



NATURAL FLOOD MANAGEMENT



River by Permaculture Association

What Is Natural Flood Management?

- A catchment is the area drained by watercourse, including all drainage channels, tributaries, flood plains, estuaries and areas of water storage.
- NFM treats catchments as a whole system, to address the source and movement of water through that system
- Takes in consideration flood by sea, rivers, lakes and surface water
- Works by reducing the likelihood and severity of flooding by lowering or spreading out the flood peak as it passes along a river
- Typically involves slowing or storing flood water
- Complements traditional flood protections measures to help reduce, for example, the height of flood walls, or extend their life
- Designed to manage risk; by assessing the 'bigger picture' it ensures flood risk is fully understood, helping make sustainable, long term decisions

Overview

- Natural flood management (NFM) works with natural physical features and hydrological processes to reduce flood risk
 - Can be used at landscape scale to enhance existing flood defenses and reduce the need for dredging (which can lead to loss of wildlife + destabilize river banks)
 - NFM is tailored to the specific area with expert and local knowledge
 - More cost-effective than normal structural defenses, lasts longer and has environmental benefits
 - But lack of evidence means little implementation
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- NFM plans are tailored to specific areas using expert local knowledge
 - Quantifying the full benefits of NFM can be challenging, but can compare favorably against traditional flood management
 - Can contribute to biodiversity, water quality, and carbon storage, thus improving wildlife, health and wellbeing, recreation and jobs
 - Important because climate change means that defenses put in place today may not provide protection in the future

Flooding in the UK

- Flood events have become more serious in frequency and severity due to climate change. For example, in November 2015 North West England saw double the average monthly rainfall; the second wettest month since records began. The result was serious widespread flooding.
- Land drainage, overgrazing on a regular basis + hard impenetrable surfaces contribute to flooding
- In response, there has been criticism of the way in which flood risk is communicated to the public
- The Environment Agency has stated that a “complete rethink” of the UK’s flood defenses is needed
- Structural defenses have high capital, maintenance and upgrade costs and cannot be raised indefinitely in response to increasing risk
- Effects of flooding are wide ranging, including personal suffering, property damage, disruption of mains water, electricity and transport, financial loss, damage to the environment – even death

“Natural flood management involves techniques that aim to work with natural hydrological and morphological processes, features and characteristics to manage the sources and pathways of flood waters. These techniques include the restoration, enhancement and alteration of natural features and characteristics, but exclude traditional flood defence engineering that works against or disrupts these natural processes” - Scottish Protection Environment Agency



Oxford Flood by Teivan Pettinger

Flood Management Measures in Detail

Desired goal of NFM on flooding: 1) reduce the downstream maximum height of a flood (flood peak) thus reducing scale + impact of the flood 2) delay arrival of flood peak downstream, thus increasing the time available to prepare

Typical features include:

Woodland Creation

- The planting and management of woodland to increase the capacity of the soil + vegetation to absorb water and reduce peak run off

Land Management

- Good practice increases infiltration of water, reducing surface water runoff and preventing soil erosion.

Agricultural and Upland Drainage Modifications

- Modifications to agricultural drainage systems (grazing regimes, stocking densities + other practices), reduce runoff and improve the condition of all agricultural land

Non-floodplain Wetlands

- The creation or restoration of upland wetlands to reduce runoff and capture sediment

River and Floodplain Restoration

- The stabilization of eroding river banks to reduce deposition of sediment downstream

In-stream Structures

- Introduction of woody material or boulders to slow water movement during high flows

Challenges

- Too many research gaps – not enough proof for the UK government to invest widely in NFM
- Smaller NFM measures do have some supporting evidence, but a lack of data that shows they are directly reducing flooding
- Test schemes have successfully alleviated risks to individual villages, but too small to be true for bigger NFM catchments
- Test catchments should therefore be implemented, tried and tested
- Currently the UK government is unlikely to fund such experimental measures

UK Government Policies on NFM

UK

- The Flood and Water Management Act 2010 requires Local Flood Authorities in England and Wales to develop local flood risk management strategies
- The Acts lists “maintain or restoring natural processes” as a way of managing flood risk and permits the designation of natural features that reduce risk
- Department for Environment, Food and Rural Affairs (DEFRA) has proposed a policy framework for catchment-based approach to water management nationally

Scotland

- Scottish Environment Protection Agency (SEPA) is required to work with local authorities to identify the most sustainable actions to manage flood risk including NFM measures.
- The 2011 policy documents ‘Water for Life’ and ‘Natural Environment’, sets out a catchment-based approach to water and environmental issues

Funding for NFM in the UK

UK

- Funding from locally-based funding streams such as wind farm biodiversity offsetting initiatives, voluntary carbon schemes, landfill tax projects or local charities

Case Study

Belford Proactive Flood Solutions – Northumberland, England

- NFM in Belford Burn to reduce flooding to the small town of Belford
- Environment Agency turned down a traditional flood defense scheme (£2.5M) due to the low number of properties at risk (30)
- This led to an alternative approach involving the construction of 40 ‘Runoff Attenuation Features’

Measures used

- Offline storage ponds and overland interception features
- In-stream structures
- In-ditch structures
- Riverbank protections
- Sediment traps
- Wetland creation
- Flood plain and riparian woodlands

Benefits

- Newcastle University continues to study the scheme. Data shows local flood peak reductions, and collected sediment is returned back into the fields.
- In-stream woody debris and planting has improved the ecological diversity of woodland
- Many features, such as the wetlands, storage ponds, and sediment traps have been found to mitigated pollution

Funding

- Funded by a £200,000 payment though the Environment Agency’s North East Local Levy, raised from local authorities.
- Compensation paid to farmers (£1000) to cover disruption and loss of land for farming



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READ MORE

2 Key Resources:

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