Creating Flood Resilient Catchments

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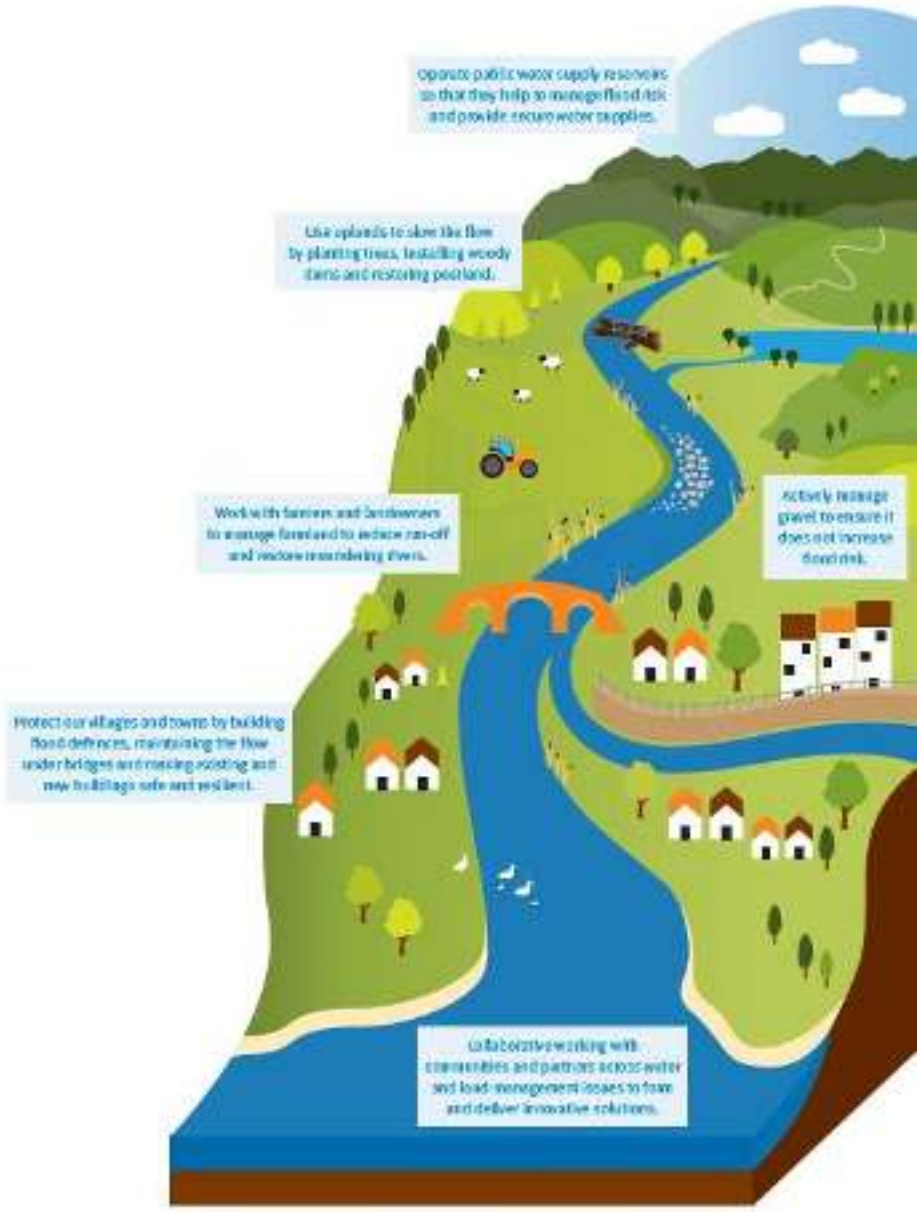
9th July 2021



Content

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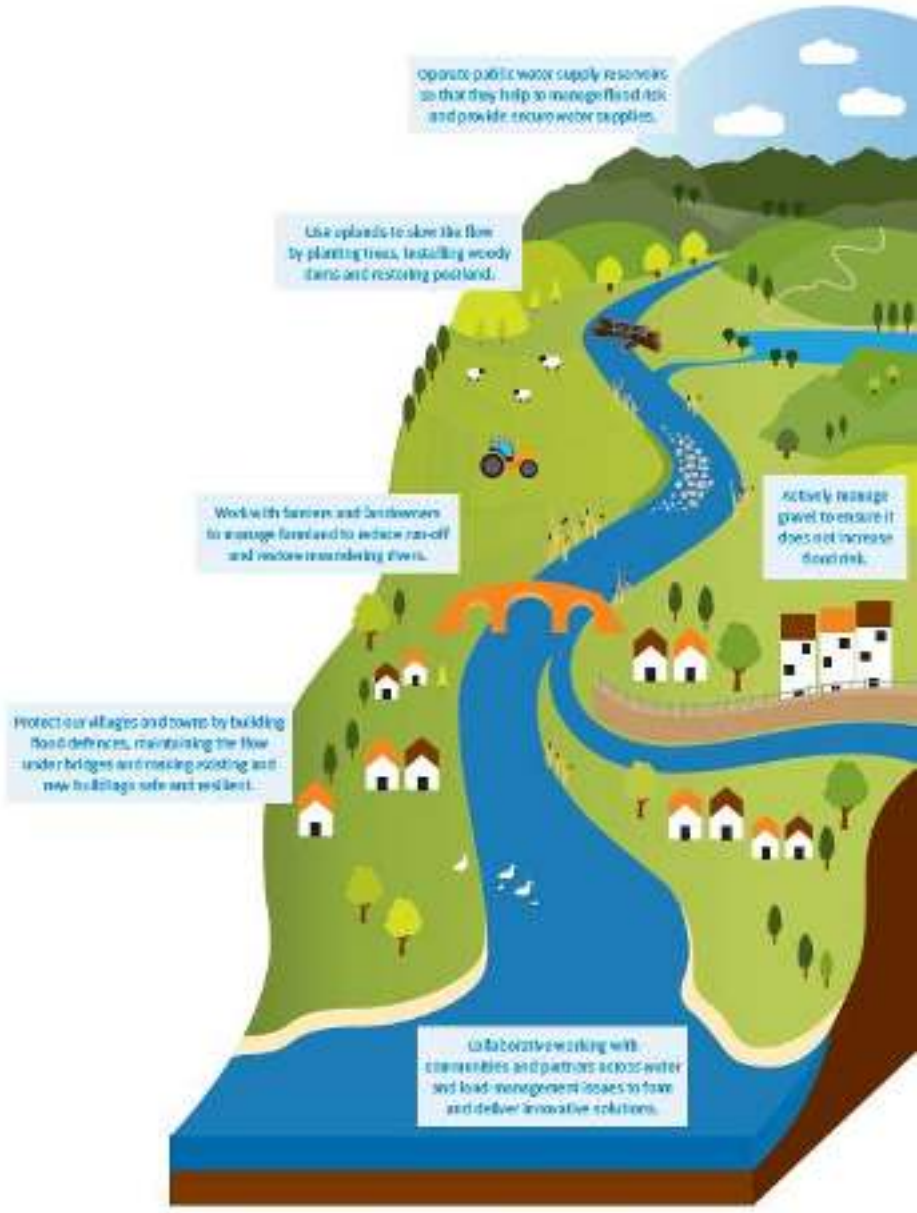
- Overview of the approach (film)
- Developing the science
- Why use these techniques?
- Downsides?
- Local case study (Dartmoor)
- Fitting it in to other solutions
- What can you do?
- Discussion




Language
"…taking action to manage flood and coastal erosion risk by protecting, restoring and emulating the natural regulating function of catchments, rivers, floodplains and coasts"
Upland Management ?
Catchment Management?
Catchment Based Approach?
Working with Natural Processes?
Natural Flood Management?
Environmental Land Management?
Natural & nature based features(USA)?
Natural water retention measures (EU)?

Language

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Overview of the approach

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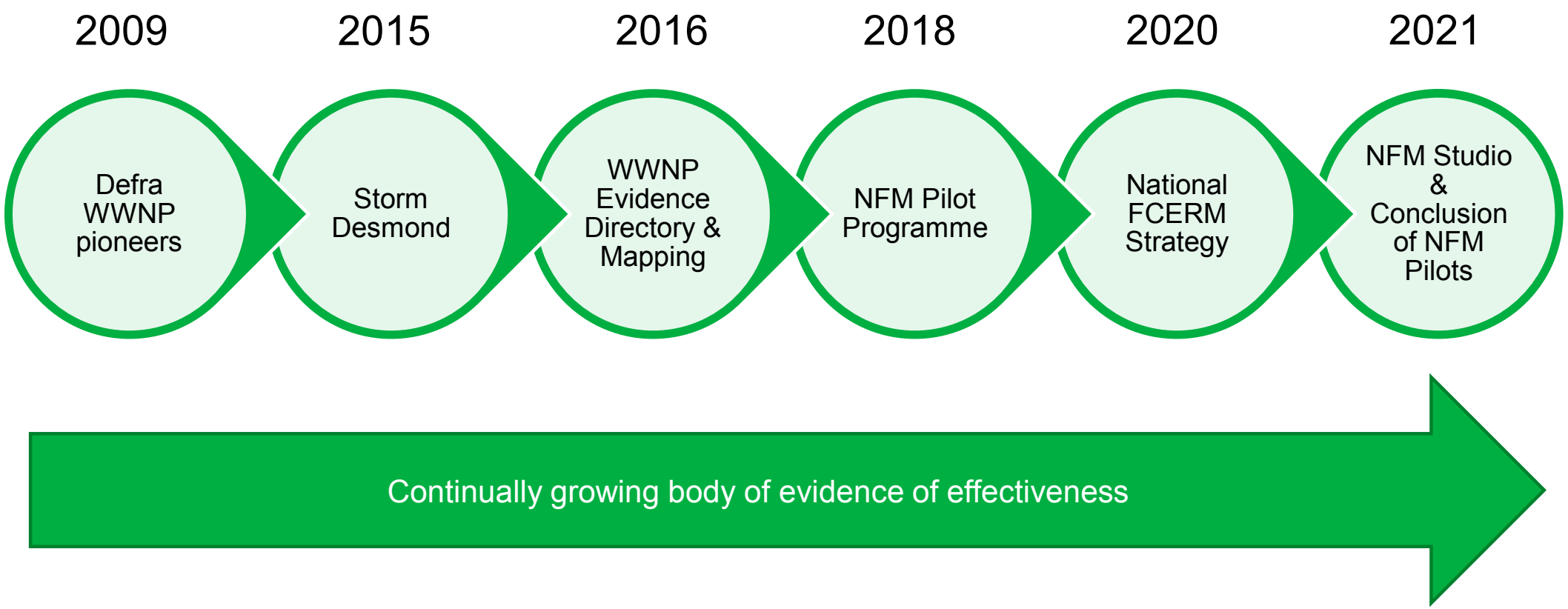
Developing the science



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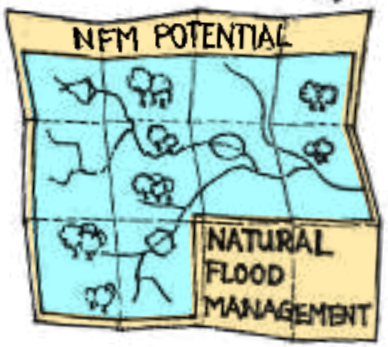
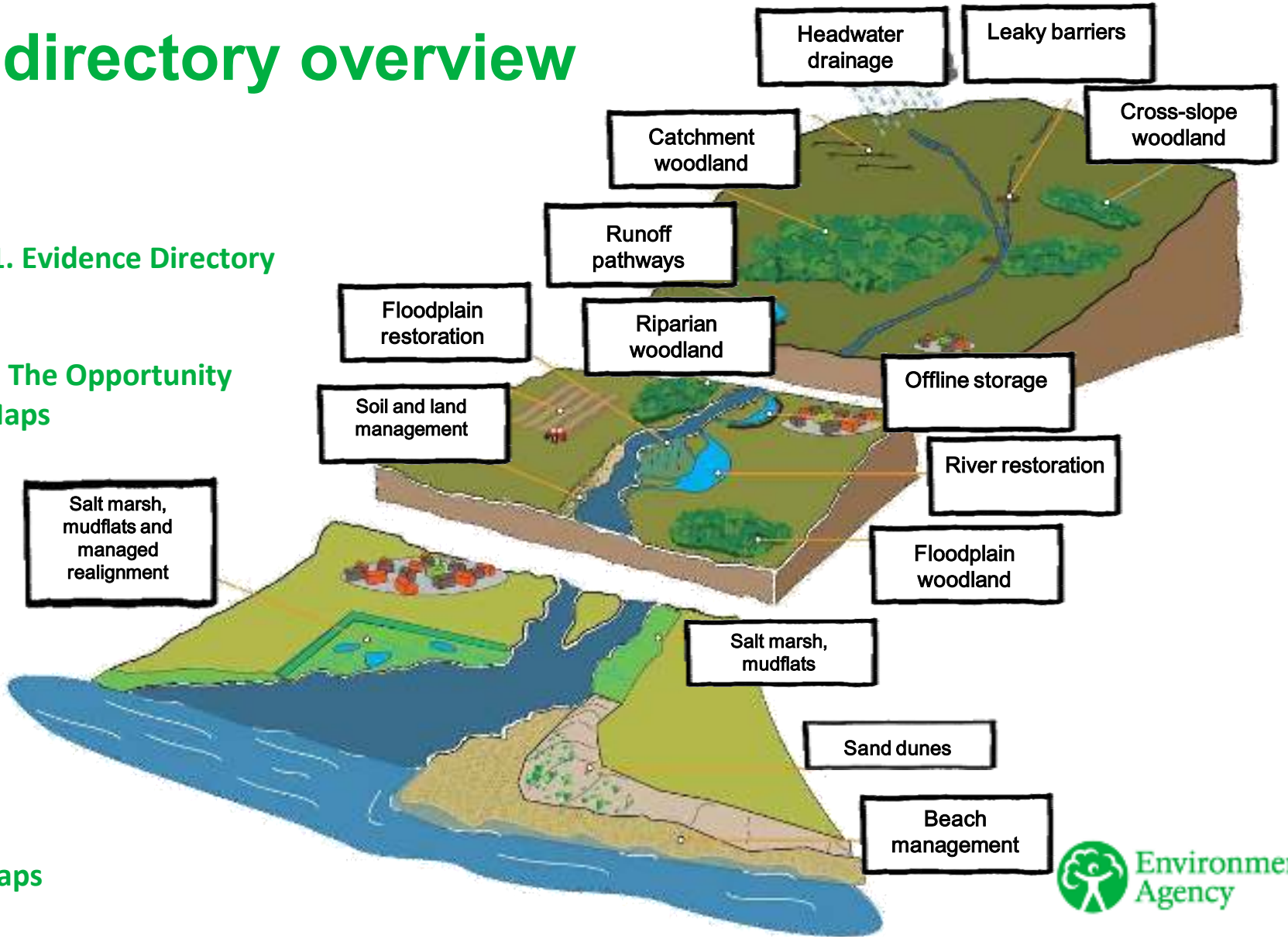
Evidence directory overview

1. Evidence Directory



2. The Opportunity Maps

3. The Evidence Gaps



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Evidence directory overview


Case study 27. Investigating the impacts of Upland Land Use Management on Flood Risk at Pontbren, Wales

Author: Tom Nisbet

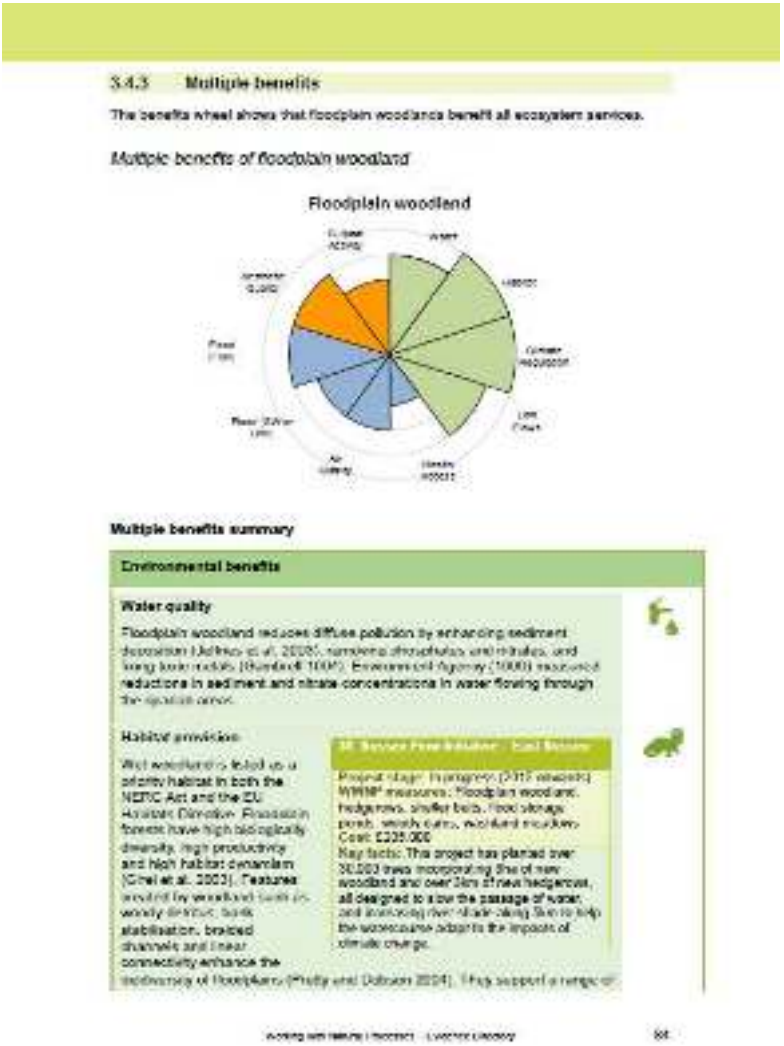
Main driver: Flood risk management

Project stage: Multi-scale experimental and modelling project

Project summary:

1. Evidence Directory

- Summary
- Key facts
- Contact details
- Hydrology
- Catchment context
- Design rationale
- Effectiveness
- Construction methods
- Funding
- Multiple benefits
- Maintenance
- Lessons learnt
- References


3.4.3 Multiple benefits

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

Multiple benefits of floodplain woodland

Floodplain woodland

Multiple benefits summary

Environmental benefits

Water quality

Habitat provision

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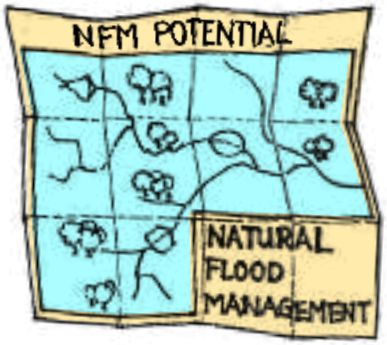
Evidence Directory NFM Potential Maps



2. The Opportunity Maps

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Evidence Directory NFM Potential Maps

3. The Evidence Gaps

Maintenance requirements M

Summary of the literature

- Leaky barriers may need maintenance if there is insufficient natural wood supply, or if sedimentation occurs upstream of the barrier.
- Naturally occurring wood in rivers can have a number of benefits and in most cases should be left in the channel.
- Engineered leaky barriers – and to an extent naturally occurring wood in rivers – can be complex to manage because:
  - the wood will decay in the long term
  - wood structures may induce sediment erosion and deposition, and so engineered leaky barriers need to be placed where these processes will not create problems
  - they could have an impact on migratory fish (see Dodd et al. 2016)
- Leaky barriers should be inspected frequently and after flood events (Quinn et al. 2013, Dodd et al. 2016) to check for:

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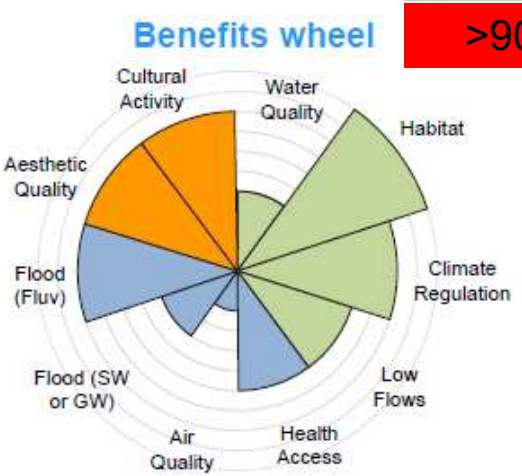
Why use these techniques?

- Reductions in flood peak of 9-13% in pioneer projects
- Up to 30% reduced peak in some case studies since
- Significantly lower carbon than hard defences
- Can deliver wider benefits to society than hard defences alone

>90(!?)% higher river flows?



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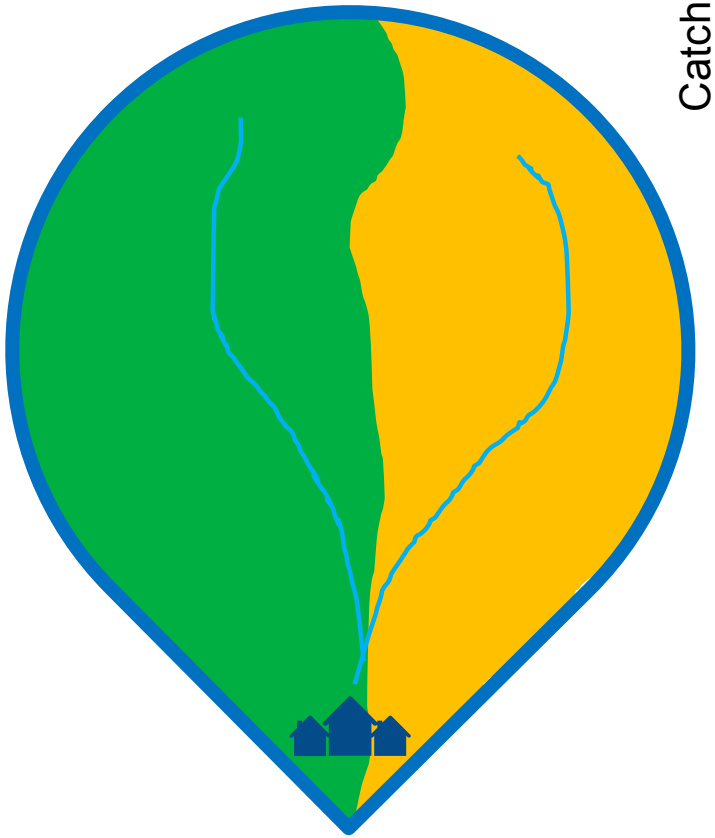
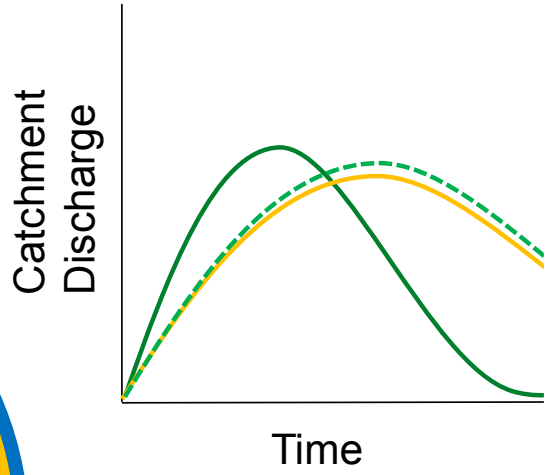
Downsides?





Peak synchronicity

Scale, scale, scale

Agricultural payments changes

Works negotiated by agreement

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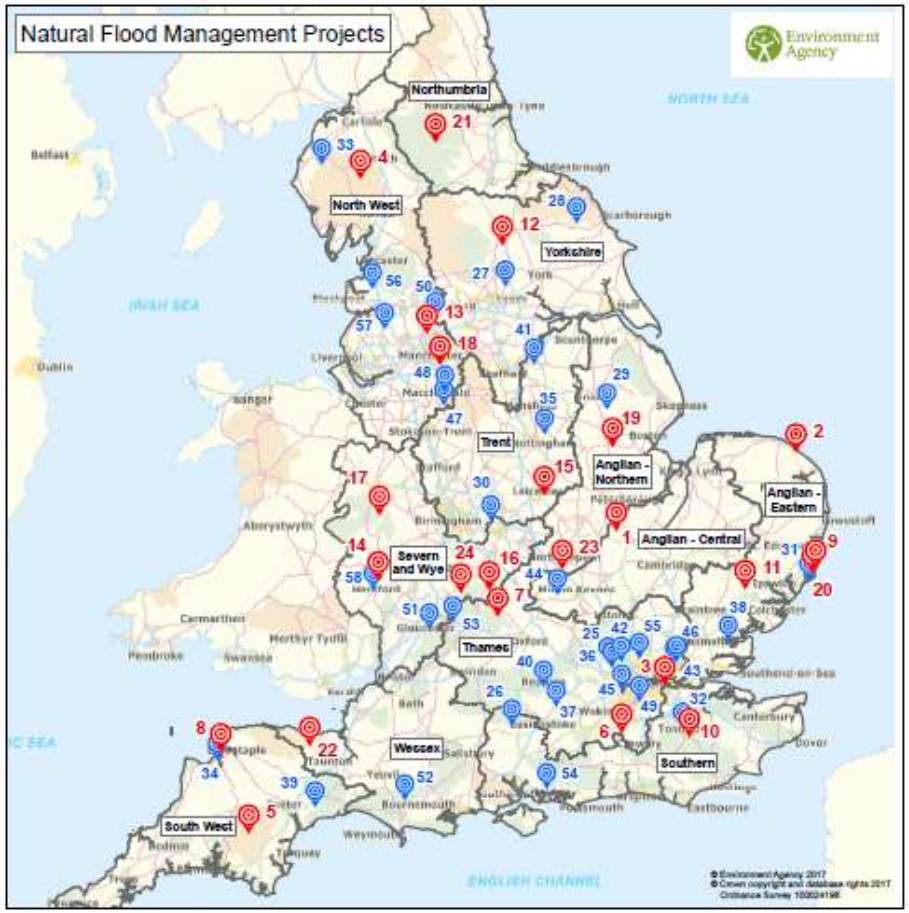
Natural Flood Management Pilot Programme



- Reduce flood risk, or coastal erosion, to homes
- Improve habitats and increase biodiversity
- Contribute to R&D to fill NFM knowledge gaps
- Support, and develop, partnerships with communities

Catchment Programme

Dartmoor Headwaters £1.2m

Marine Pioneer Intertidal £100k

Community Programme

Ottery St Mary £165k

Kenwith £110k

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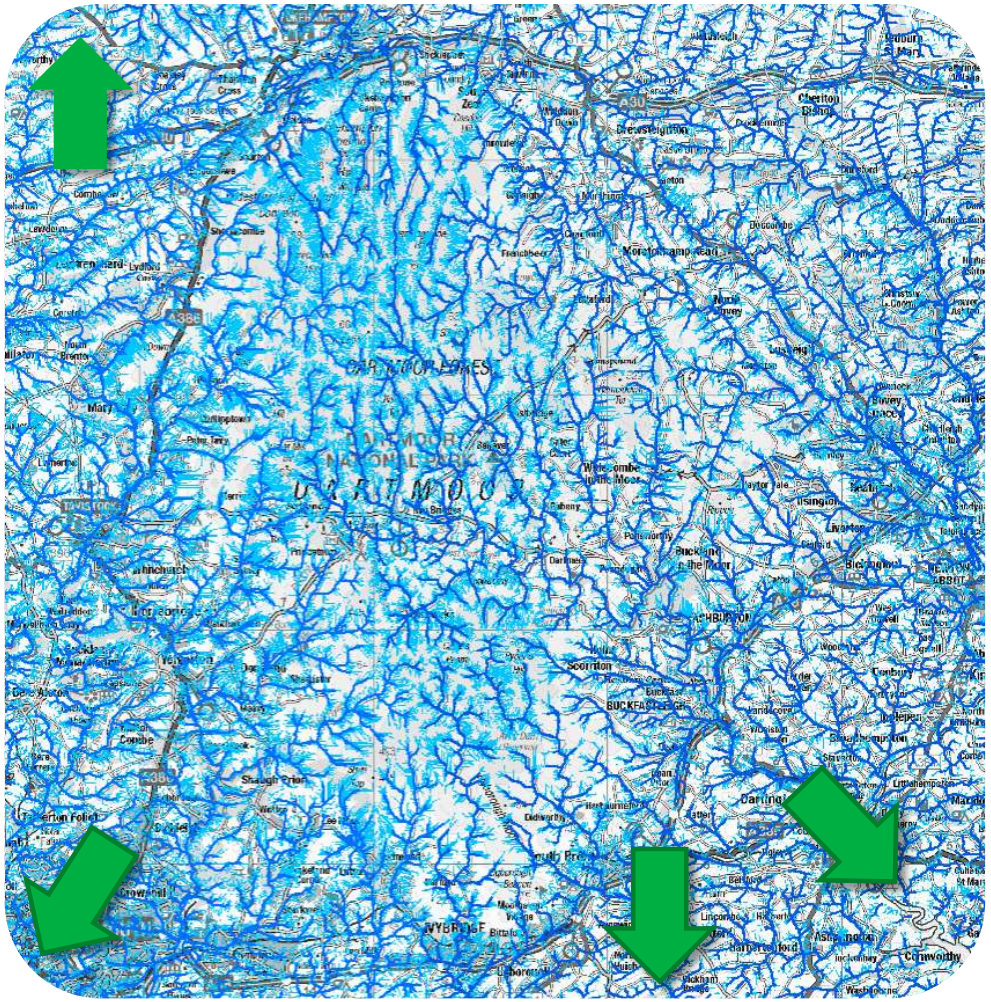
Dartmoor Headwaters Pilot

Barnstaple



Plymouth

Totnes

Newton Abbot

Logged events causing property flooding on Dartmoor by year:

1638, 1784, 1823, 1826 x2, 1838, 1839, 1840, 1841, 1844, 1845, 1846, 1848 x3, 1855, 1858, 1859 x4, 1866 x2, 1867, 1869, 1872, 1873, 1878, 1880, 1883, 1890, 1892, 1893, 1894 x3, 1898, 1900 x2, 1900 x2, 1905 x3, 1909, 1910, 1912, 1915 x3, 1917, 1922, 1923 x2, 1925, 1927 x3, 1929 x4, 1930, 1931 x2, 1932 x2, 1933, 1934, 1935, 1938 x3, 1939 x2, 1940 ,1944, 1946 x3, 1949, 1954 x2, 1958, 1959 x2, 1960 x3, 1962, 1963, 1965, 1967, 1968, 1970 x2, 1971 x3, 1972 x3, 1973, 1974 x5, 1975 x2, 1978 x2, 1979 x5, 1980, 1981 x4, 1982 ,1983 x2, 1984 x2, 1986 x3, 1987, 1989 x3, 1990, 1991 x2, 1992 x6, 1993 x2, 1994 x4, 1995 x5, 1996 x6, 1997, 1998, 1999 x6, 2000 x6, 2001, 2002 x3, 2004 x2, 2005 x4, 2006 x3, 2007 x3, 2008 x4, 2009, 2010, 2012 x12, 2013 x8, 2014 x5, 2015 x3, 2016 x3, 2017 x2, 2020

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Dartmoor Headwaters Pilot

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NFM Pilot Programme Outcomes

15,000
homes*

£15 million
government
funding

£6 million
contribution

2 lessons
learnt reports

85
partners

610 km
river
improved

takes time

gov.uk
page

working
together

4000 ha
habitat
improved

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Fitting into other solutions

Blog

Creating a better place

Organisations: Environment Agency

Engineers and the Environment – natural allies in our fight for a more flood resilient nation

John Curtin, 10 April 2018 · Climate change, Flood

What is new is a better understanding of how we can work collaboratively to bring all of these elements of flood management together. Too often the conversation has been about a false choice between hard or soft engineering – as if there is a conflict or competition between them. The approach we need is one where these elements complement each other - one where we work more closely with place builders, infrastructure providers and of course communities to achieve this.

- Time to deploy PFR measures
- Prolong life of existing defences
- Reduce need for works in-town
- Align with farm business models
- Delivery through non-flood initiatives

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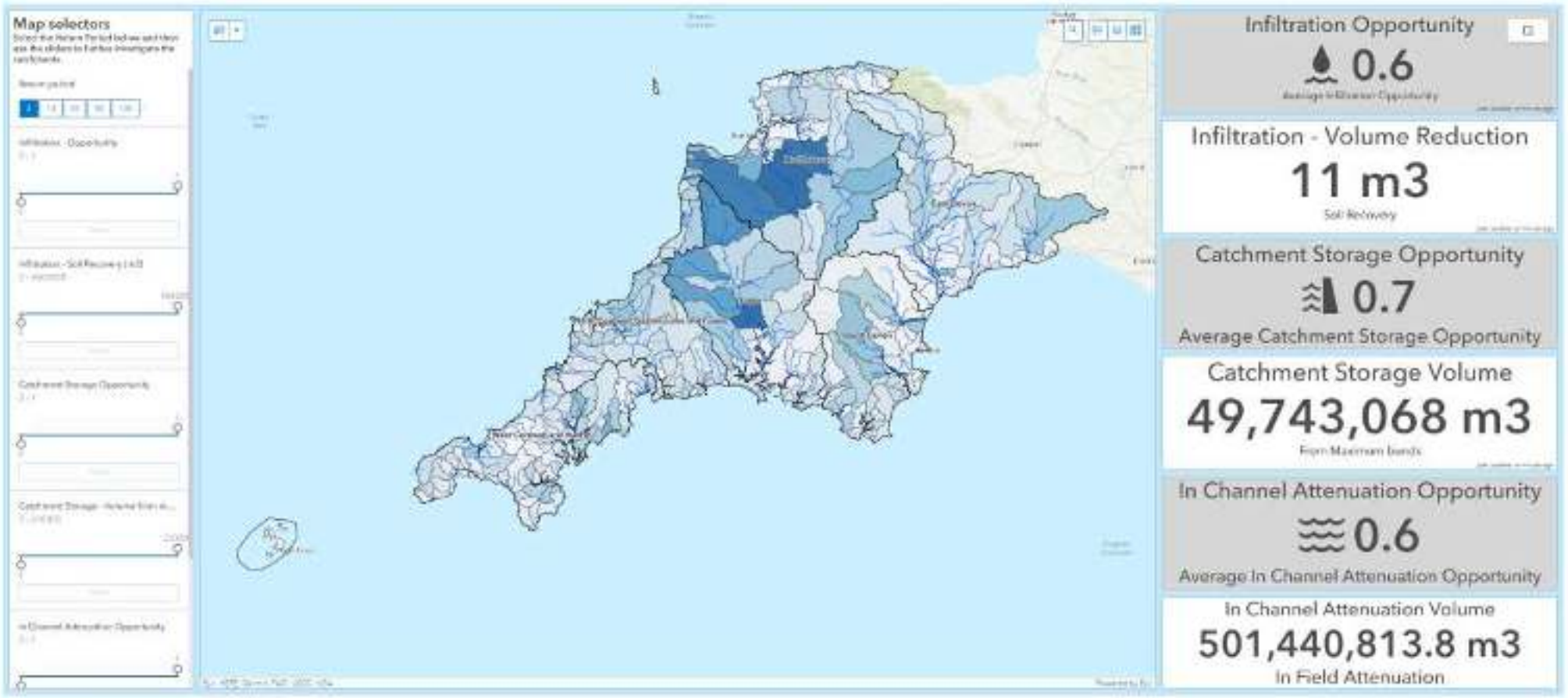
Fitting into other solutions – where?



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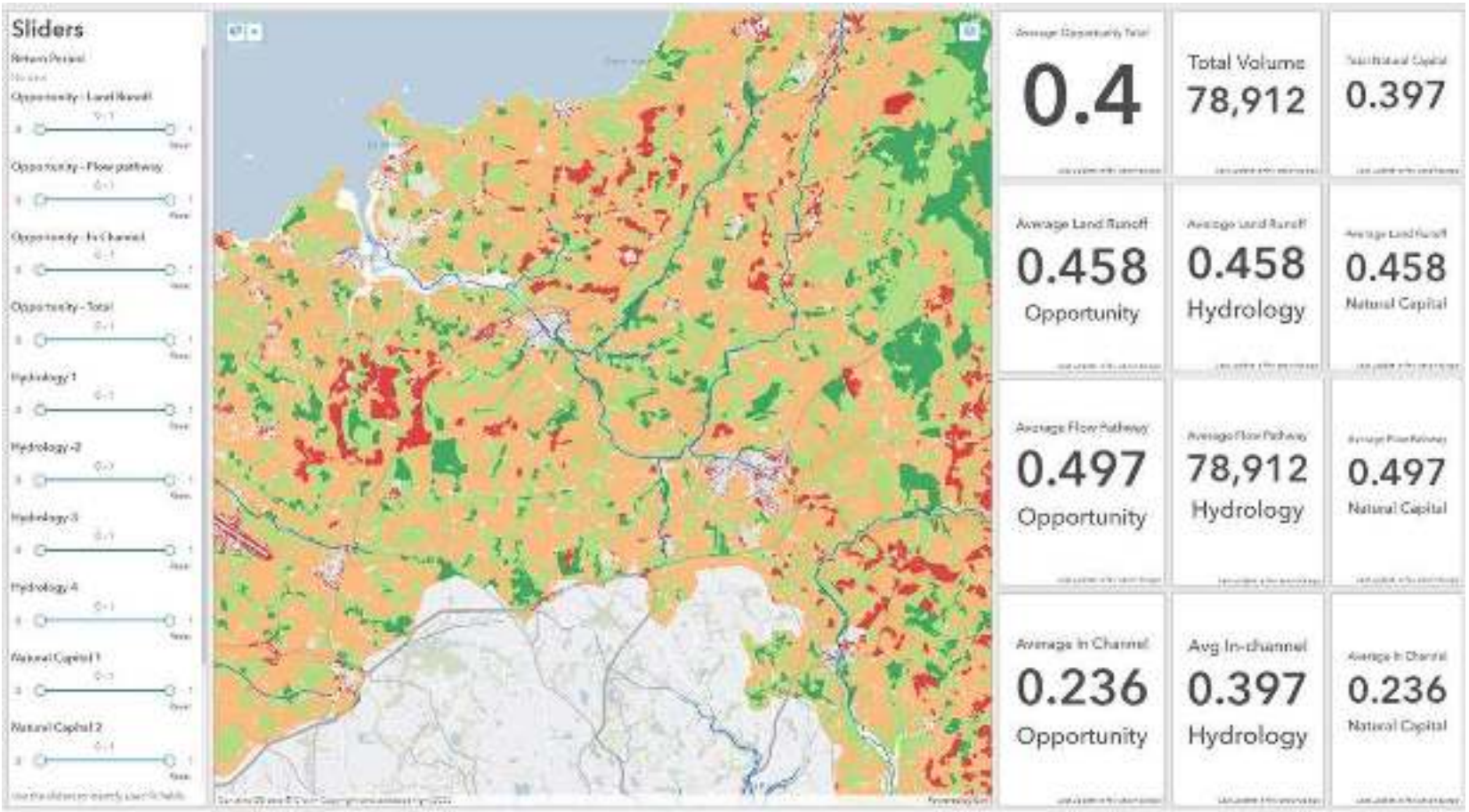
Fitting into other solutions – what?



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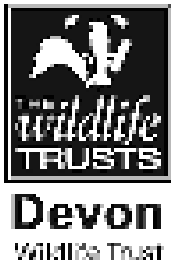
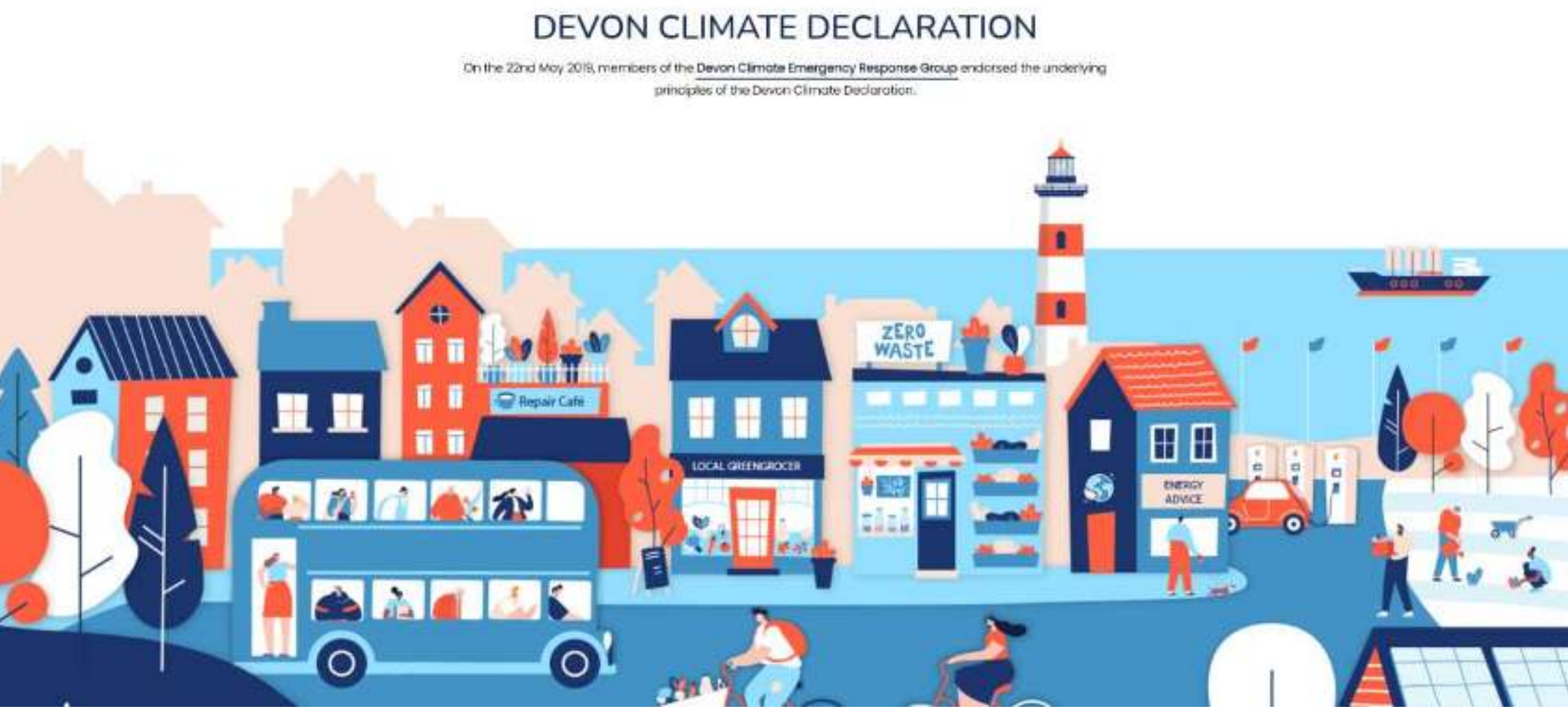
NFM Strategic Group



What can you do?



What can you do?

Help seek funding

Help design & **decide** solutions

Take on a formal role?

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%

What's in it for you?

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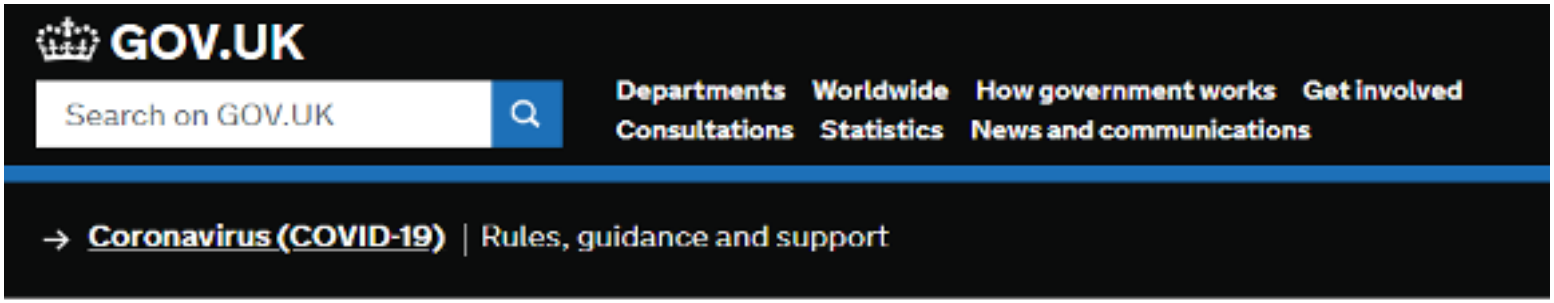
Information for community groups



Home > Environment > River maintenance, flooding and coastal erosion

Guidance

Use nature-based solutions to reduce flooding in your area

Find out how you can use natural options to reduce flooding in your area, who to contact for advice, and if you can get funding.

Contents

- Examples of nature-based solutions
- Benefits of nature-based solutions
- Who to contact to get started
- Get permission for works
- Manage your nature-based solution
- Apply for funding

https://www.gov.uk/guidance/use-nature-based-solutions-to-reduce-flooding-in-your-area

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Questions?

“To continue to focus only on traditional approaches to flood risk management, such as flood walls, will not be sustainable and therefore our approach to managing flood risk has to change. It needs to be more integrated, managing land and water throughout the river system...”

SEPA 2016

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