



Strategic Woodland Creation for Natural Flood Management

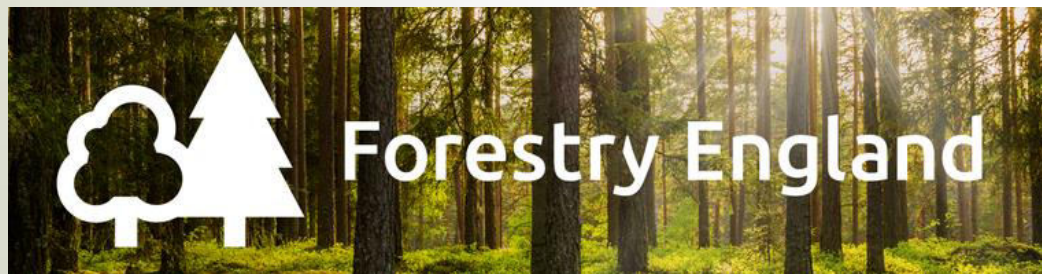
Kate Hawley

IWRA World Water Envoy 2023

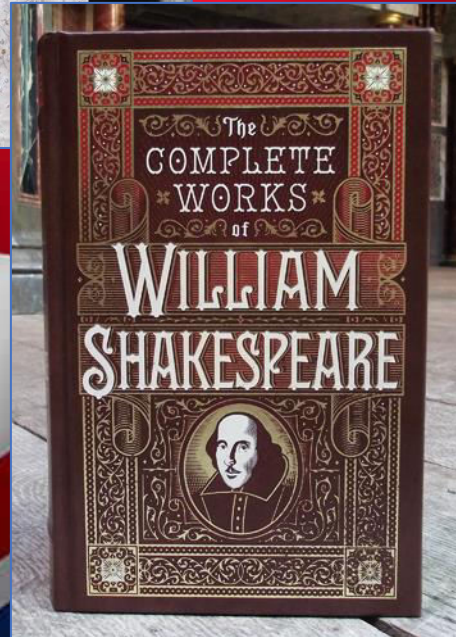
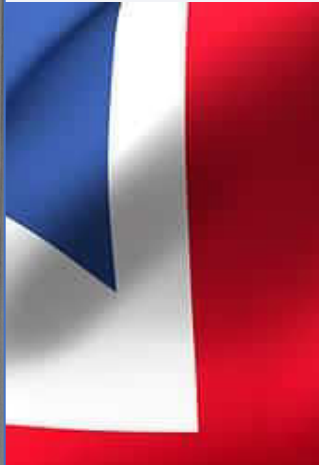
Area Operations Manager, Forestry Commission, UK



Kate Hawley - Area Operations Manager
Forestry Commission (UK Government Department)



When you think of the United Kingdom...



Flooding facts in the UK



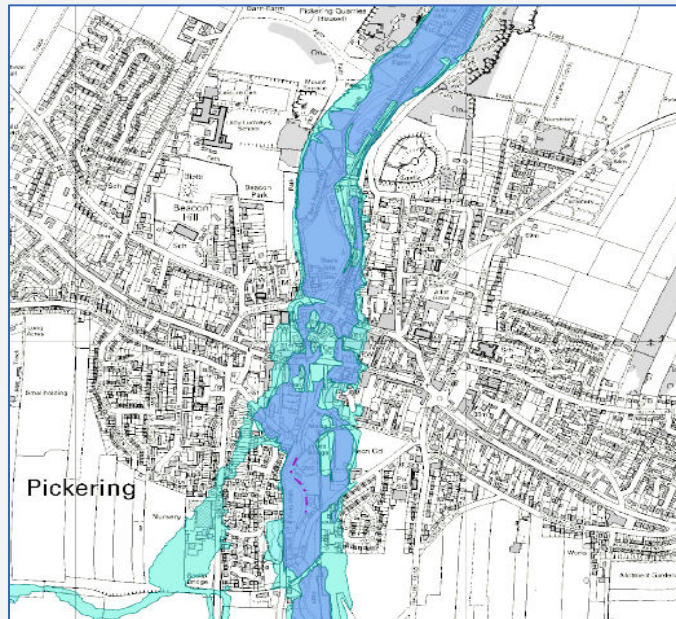
- **1 in 6 buildings** in the UK are at risk of flooding
- Individual flooding events: **>£2billion damage per region**
- **5 million people** are at severe risk of flooding: UK homes significantly **more likely to be flooded than burgled**
- Climate change predictions will lead to increased flooding

Aim: A long-term strategy to **minimise likelihood and impact** of flood events

Pickering, Yorkshire



Over time, the river channel has become incised, linear, and cut-off from the flood plain, discharging water quickly to town



4 floods: 1999-2007;
85 properties affected and £7m in damages



Aims of the partnership

- Solution needed at the **catchment scale** to keep water in the landscape for longer
- Government-led partnership formed, led by government: **Slowing the Flow at Pickering**
- Construct **150 Large Woody Debris dams**
- Plant **50 ha riparian woodland** and **30 ha of floodplain woodland**

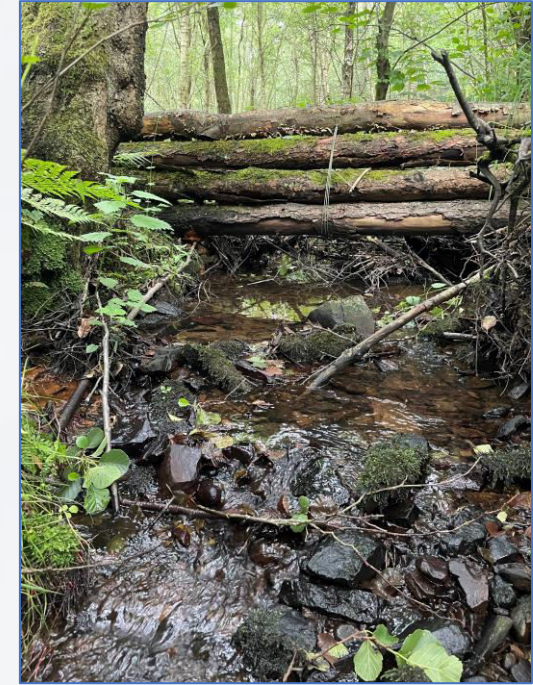
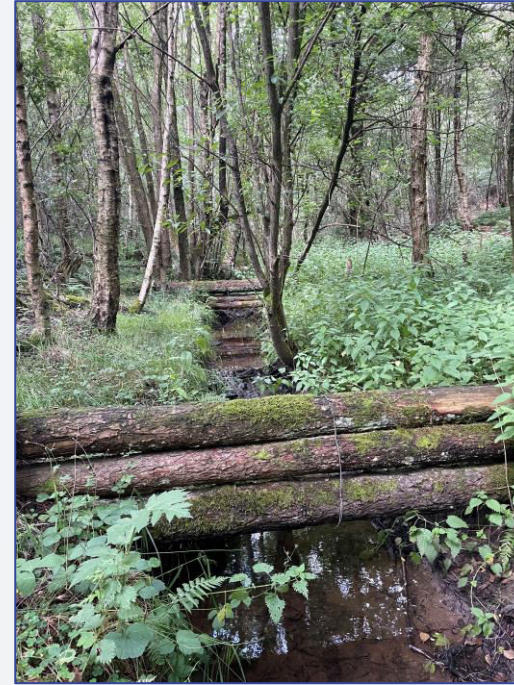
Total cost over 2 phases: ~£500,000



Woody Debris Dams and Timber Bunds



- 167 dams installed (1600m³ water storage)
- Larger dams = more cost effective
- As low as £50/dam!



- 2 timber bunds (4880m³ water storage): 1.5m x 57.5m
- Cost £5k/bund
- Most cost-effective form of storage at <£2/m³
- Issues of longevity and responsibility



Woodland Creation: Riparian and Catchment



- 29 ha of riparian woodland planted
- 15 ha of farm woodland planted
- 5,000m³ water storage

Results: Tested sooner than we thought!



- Analysis indicates that measures reduced peak flow by 2 cumecs (15-20%)
- Chance of flooding in Pickering in any one year: 25% -> 4%
- 50% of flood reductions due to upstream natural methods
- All modelling showed an increase in hydraulic roughness
- Volume of storage created:
167 dams = **1600m³**
2 timber bunds = **4880m³**
Woodland creation = **~5000m³**

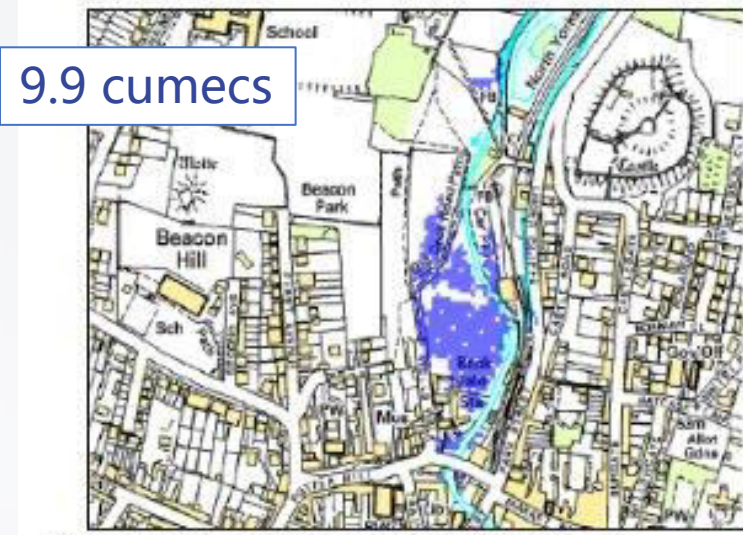


Figure 2a - Modelled flood outline for a peak flow of 9.9 m³/s at Roperly Bridge

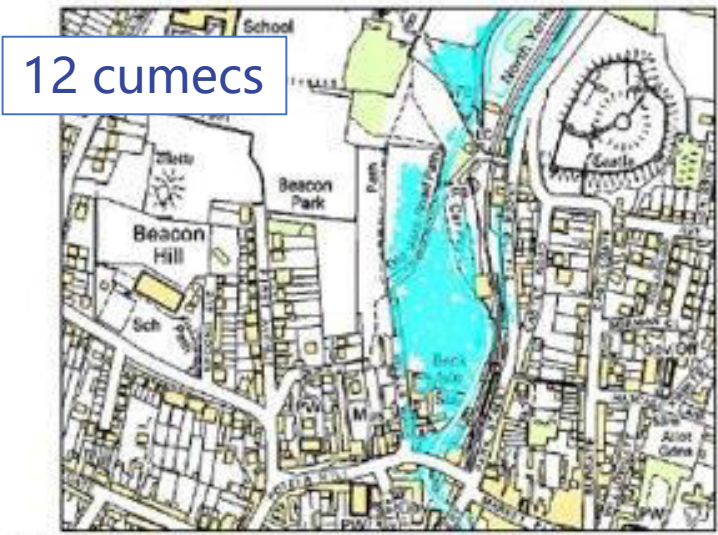


Figure 2b - Modelled flood outline for a peak flow of 12 m³/s at Roperly Bridge

Total: 11,480m³



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Beaver experiment 'to combat flooding' in North Yorkshire

1 October 2018



Beavers in North Yorkshire save town from flooding with giant 70m dam

The Beavers have constructed the largest dam of its kind in England, protecting residents from life-changing flooding.

By **MAX PARRY**
09:50, Wed, Feb 22, 2023 | UPDATED: 10:10, Wed, Feb 22, 2023

     **BOOKMARK** 

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Beavers have constructed a 70m dam in North Yorkshire (image: Getty)



How is Natural Flood Management used in your country/community?

- China: Sponge Cities and Afforestation Targets
- USA: Natural and Nature Based Features (NNBF)

How can we work together to share best practise?

How do you work with your national forestry/woodland service to combat flooding?

Any questions?

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www.forestresearch.gov.uk/research/slowing-the-flow-at-pickering