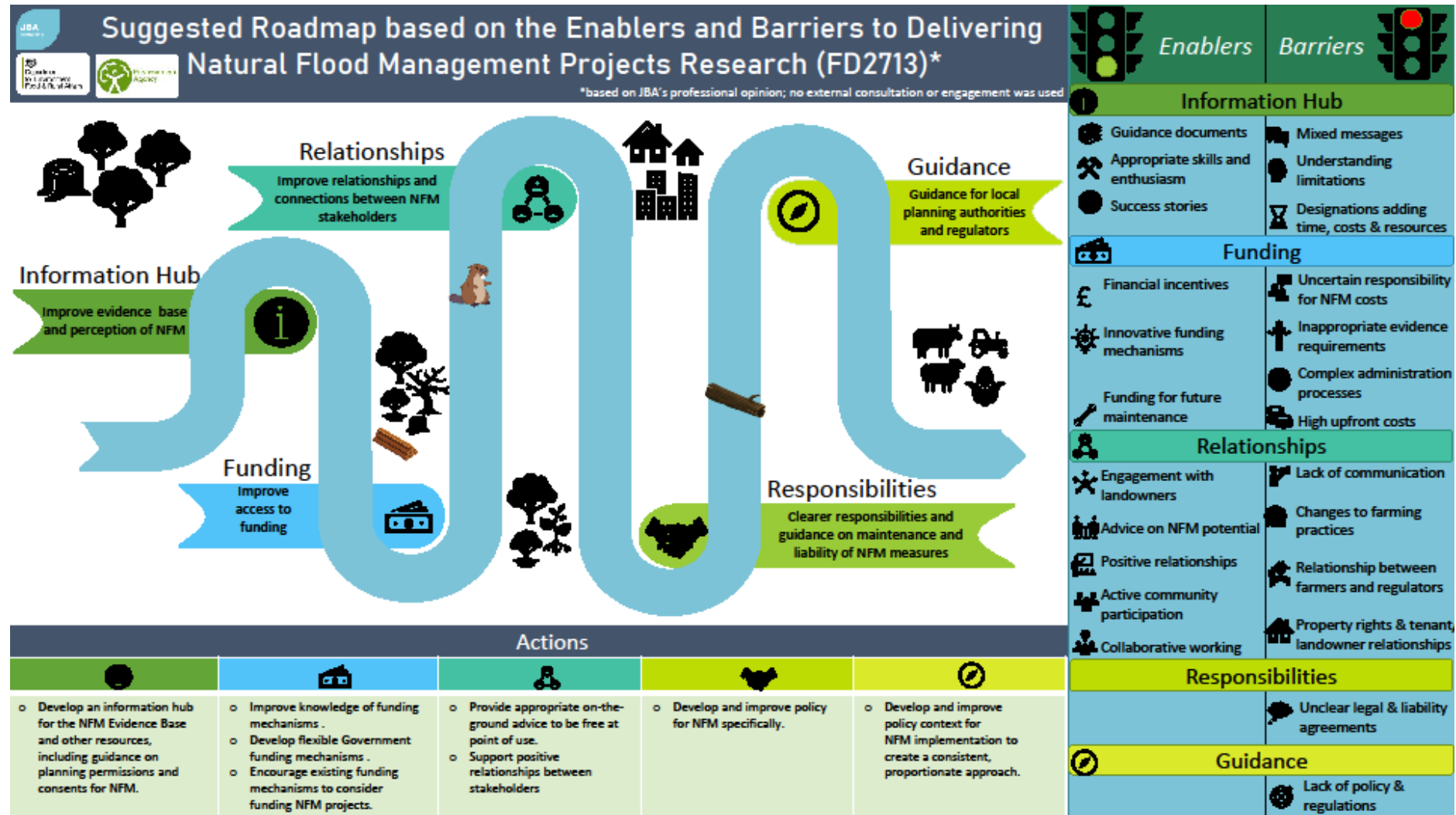
Maintenance Task	Landowner	Community Group	Environmental NGO	Other	N/A
Inspection	45%	20%	28%	8%	0%
Repair	42%	15%	25%	17%	2%
Replacement	39%	11%	26%	15%	9%

- Active / Information

# Defra's Enablers and Barriers to NFM

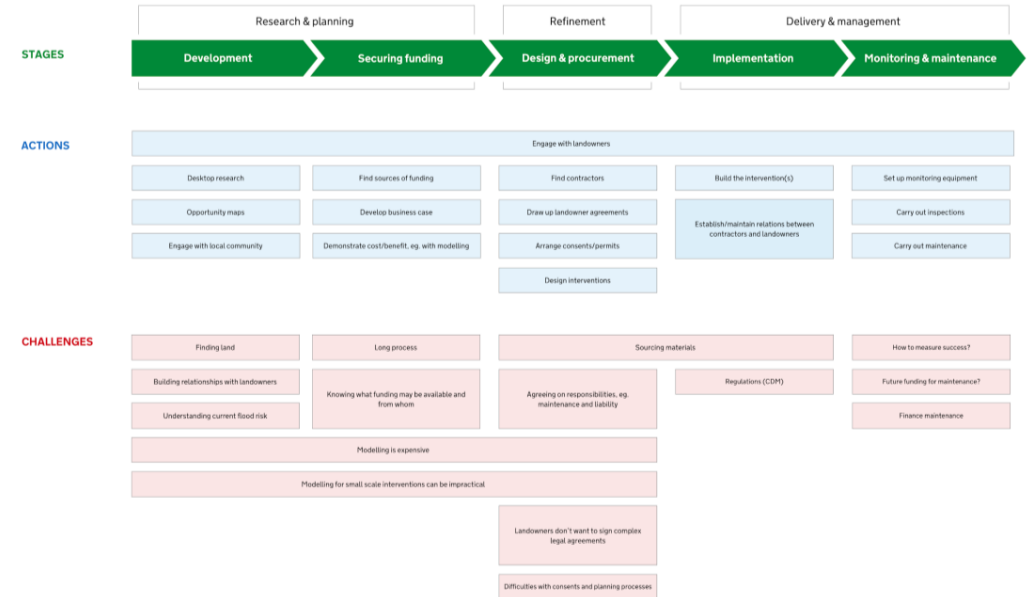
- This project looked at identifying what the barriers and enablers are to delivering natural flood management. 4 research questions were addressed by this project:
  - Who are the main stakeholders delivering NFM projects, and what engagement do they have?
  - What social, regulatory and/or institutional barriers are experienced in the delivery of NFM projects?
  - What social, regulatory and/or institutional enablers are experienced in the delivery of NFM projects?
  - What are the main enablers and barriers associated with different funding mechanisms used to deliver NFM projects?

# Roadmap



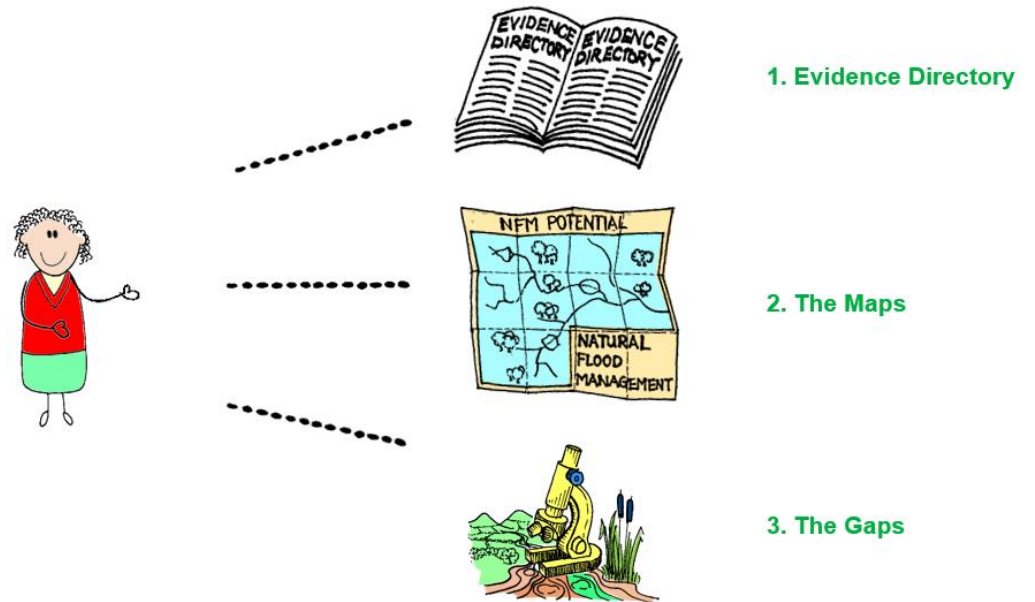
# Digital Work

- Review the challenges and look for digital solutions to “Make NFM an everyday choice”
- Finding land
- Funding
- Modeling
- Measuring success
- Risk



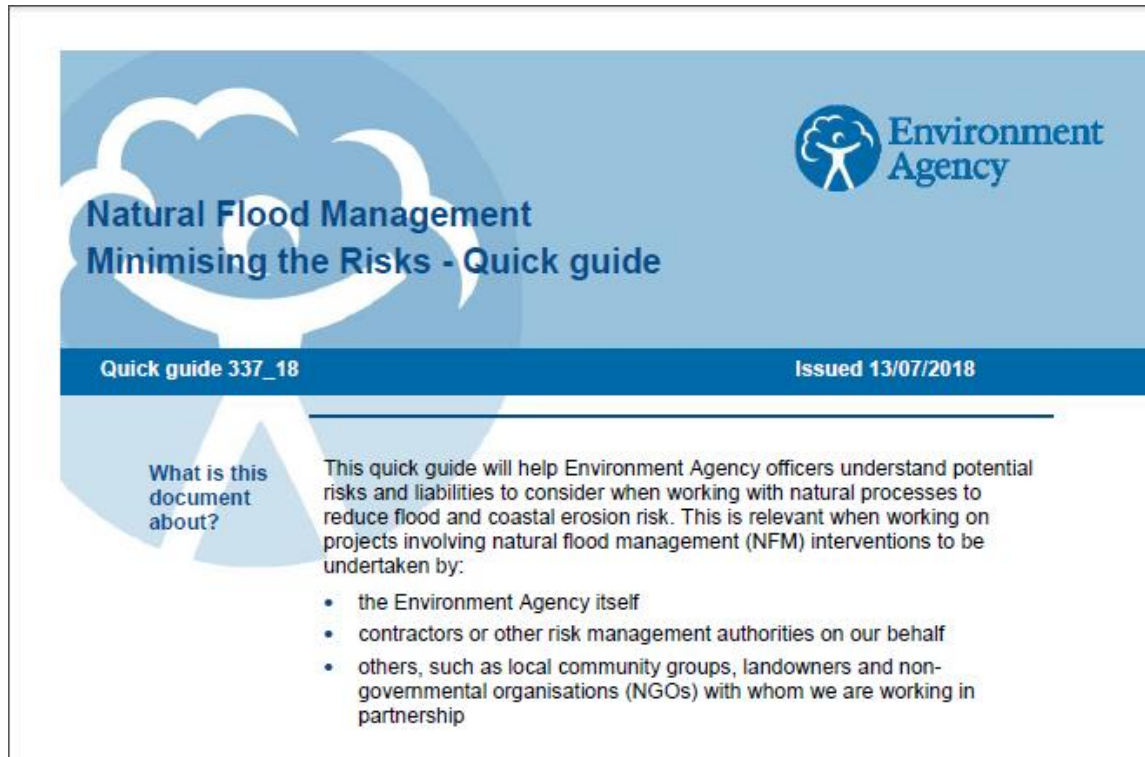
# What we've done and are doing

- Updating the learning
  - Working on Guidance
  - Funding
  - Ways of Working
  - Sharing knowledge
- 
- FCERM Strategy Action Plan



# Minimising the Risk

- NFM interventions can lead to risks



- **Legal risks** – such as the risk of legal action by a third party
- **Financial risks** – such as the risk of unplanned expenditure to maintain NFM features or structures
- **Reputational risks** – such as the risk of challenge over the failure of NFM features

# Guidance

- Modelling Guidance
  - Standards for NFM
  - Perhaps a national NFM model?



- Design Guide
  - How to install / best practice

CIRIA RP1094

London, 2020

The NFM manual

FIRST DRAFT

Wren E et al

# Funding

- Partnership Funding Update
- Allocation
  - £5.2bn capital to protect 336,000 properties.
  - £120m for asset recovery
  - £200m Resilience Funding
- Other Funding
  - Nature for Climate
  - Trees
  - Private / investment

Project teams are required to provide a copy of the PF Calculator within their business case for approval of FCERM GiA.

## Flood and Coastal Erosion Risk Management (FCERM)

### Partnership Funding (PF) calculator 2020 for Flood and Coastal Erosion Risk Management Grant-in-Aid (FCERM GiA)

Version 1: March 2020 (for use by projects delivering FCERM outcomes after 1 April 2021)

Key: input selection calculated cells

#### SECTION 1: Project details

Project Name:  Project stage:

National Project number:  Option reference:

Date of PF Calculator:

Lead RMA:

FCERM GiA applicant type:

Project benefit to cost ratio:  Benefit/Cost ratio:  to 1

Effective return to taxpayer:  r/a to 1

Effective return on contributions:  r/a to 1

All values in £ (pound Sterling)

Figures in blue to be included in the national FCERM capital programme for the chosen option

#### SECTION 2: Prospect of eligibility for FCERM GiA

Confirmed strategic approach?  #DIV/0!

Raw PF Score:  #DIV/0!

Adjusted PF Score:  #DIV/0!

Minimum pv contribution/saving required:  #DIV/0!

pv FCERM GiA up-front costs:  #DIV/0!

pv maximum eligible FCERM GiA:  #DIV/0!

pv FCERM GiA future costs:  #DIV/0!

#### SECTION 3: Costs and contributions for the PREFERRED OPTION (over the duration of benefits period)

Project costs	Towards qualifying outcomes	Contributions secured to date	towards pv appraisal costs	towards pv qualifying outcomes up-front	towards pv qualifying outcomes future	Contributor(s) or Fund(s)
pv appraisal costs	<input type="text"/>	pv Local Levy	<input type="text"/>	<input type="text"/>	<input type="text"/>	
pv design and construction costs	<input type="text"/>	pv other public sector	<input type="text"/>	<input type="text"/>	<input type="text"/>	
pv risk contingency	<input type="text"/>	pv private and voluntary sector	<input type="text"/>	<input type="text"/>	<input type="text"/>	
pv costs for approval	<input type="text"/>	pv other Environment Agency	<input type="text"/>	<input type="text"/>	<input type="text"/>	
pv future costs	<input type="text"/>	<b>pv sub-total</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
pv WLC (over duration of benefits)	<input type="text"/>	pv total contributions	<input type="text"/>	<input type="text"/>	<input type="text"/>	

#### SECTION 4: Outcome Measure 1 - economic benefits arising from FCERM

pv WLB (appraisal period):

Duration of benefits (DoB) period:

Economic summary sheet completed:

Economic data included in business case?:

Navigation: [Guidance and version](#) [PF calculator](#) [Economic summary](#) [Policy assumptions and formulae](#) [pv calculator](#) [SA1](#) [SA2](#) [SA3](#) [SA4](#) [SA5](#) [SA6](#) [SA7](#) [+](#)

# Ways of working

- Processes
  - Appraisal Guidance
  - Design guide
  - Modelling standards
- Metrics
  - Number of projects
  - Amount of cash



# International Relations



- USACE **launch the 'Engineering with Nature – An Atlas'.**
- We have been working with the United States Army Corps of Engineers (USACE) to develop this international guide on Natural Flood Management. The Atlas is a high quality illustrated book which **shares case study examples from around the World** showing how we can engineer with nature to reduce flood and coastal erosion risk. **10 of the 56 case studies are from the UK.**
- It is **free to download.**
- **<https://ewn.el.erdc.dren.mil/atlas.html>**

# Summary

- The Direction is more NFM/ NBS/ WwNP
- We must integrate NFM in our projects and programmes



# Thank you

Further information can be found on Knowledge Hub  
[www.khub.org](http://www.khub.org) and search for the  
'Catchment Scale Natural Flood Management Projects' group

Contact:

NFM@environment-agency.gov.uk  
jon.hollis@environment-agency.gov.uk