The use of modelling in land management

Paul Leadbitter, Peatland Programme Manager
Overview

• Peatlands
• Why model
• What is NFM
• What was modelled
• Results
• Practical works
• Workshop on modelling
Why is Peat Important?

Biodiversity
Carbon
Flooding*
Water Colour
Sediment Loading
Historical Record
Economy
North Pennines AONB Peatlands

- 100,000 ha of peat
- 61,000 ha of SSSI
- 30% of England’s Blanket Bog
- England’s largest Blanket Bog
• 10,000 km of ditches
• 3000 ha of eroding peat

• And the non peat areas.
Why Model in the North Pennines?

AONB is 2000 km$^2$ of uplands half is peat
10,000 km of grips
3000 ha of bare peat
10,000 ha + of degraded peat
Could take 50 years to restore?
100s of landowners
How to prioritise?
Where is the low hanging fruit?
Maximise benefits minimise costs
How to build restoration synergies
Natural Flood Management at the Catchment Scale

What is natural flood management?

Natural flood management aims to reduce the downstream maximum water height of a flood (the flood peak) or to delay the arrival of the flood peak downstream, increasing the time available to prepare for floods. This is achieved by restricting the progress of water through a catchment using a range of techniques. These techniques work with the natural features of the catchment to slow down or store flood waters. They rely on one, or a combination, of the following underlying mechanisms.

1. **Increasing soil infiltration**: free-draining soil will make saturation less likely, potentially reducing surface runoff.
2. **Evaporation** from vegetation and soil can also make space for water.
3. **Slowing water**: by increasing resistance to its flow – for example, by planting floodplain or riverside woods, or blocking grips on moorland.
4. **Storing water** by using, and maintaining the capacity of, ponds, ditches, embanked reservoirs, channels, or land.
5. **Reducing water flow connectivity** by interrupting surface flows of water – for example, by planting buffer strips of grass or trees.
Cumbria and Weardale get third of government’s NFM funding

The Cumbria Floods Partnership and the Weardale natural flood management scheme in Northumbria are to get nearly a third of the government’s £15m funding allocation to develop NFM schemes around the country.

19 July 2017 / Finance & Insurance, Water Management

The allocations come from the £15m of natural flood management funding announced by the government after last year’s Autumn statement.

In total, 24 larger scale projects will split £13,181,500 in funding, although Cumbria will receive £2,503,000 and the Weardale NFM demonstrator project in Northumbria will receive £2,086,000. The Slow the Flow project upstream of Greater Manchester, Mersey and Cheshire will receive £1m.

The remainder, £1,588,500, will be shared out between 34 community-led projects. Floods minister Thérèse Coffey announced the allocations while visiting community-led schemes Sutton and Roxwell. The communities will each receive £50,000 for SuDS and ditch management projects respectively.

Five of the 34 winning community schemes are run by Rivers Trust organisations: Yorkshire Dales Rivers Trust, West Cumbria Rivers Trust, Trent Rivers Trust, Thames21, Wyre Rivers Trust and the Wandle Trust.

In May, the Cumbria Rivers Authority Governance Group visited MPs in London to discuss the possibility that the government might recognise Cumbria’s landscape makes it a special case when it comes to flooding.
What and How

• Led by the Environment Agency.
• Looked at 5 sub catchments of the River Wear.
• Used DTM, Lidar, Land Cover, grips, bare peat etc to model and evaluate the effectiveness of a series of NFM measures to help reduce flood risk.
Bare Peat
Leaky dams
RAFs
Run off attenuation features
Grass fields - roughness
Next steps

Modelling is complete*
Landowner engagement
Monitoring systems in
Complete the work
Watch this space.
Watch this video
- NPAP lead on a National Peat Carbon project.
- 10,000s of peat depth points from across England.
- Used GIS to develop a model to predict carbon amount.
- Model is being refined.
Question 1

• What possibilities do you see for the broader application of modelling in site management and restoration?
Question 2

• What is needed/what are the issues to achieve broader application of modelling in planning management and restoration?
Question 3

• What role do you see for ecosystem service concepts in planning your management and restoration actions?
Question 4

• Do you know of any good examples of integrating modelling and or the ecosystem services approach into site management and decision making?
Thank You

LIFE Programme

Yorkshire Water

Northumbrian Water

United Utilities

Environment Agency