

# Integrating local knowledge in to NFM work: Insights from lowland catchments in the Landwise project

**Angie Elwin** Postdoctoral Researcher, University of Reading

[angie.elwin@reading.ac.uk](mailto:angie.elwin@reading.ac.uk)

**Chris Short** Reader in Environmental Governance, CCRI

[cshort@glos.ac.uk](mailto:cshort@glos.ac.uk)

## **LANDWISE: LAND management in loWland catchments for Integrated flood riSk rEducation**

**Research & Consultancy:** University of Reading, British Geological Survey, Centre for Ecology and Hydrology, University of Gloucestershire, Forest Research, JBA Consulting, CGI Group, Institute for Environmental Analytics JBA Trust, University of Sheffield, Agrimetrics,

**Policy:** Environment Agency, Natural England, Forestry Commission

**Flood Groups:** National Flood Forum, Loddon Valley Residents Association, Swallowfield Flood Resilience Group, Pang Valley Flood Forum

**Farm Advisors:** National Farmers Union, Farm and Wildlife Advisory Group (SE), Farm and Wildlife Advisory Group (SW)

**Farmers:** Wilts Soil and Root Innovators, Penn Croft Farm, Hendred Farm Partnership, Fincham Farm Partnership, Yateley House Farm, Kingsclere Estate, Farmer Guardians of the Upper Thames

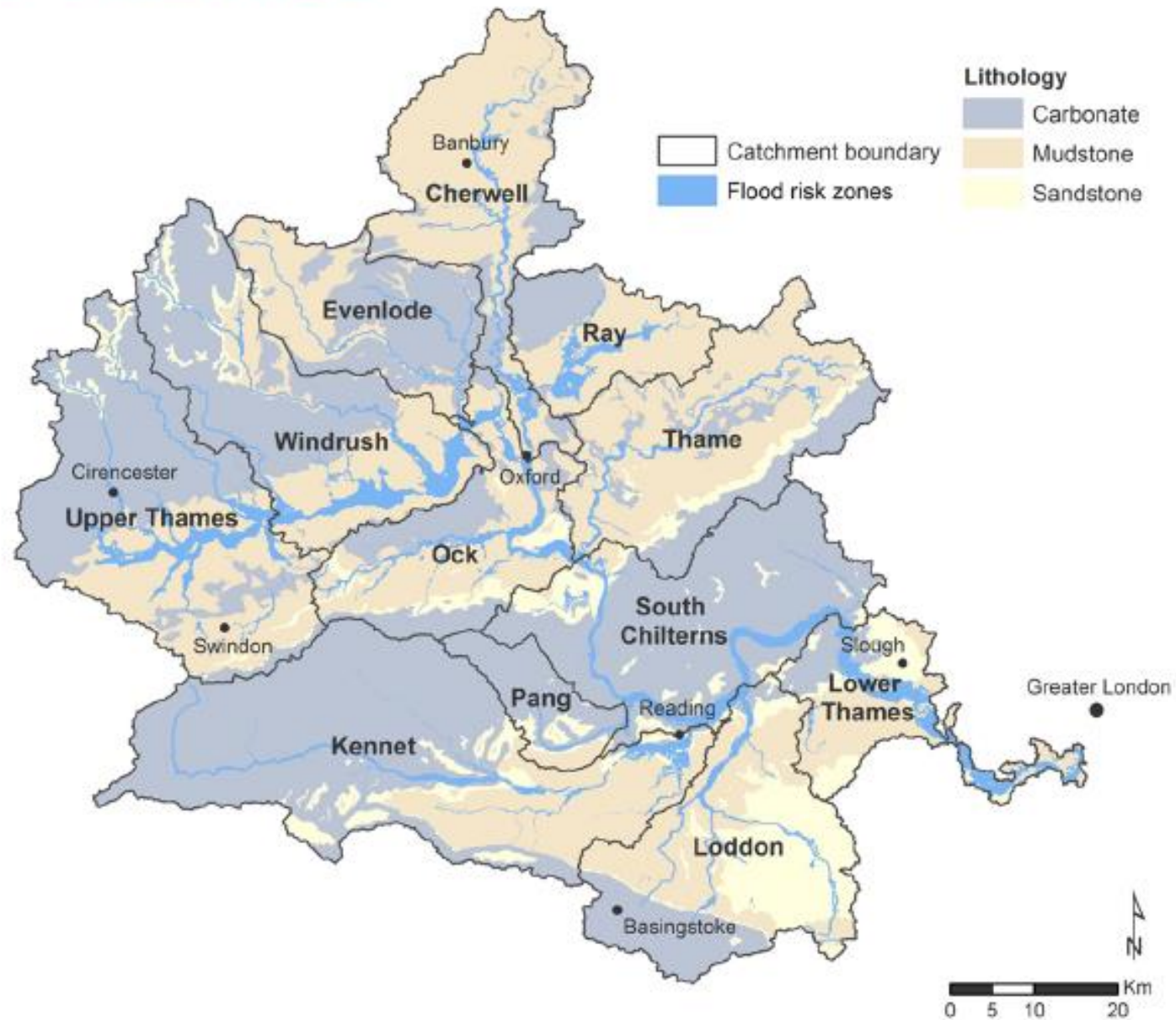
**Conservation NGOs:** The National Trust, Loddon Fisheries & Conservation Consultative, Blackwater Valle Countryside Partnership, Wild Oxfordshire, Foundation for Water Research, Action for River Kennet, South East Rivers Trust, Freshwater Habitats Trust, Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust, Hampshire and Isle of Wight Wildlife Trust, Westcountry Rivers Trust

**Local Flood Authorities:** Wokingham Borough Council, West Berkshire Council, Hart District Council, Swindon Borough Council, Thames Regional Flood & Coastal Committee

**Water Utilities:** Affinity Water, Thames Water

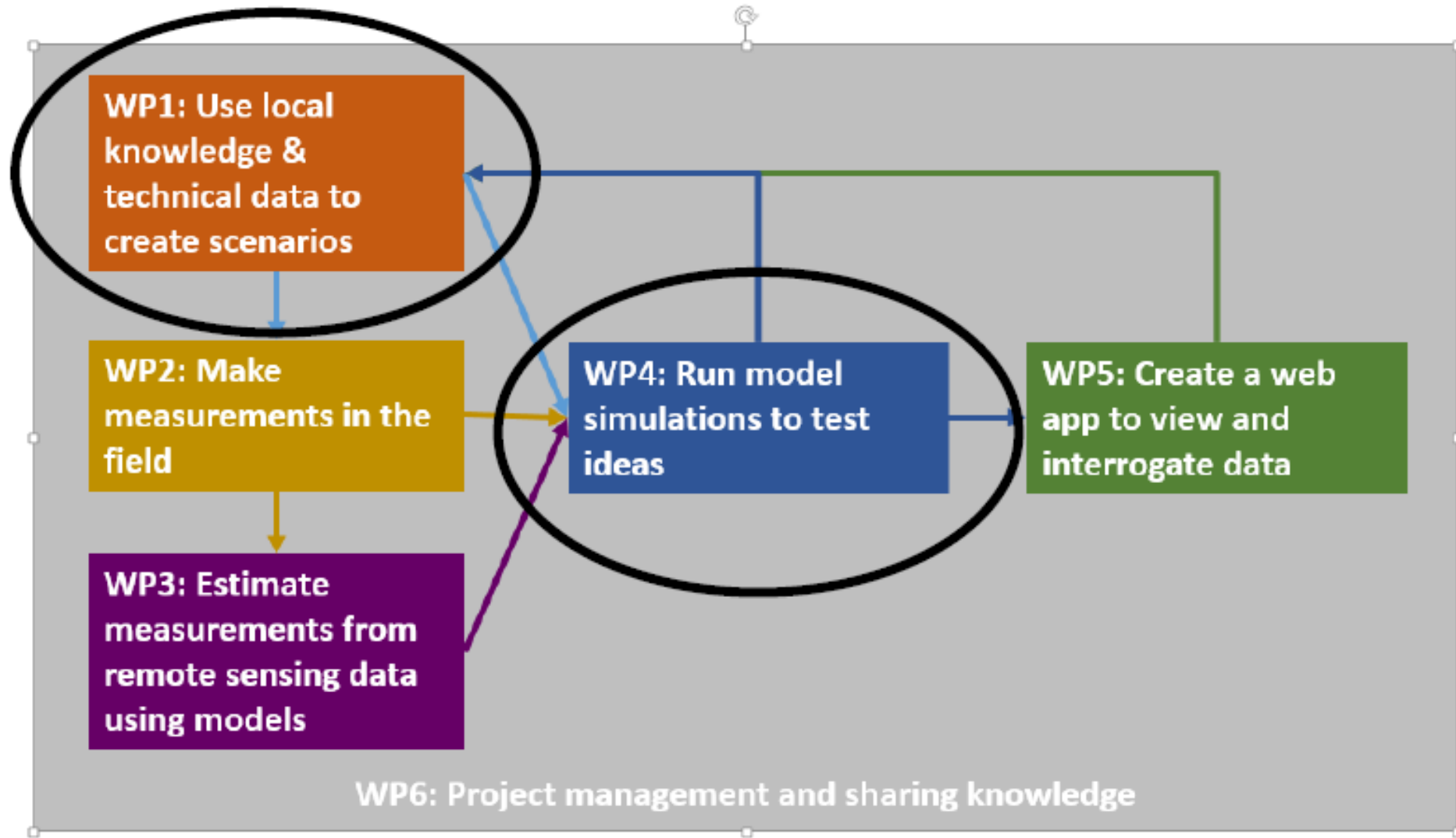
**Catchment Partnerships:** Loddon, Chilterns, Upper Thames, Evenlode, Kennet and others

# West Thames



# Research questions

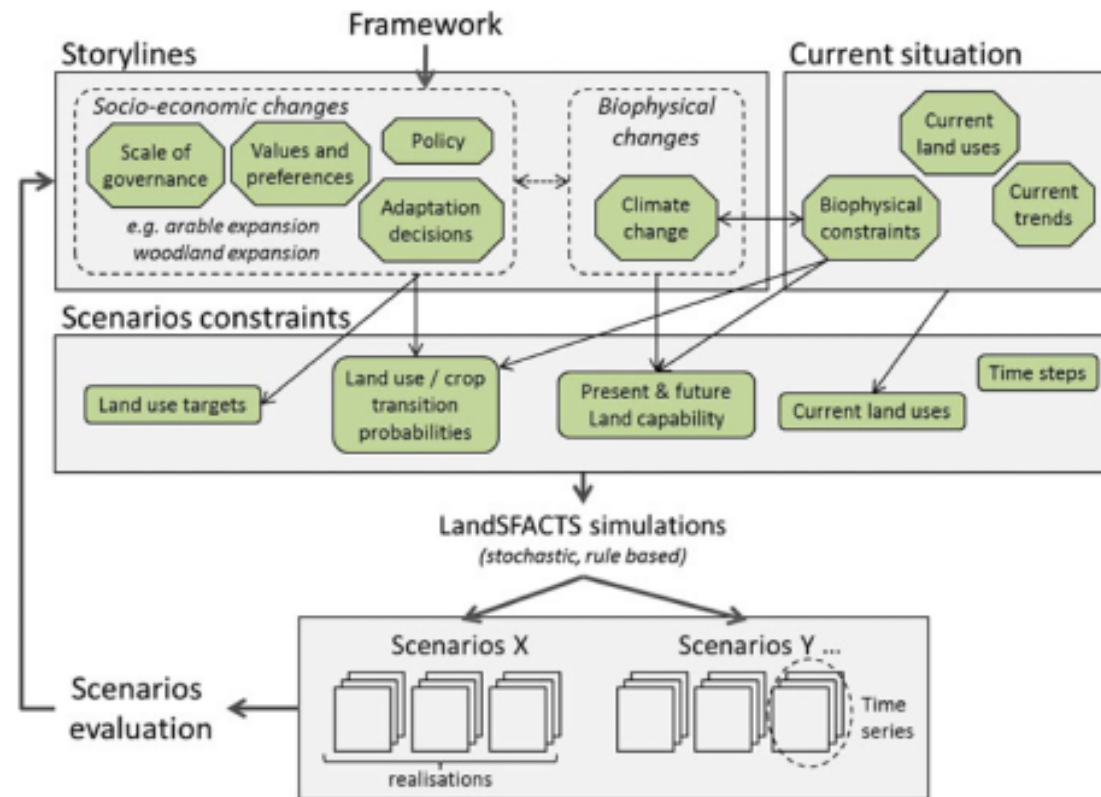
- **Qa.** How effective are different land-based NFM measures at **increasing infiltration, evaporative losses and below-ground water storage** in different locations across lowland catchments?
- **Qb.** How does the effectiveness of land-based measures vary seasonally and between years with respect to antecedent conditions, precipitation magnitude and duration?
- **Qc.** How effective are land-based measures at delivering **catchment-wide water storage and infiltration, thereby reducing runoff rates, compared to targeted approaches** to reduce downstream flood (and drought) risk across different catchment scales (<100-8000km<sup>2</sup>)?



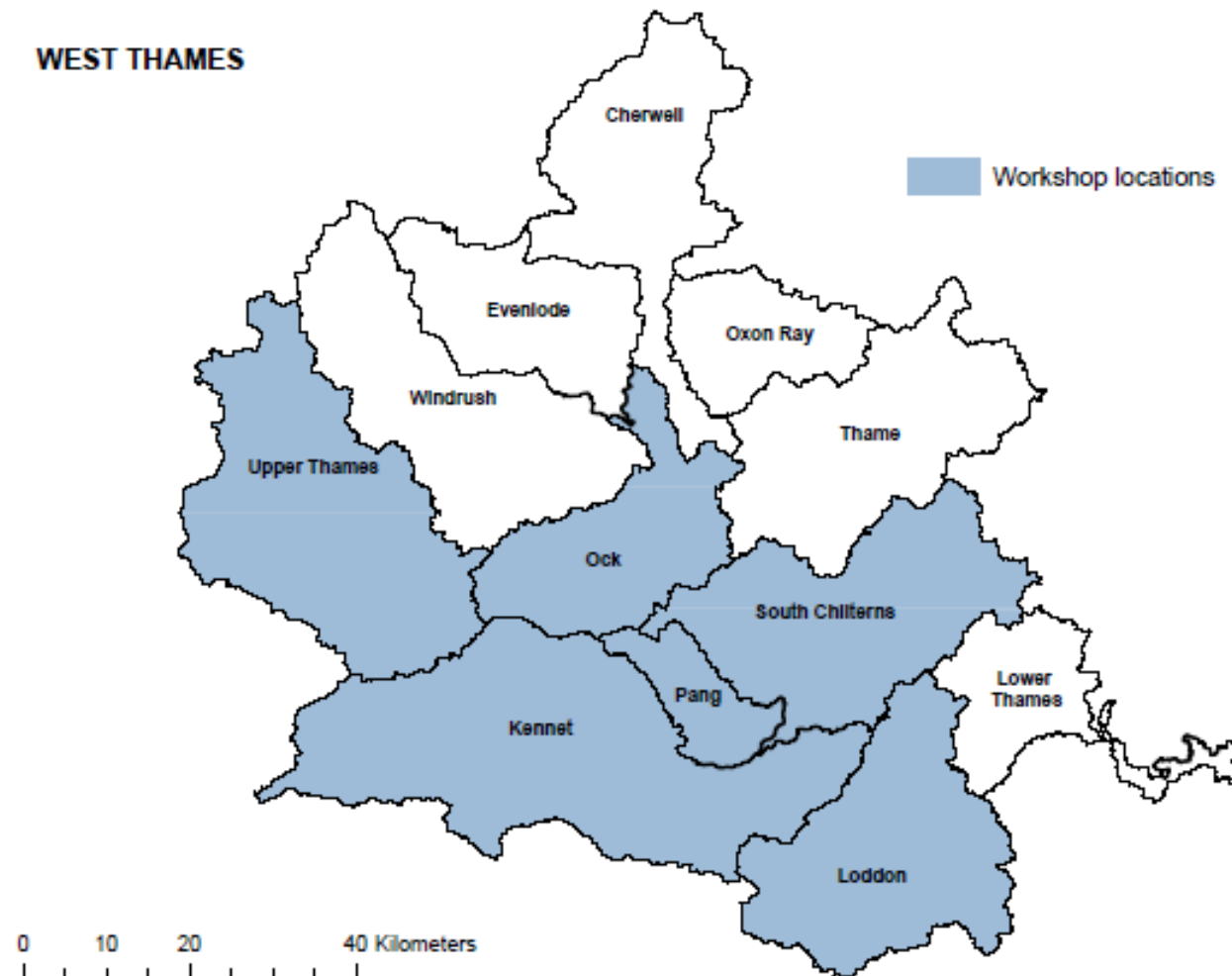
# Co-creating landscape scenarios for Natural Flood Management

# Why co-create landscape scenarios?

- Aim to identify possible future landscape scenarios from co-construction of knowledge
- 'Bottom up' fine grained local knowledge complements 'top down' landscape-scale LUC scenarios, strengthening the validity
- E.g., landscape-scale models have difficulty incorporating key social/cultural info that can influence land-use behaviour
- It is ultimately land-owners/managers that decide how land is used



# Local NFM workshops 2019-2020



**Aim:** Create catchment scale scenarios for NFM that reflect the type of measures the local community and organisations want to see



# Local catchment workshops

- 5 workshops, ~20-25 participants per workshop
- 3-5 groups per workshop (representing different areas of the catchment)
- Landowners, farmers, farm advisors, flood groups, EA, Rivers/Wildlife Trusts, communities at risk, fisheries consultancy, local authority, water company..



# Methods - what we were asking

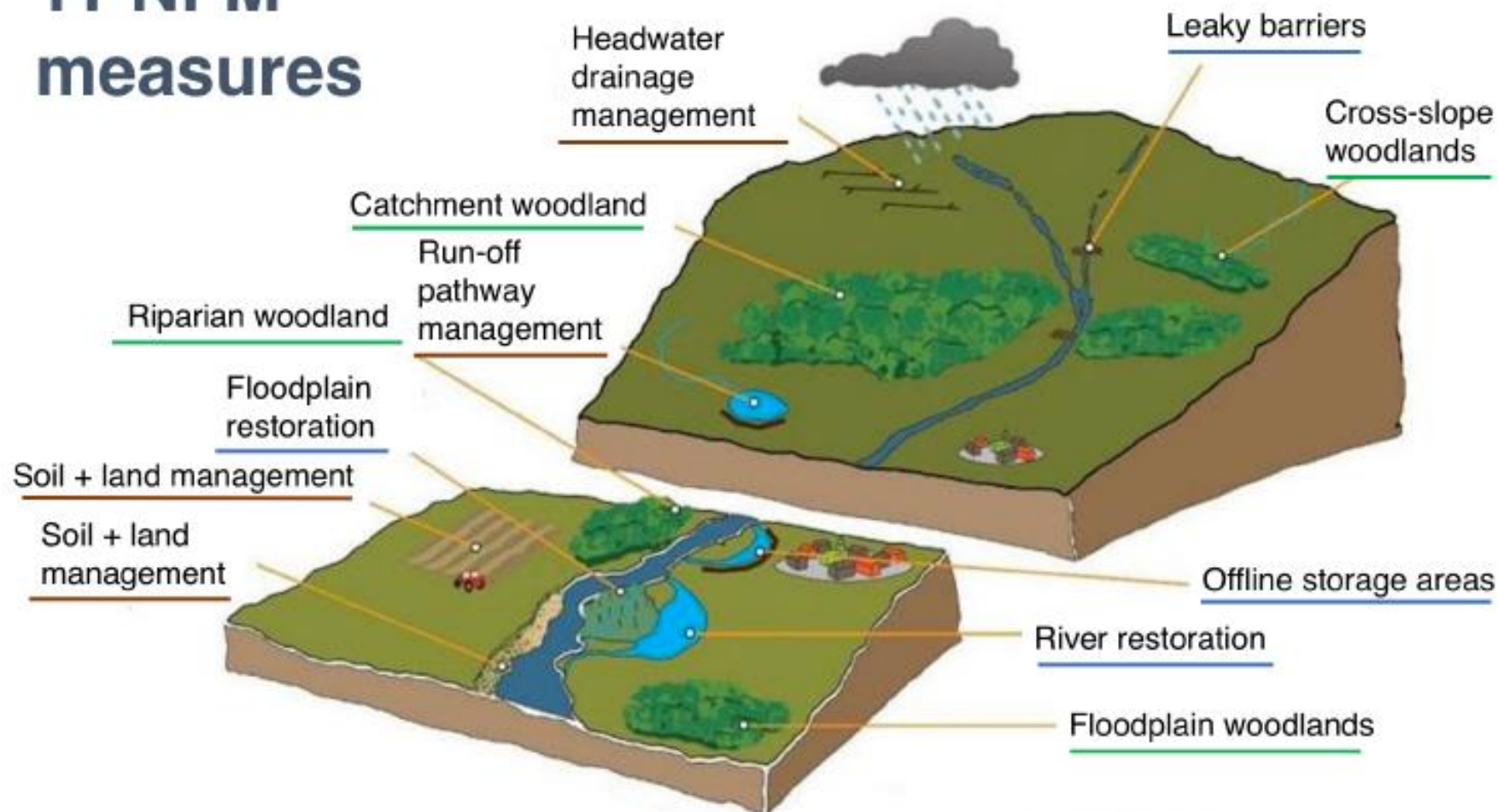
- What types of NFM measures do different groups find culturally or socially acceptable and most feasible in different areas within the West Thames? Why?
- Where in the catchment do local communities and organisations want to see these measures and why? What are the social/cultural, economic, landscape constraints?



# Scoring NFM measures

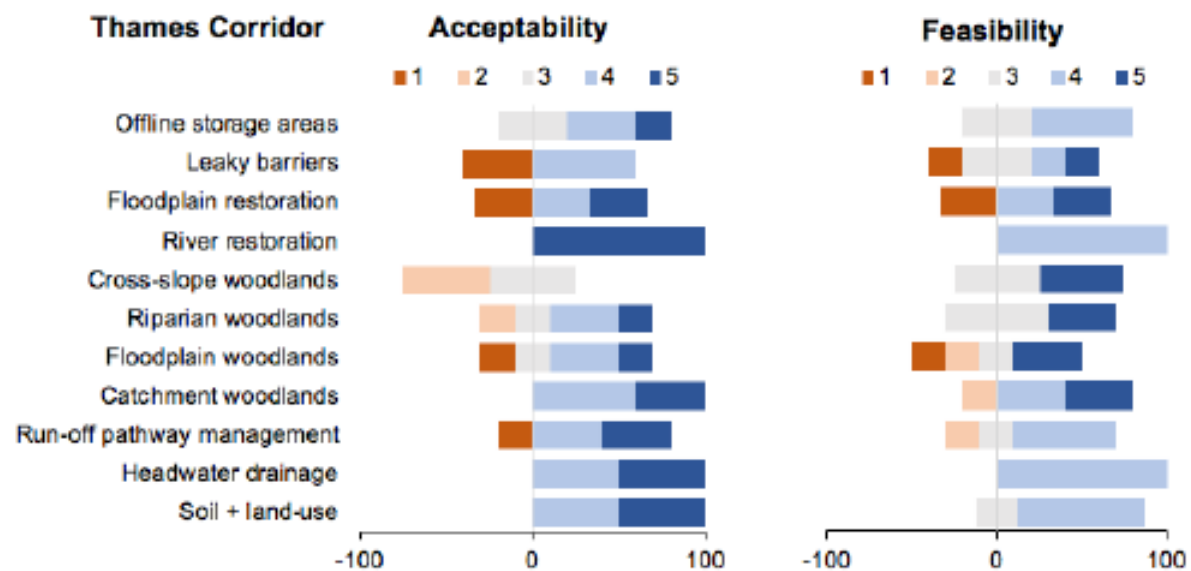
What types of NFM measures do different groups find culturally or socially acceptable and most feasible?

## 11 NFM measures

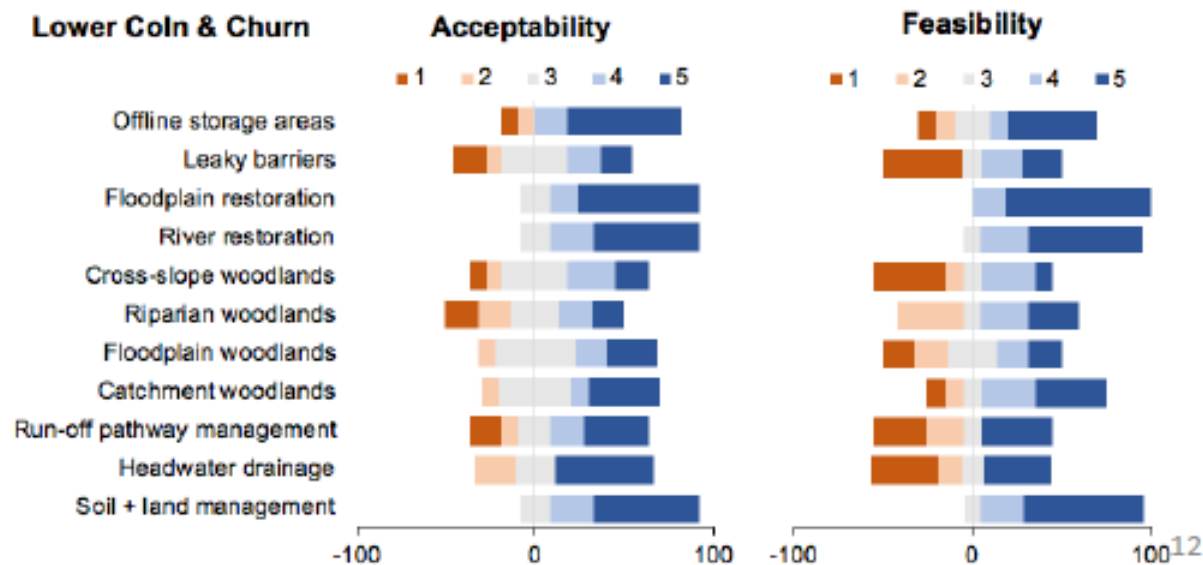


# Individual preferences

## South Chilterns



## Upper Thames

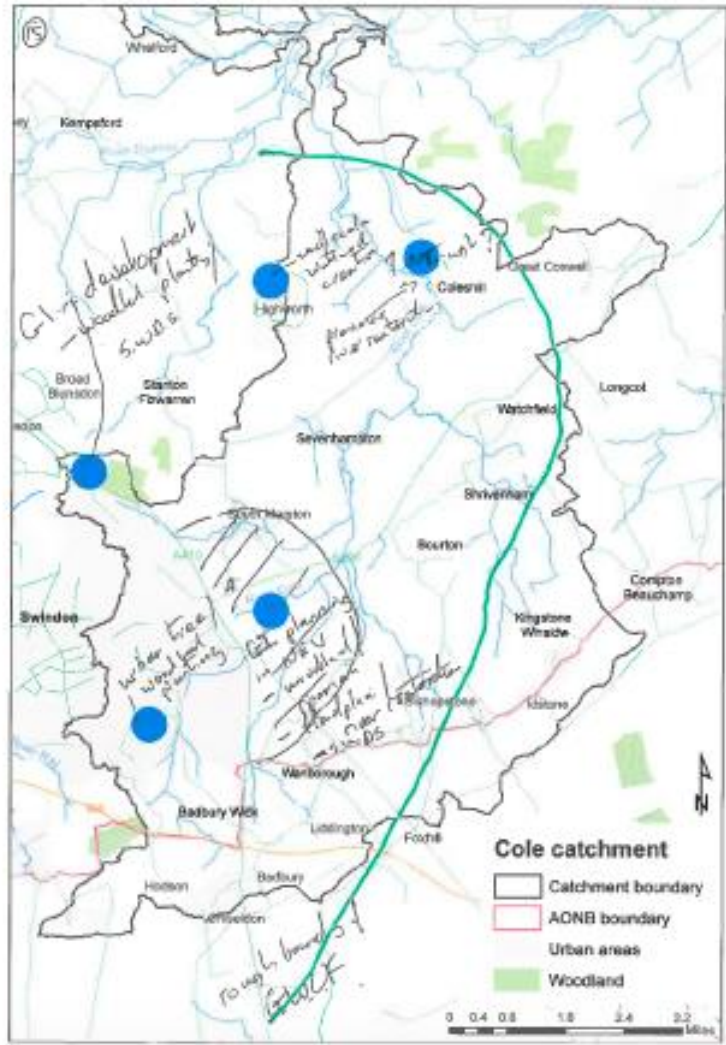


# Regional differences

	CATCHMENT AREAS												
	Upper Thames				South Chilterns			Kennet			Loddon		
NFM MEASURE	1	2	3	4	5	6	7	8	9	10	11	12	13
Soil + land-use													
Run-off pathway													
Leaky barriers													
Catchment woodlands													
Floodplain woodlands													
Cross-slope woodlands													
Riparian woodlands													
Offline storage areas													
River restoration													
Floodplain restoration													
Headwater drainage													

# Individual preferences

Where in the catchment do local communities and organisations want to see these measures and why?





# Local preferences

## **Upper Thames: Soil + land-use**

*'Goes hand in hand with good farming practice'; 'good soil management is economically beneficial to farmers', 'positive ecological impacts'*

## **South Chilterns: Catchment woodland**

*'Woodland planting in valleys more acceptable [than hillslopes] within the AONB considering local landscape setting values'; 'Acceptability depends on how woodland looks and how it can be used by the community'; 'Opportunities for planting on low quality agricultural land and on clay where production value is low'*

## **Kennet: Soil + land-use**

*'Enhances biodiversity and natural habitat'; 'increases carbon sinks, improves air quality and bird migration routes'; 'enhances soil health and fertility'; 'does not require dramatic LUC and Countryside Stewardship payments are available'*

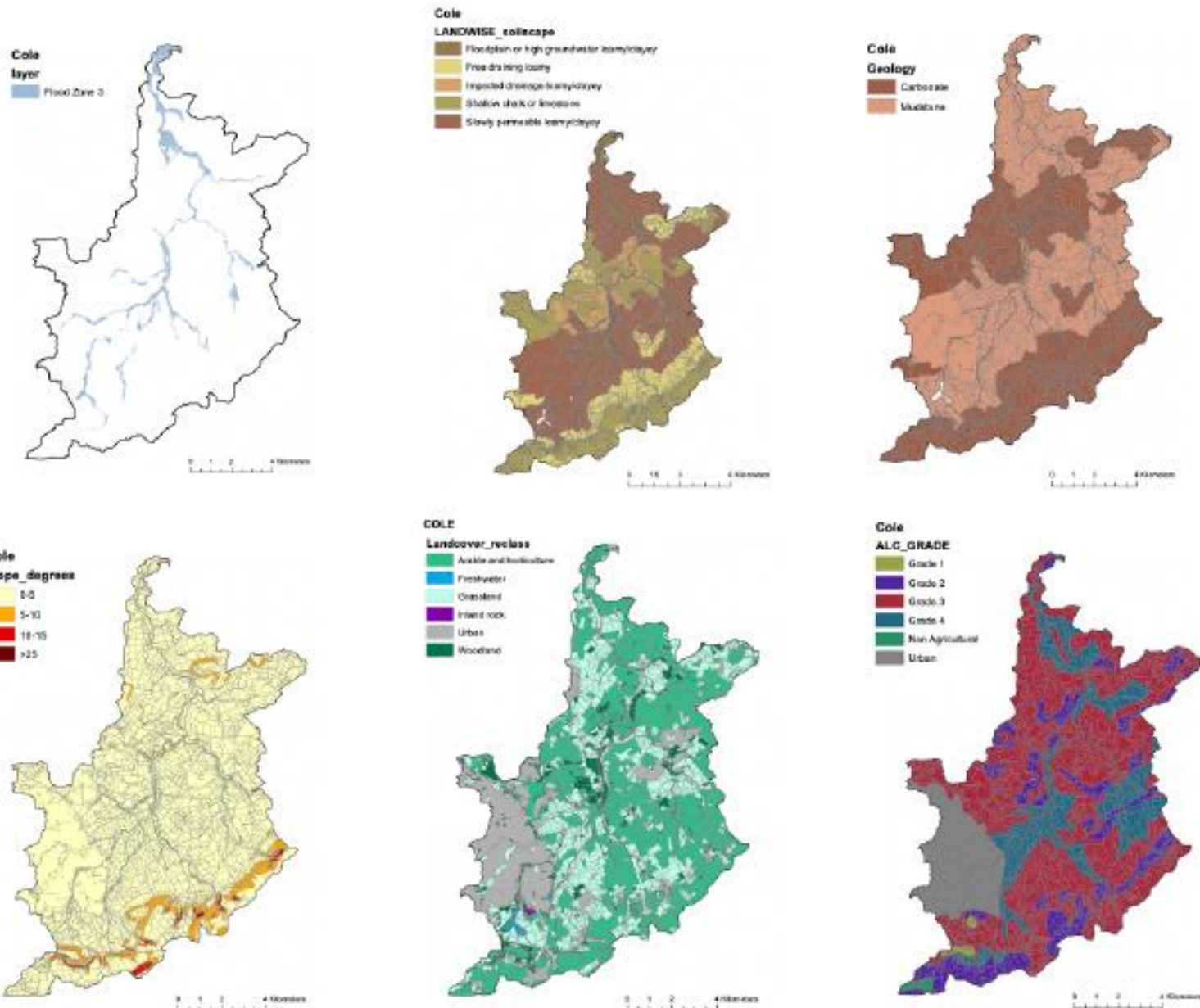
## **Loddon: Leaky barriers**

*'Reduces water velocity and run-off downstream, non-intrusive, easy to remove and relatively cheap'; 'enhances wildlife, aesthetically attractive'; 'opportunities on NT land where they could be used for teaching about natural processes'*





# Landscape character assessment



# Converting map data into something modelers can use

## Loddon

### Blackwater

<b>NFM measure</b>	<b>Geology</b>	<b>Soilscape</b>	<b>Slope</b>	<b>ALC</b>
Floodplain woodland	Carbonate, Mudstone	Slowly permeable loamy/clayey; Floodplain or high groundwater....; Free draining loamy	Flat, Gentle	Non-agri Grade 3 Grade 4
Headwater drainage management	Sandstone	Naturally wet sandy/loamy; Freely draining sandy/loamy	Moderate, Moderately steep	Non-agri Urban
Cross-slope woodland	Sandstone	Freely draining sandy/loamy; Naturally wet sandy/loamy	Gentle, Moderate	Non-agri Grade 3,4 Urban

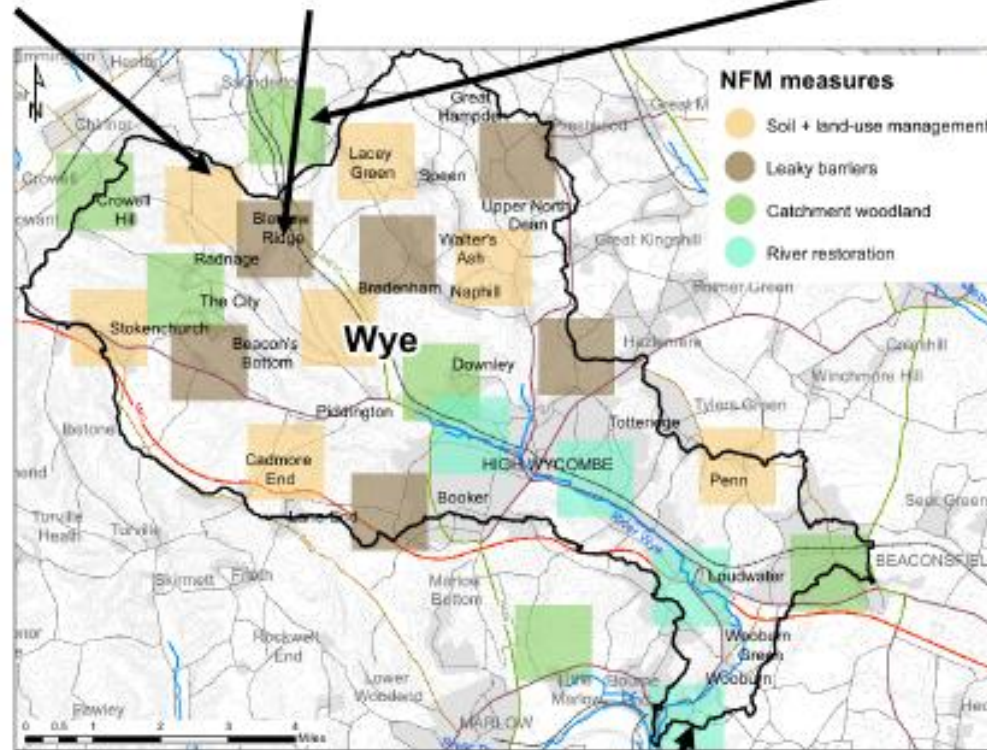
# Integrating narratives

## Soil + land management:

- Landowner interest
- Possible on very steep arable land - reduce speed of run-off and increase groundwater re-charge.
- Possible on arable areas of slightly acid/loamy and clay soils with impeded drainage (farms on steep slopes) (funding for areas hard to farm).
- Reduce soil loss, pollution, costs of clearing drains, siltation, increase water quality and river ecology.
- Increased local wellbeing

## Leaky barriers:

- Possible on most headwaters and focus on areas of impeded drainage.
- Work on river section: leaky barriers on joining streams.



## River restoration:

- Improves biodiversity.
- New houses are planned and area floods therefore will benefit from river restoration.

## Catchment woodlands:

- Area needed is an issue.
- Landowner is key - How it is 'sold'
- Planting in areas of very steep land which is hard to farm.
- Linking existing pockets of woodland at the headwater end more feasible than 'brand new' woodland
- Wildlife connectivity
- Wellbeing increased by visiting new woodland.

# Converting map data into something modelers can use

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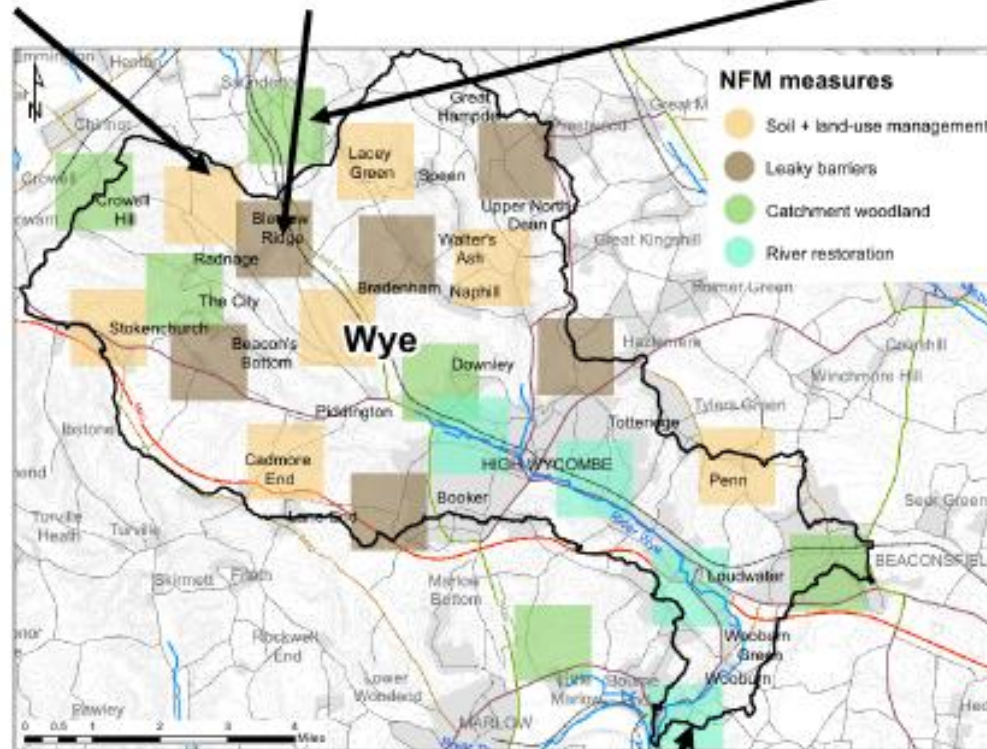
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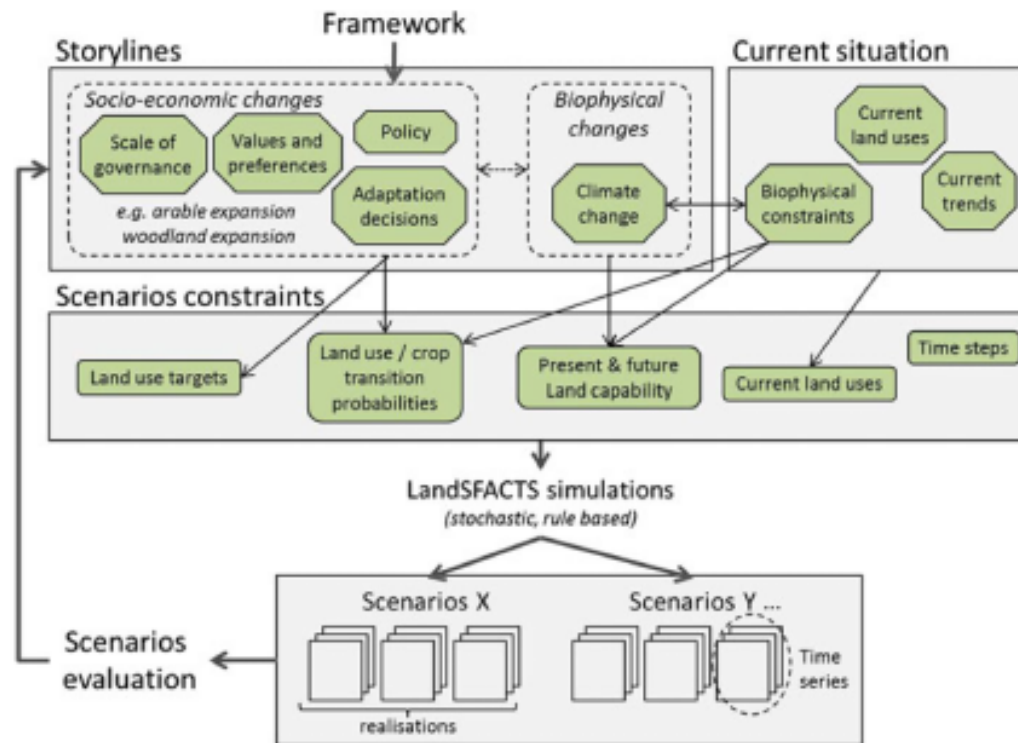
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# Building scenarios for modeling



- Constrain landscape options for different NFM measures based on landscape character and narratives
- Run scenarios through models to 'test' how effective they are at reducing flooding

**THANK YOU**  
[angie.elwin@reading.ac.uk](mailto:angie.elwin@reading.ac.uk)

