Natural Flood Management (NFM) : an ecological framework for flood mitigation, water quality control and biodiversity

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Introduction

- NFM is defined as a set of flood management techniques that aim to work with natural processes (or nature) to manage flood risk

- The Flood Risk Management Act (Scotland) 2009 is the main policy driver for the implementation of NFM. In current practice, its inclusion as part of catchment flood management plans is required to determine short and long term benefits

Purpose

This research explores the multifunctional management benefits associated with NFM applications:

- The existing research approaches to NFM

both from the natural and social sciences

- Interconnecting drivers for NFM

- Suggests new directions for long term strategic approaches to river flood management

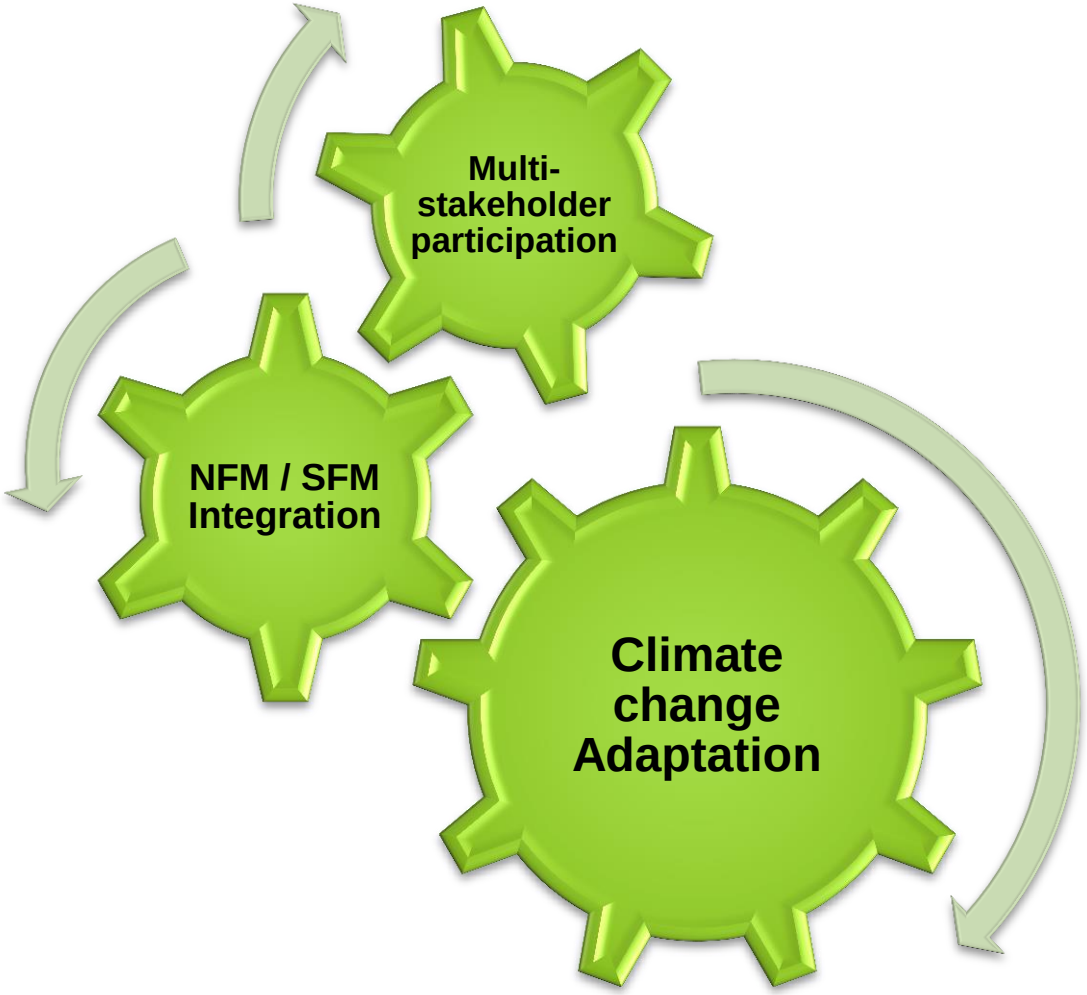
NFM: context and challenges

NFM and the multi – functional concept

- Combines other functions i.e. Eco-system restoration, pollution control etc. with its primary flood protection role

- Adaptive regimes that take into account environmental, technological, economic, institutional and cultural characteristics of river basins

Interconnecting Drivers for NFM

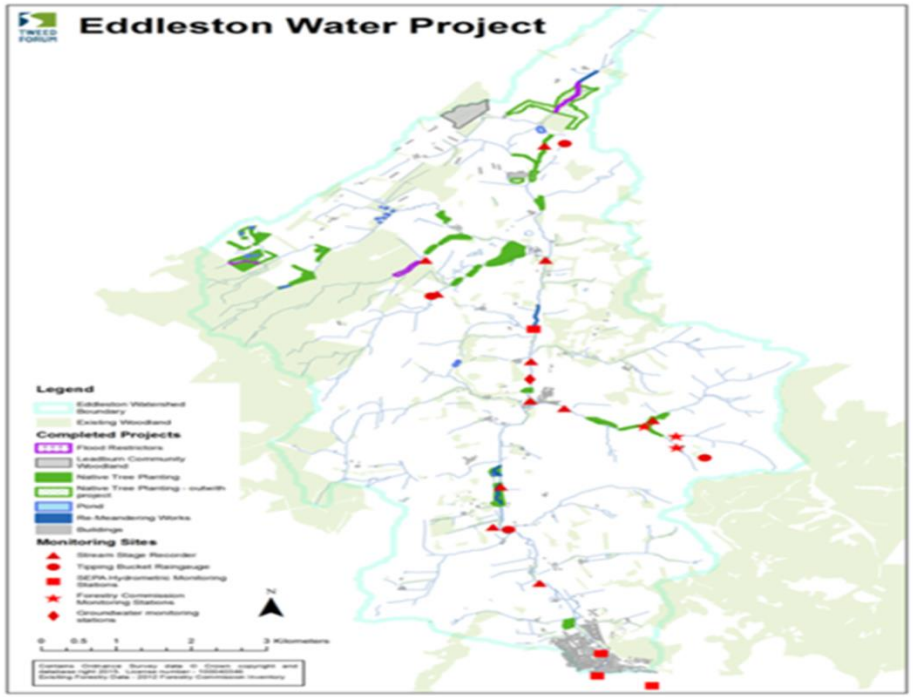


Research approaches to NFM application (Environmental context)

Allan Water

- Topography and steep tributaries along length of river contribute to flood risk in parts of Dunblane, Bridge of Allan and a number of villages as highlighted by the 2006 floods
- A range of biotic and abiotic elements of the river ecosystem was considered
- Restoration of the River Knaik riparian corridor was adopted as the pilot

Eddleston

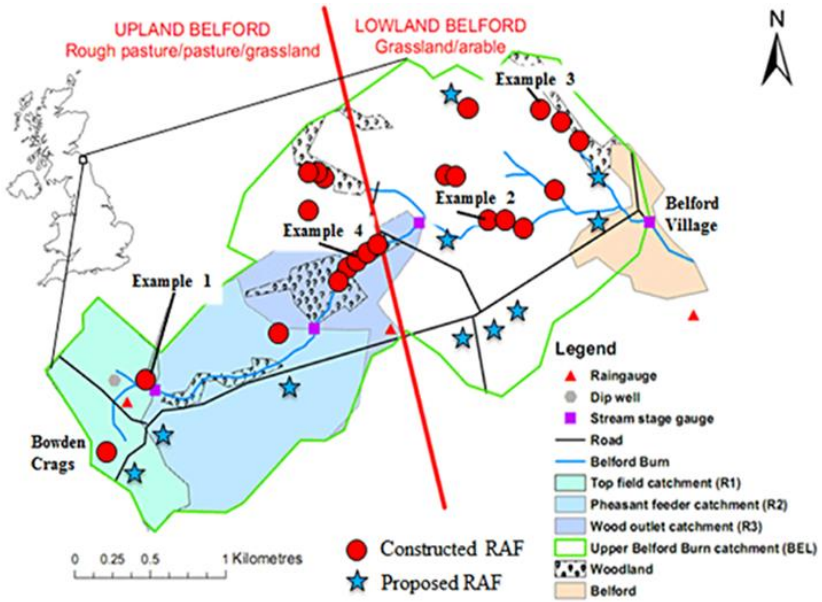


- Modification to improve agricultural production lead to loss of natural habitats and flooding risks to Eddleston and Peebles
- Developed restoration strategy using multiple measures

Tarland

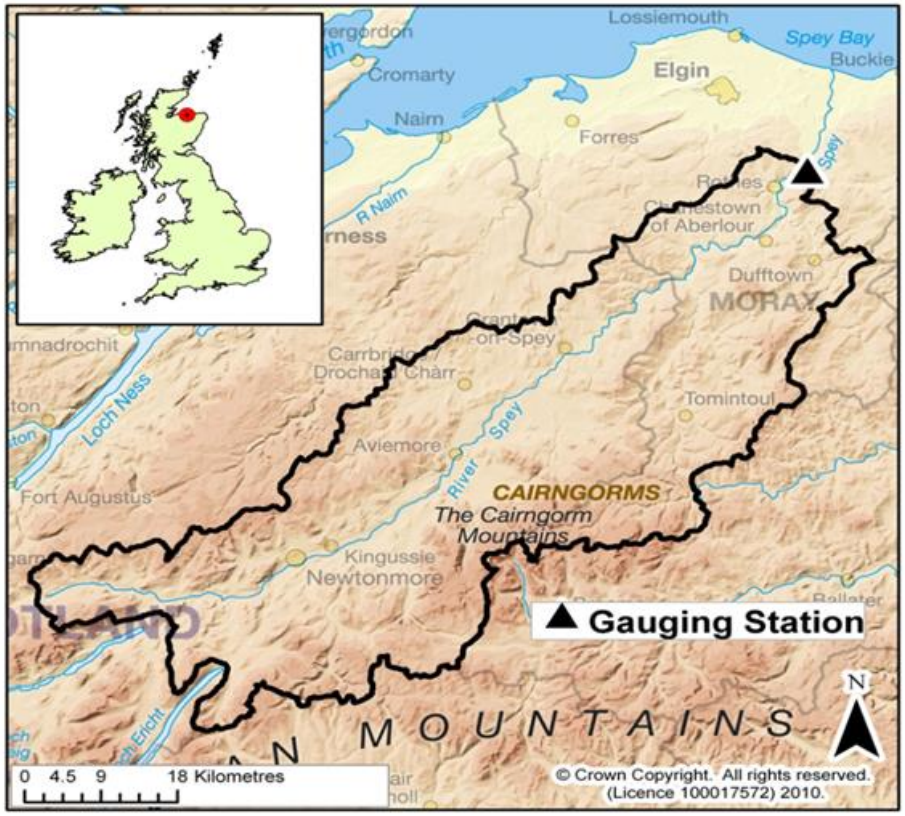
- Flood mitigation in Aboyne, water quality pressures from agricultural activities
- Linked hydrology, water quality and ecology to provide catchment scale demonstration sites evaluated through monitoring and modelling

Belford



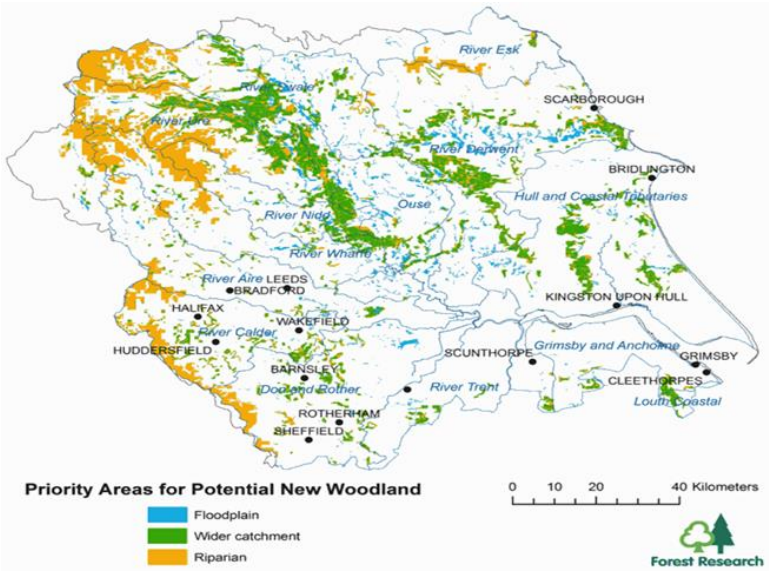
- Long history of flooding
- Opted for agricultural management to manage flow pathways by storing , slowing, reducing sediment flow, creating new habitat and flood mitigation

Spey



- Proactive strategy for the enhancement of water quality, sustainable use and natural heritage
- Integrated catchment management to protect and restore features using riparian woodlands, enhancing wetland and controlling invasion of non native plants and animals

Derwent



- Geology and soil classification encourages high levels run-off and potential flooding
- Multiple measures to restore land and river banks, flood mitigation, improve water quality and pollution control from pesticides used for agriculture

Upper Clyde

- Much of floodplain developed for agricultural activities
- Communities at risk of flooding include Crossford, Dalserf and Rosebank
- Scoping study considered a multifunctional approach where opportunities for NFM, quality of water body and biodiversity benefits were identified

Research Approach (social)

Allan

- Hydrological analysis and local perception of contributing factor and early consultation with main landowners identified opportunities to improve River Knaik's riparian planting and fencing

Eddleston

- A partnership of local and national organisations lead by the Tweed forum developed cooperative water and land management strategies aimed at habitat restoration

Tarland

- Worked with farmers to install run-off attenuation features and improve instream habitats

Belford

- Partnerships with Newcastle University addressed flooding problem using soft engineering runoff management features

Spey

- Spey Catchment Imitative (SCI) developed by stakeholders and communities

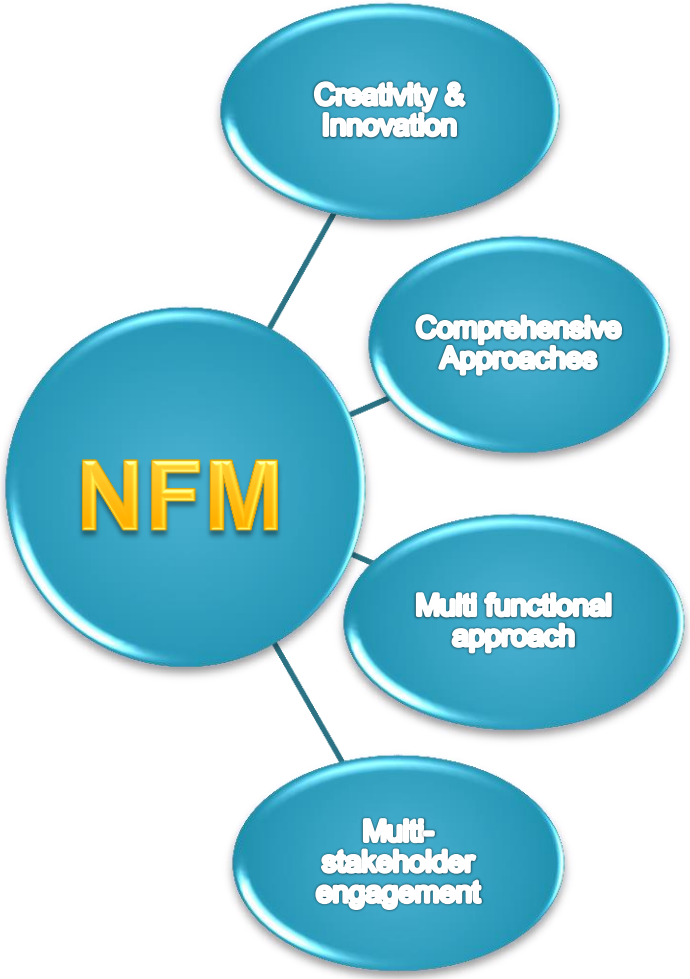
Derwent

- Working with landowners on floodplain and riparian planting projects to reduce downstream flooding

Upper Clyde

Project at scoping stage aimed at investigating NFM potential in the Upper Clyde catchment

Emerging Themes



Key findings

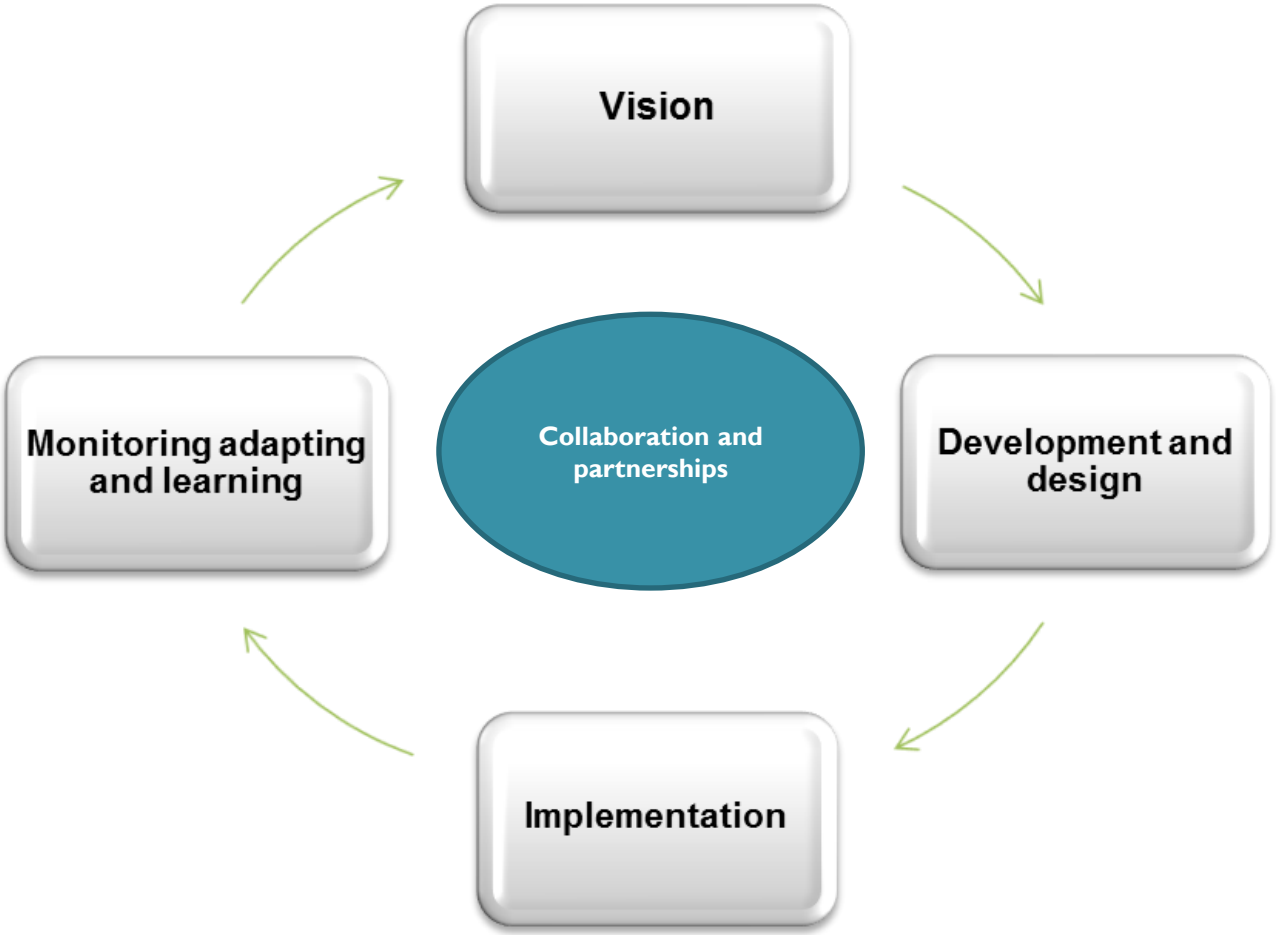
- In response to local challenges, management organisation developed objectives for intervention into land and water management practices

- Directly and indirectly played a “broker” role to position themselves between individuals and decision makers

- Pre –project consultations and engagement process considered local inputs for management options

- Outcomes of collaborative management allowed the consideration of a wider range of management options, trade-offs and thereby facilitating mutual benefits for the parties involved i.e. “win- wins”

NFM Framework



Future Strategies

- Adaptation strategies using NFM techniques would need to be considered in line with local exigency where local stakeholders are empowered towards a new understanding of sustainable water resource management as a societal search and learning process

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Thank you for Listening