

Natural flood management



Mike Acreman



**Centre for
Ecology & Hydrology**

NATURAL ENVIRONMENT RESEARCH COUNCIL

The peril of floods

Floods can have disastrous consequences

- Loss of life
- Damage to property
- Decline in businesses
- Cutting of communications
- Stranded people



Is there anything good about floods?

Flooding in the right place can have benefits

- Fertile floodplain soils
- Birds
- Flowers
- Mammals
- Nutrient/ carbon dynamics



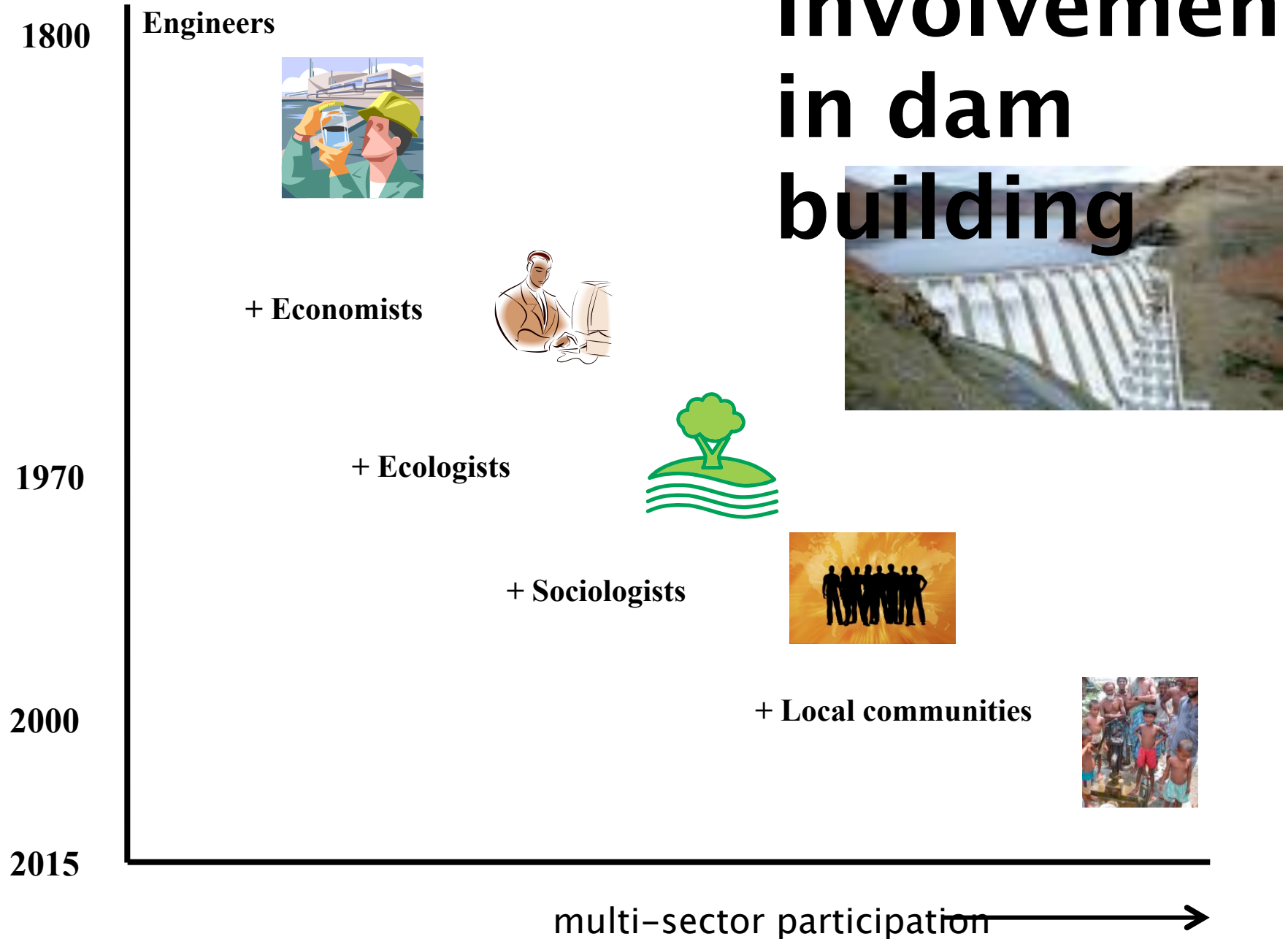
A fight against nature?

1950s and 1960s

Man can control nature if
we pour enough concrete



Involvement in dam building



Are we making flood risk worse?

- Wetlands drained 90% lost
- Forests removed now 12% of UK
- Rivers straightened 50% are modified
- Rivers separated from floodplains 42%





HM Government

The Natural Choice: securing the value of nature



Parliamentary Office of
Science and Technology

postnote

March 2007 Number 281

ECOSYSTEM SERVICES

The natural environment provides people with goods and services that are fundamental to human wellbeing.

Box 1. Ecosystems and services

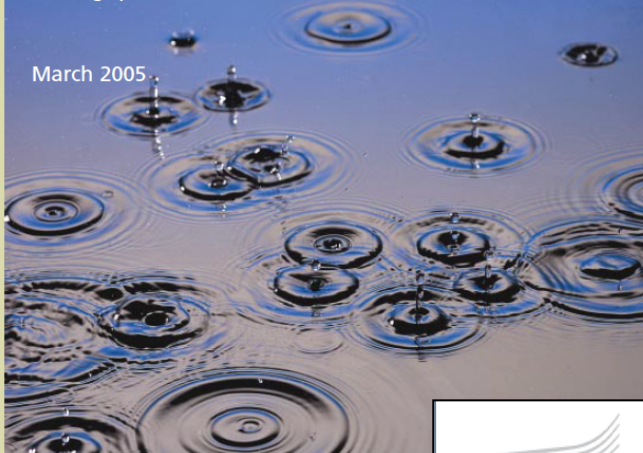


Making space for water

Taking forward a new Government strategy for flood and coastal erosion risk management in England

First Government response to the autumn 2004
Making space for water consultation exercise

March 2005



HM TREASURY

Office of the
Deputy Prime Minister
Creating sustainable communities

Department for
Transport



enhancing... improving... cleaning... restoring...
changing... tackling... protecting... reducing...
creating a better place... influencing...
inspiring... advising... managing... adapting...

Working with Natural Processes to
Manage Flood and Coastal Erosion Risk



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Introduction

[About flood risk management](#) ▼

[Floods and their impacts](#)

[What is Flood risk
management ?](#)

[Better environmental options](#)

Towards better environmental options in flood risk management

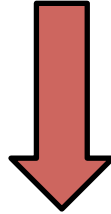


Reducing human casualties and damage to economic activity and the environment are key objectives shared by all EU countries and implementation of the 2007 Floods Directive has an important role in making this happen. Traditional measures to reduce negative impacts of floods include constructing new or reinforcing existing flood defence infrastructure such as dykes and dams. There are, however, other and potentially very cost-effective ways of achieving flood protection which profit from nature's own capacity to absorb excess waters. Such green infrastructure measures can play a major role in sustainable flood risk management in Europe. Win-win solutions need to be the focus of flood risk management.

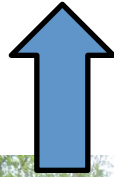


Woodlands

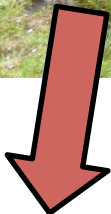
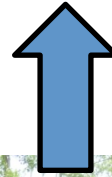
rainfall



canopy intercepts



leaves evaporate



stream flow



roots infiltrate

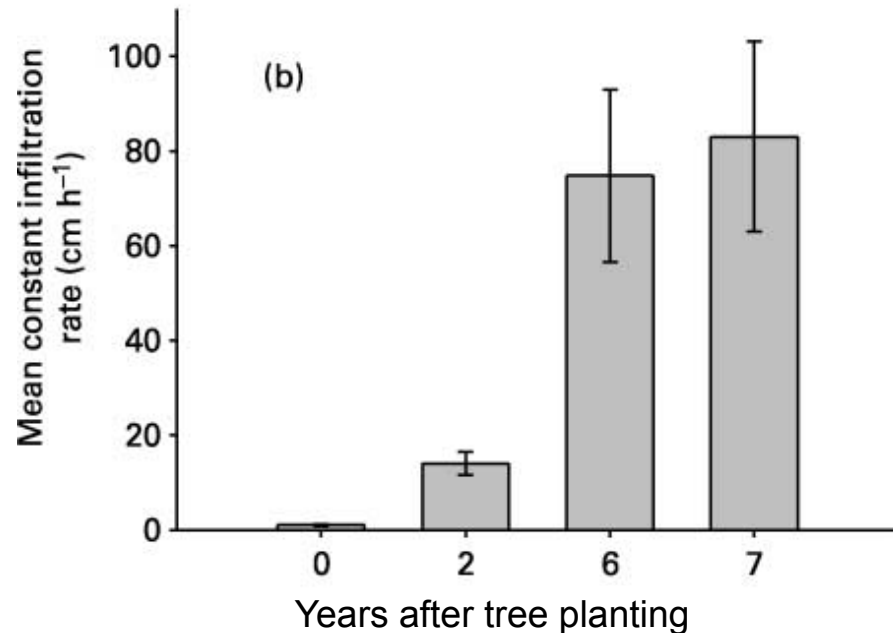
Response to tree planting

Pont Bren experiment

Increase in infiltration

Reduction in peak runoff

But science weak, little understanding of processes

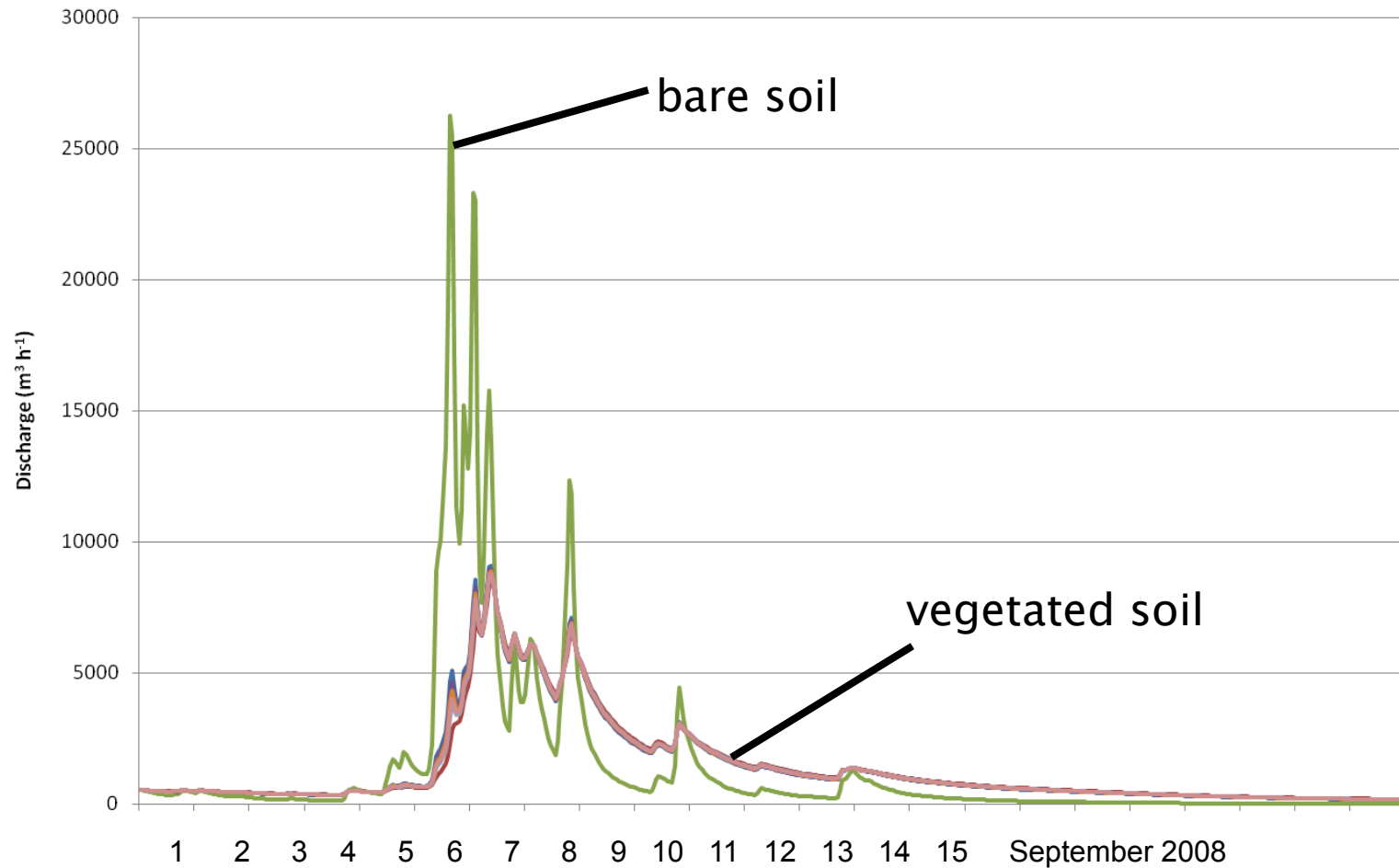


Exmoor Mires restoration

- Storm water runoff reduced by 33%
- Multiple benefits
- Sediment reduced
- Native plants, birds, recreation



Peatland runoff and vegetation



Combining nature and engineering

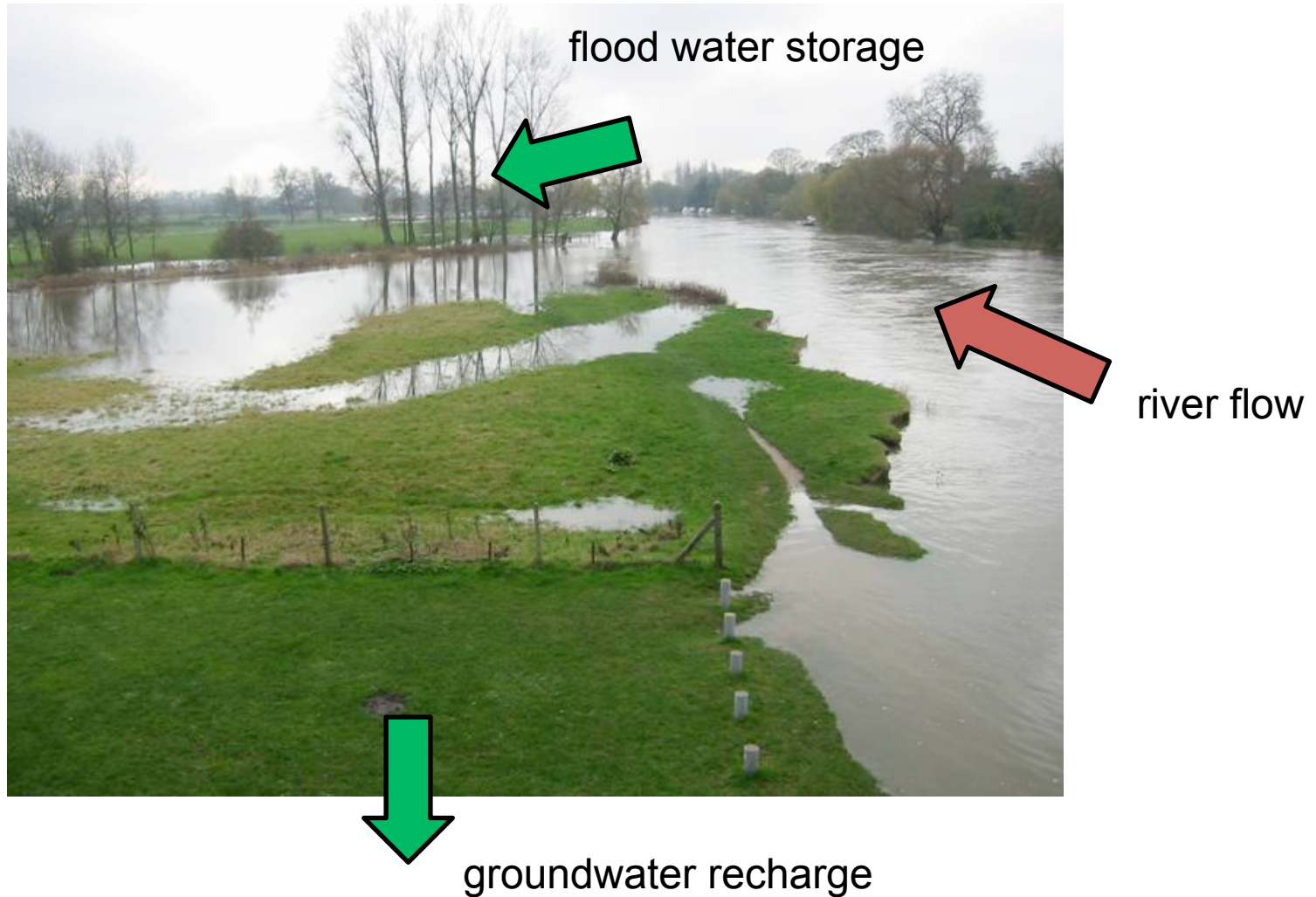
- Keeping water in the catchment
- Mimicking nature
- Building small attenuation features



Runoff Attenuation Features

A guide for all those working in catchment Management

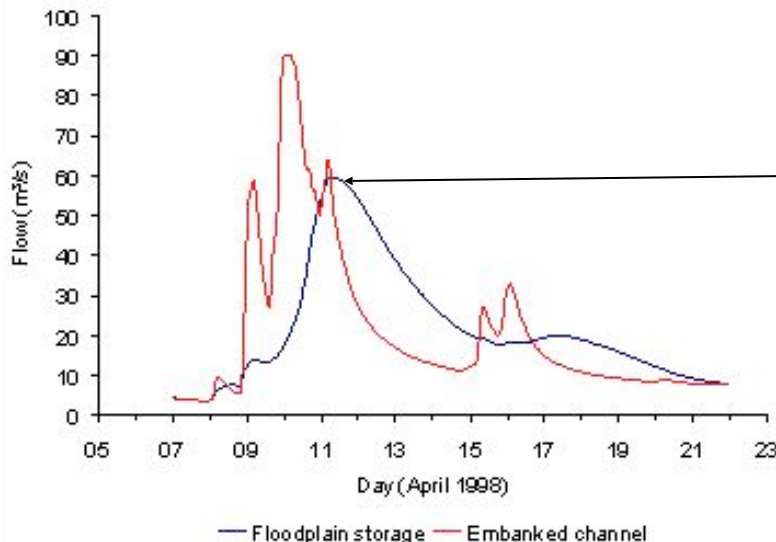
Floodplains



Floodplains and flood management



Air photo of
River Cherwell
and its floodplains

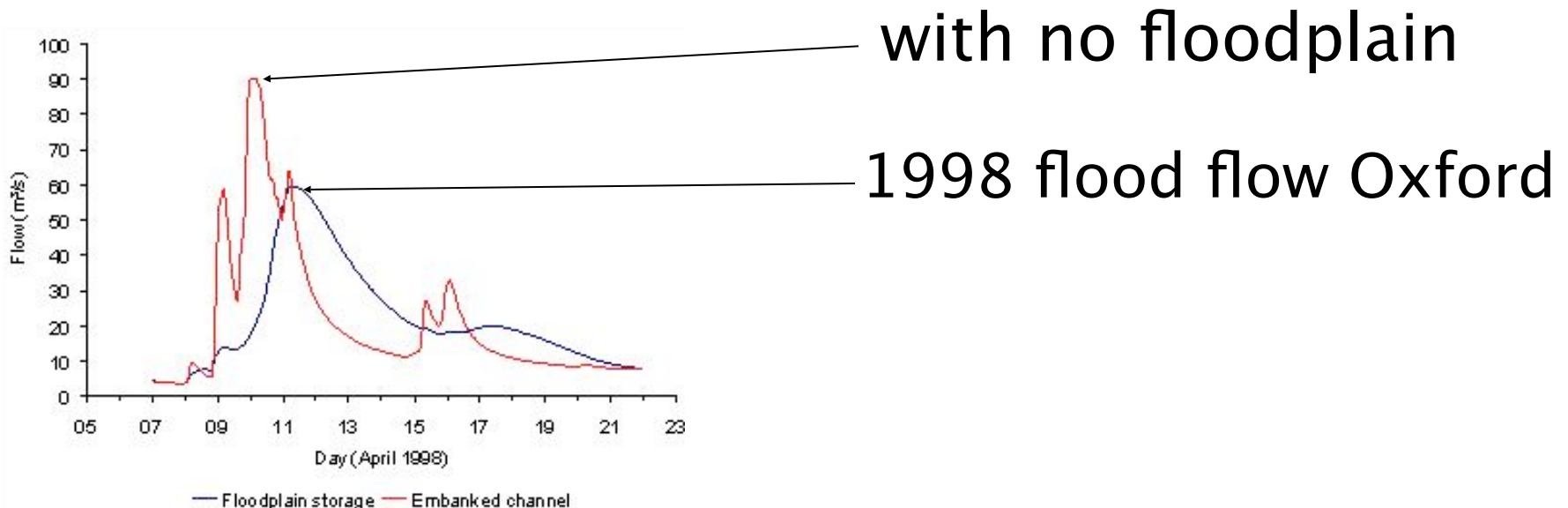


1998 flood flow Oxford

Floodplains and flood management



Air photo of
River Cherwell
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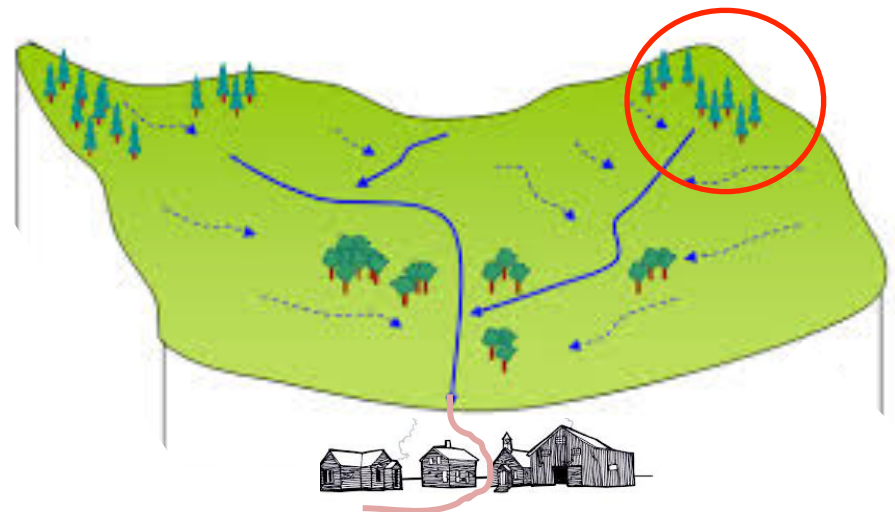
Thames Floodplain

- Reconnection of river and floodplain
- Restoration of meadows
- Multiple benefits
- Birds, otters, plants
- Potential flood storage, but small compared with



Scale issues

- Wetlands & forests can have significant impact at **local** level for **small** floods
- 6000 m³ sounds like a lot
- Landscape is fragmented – small plots of woodland and wetlands
- Need landscape interventions

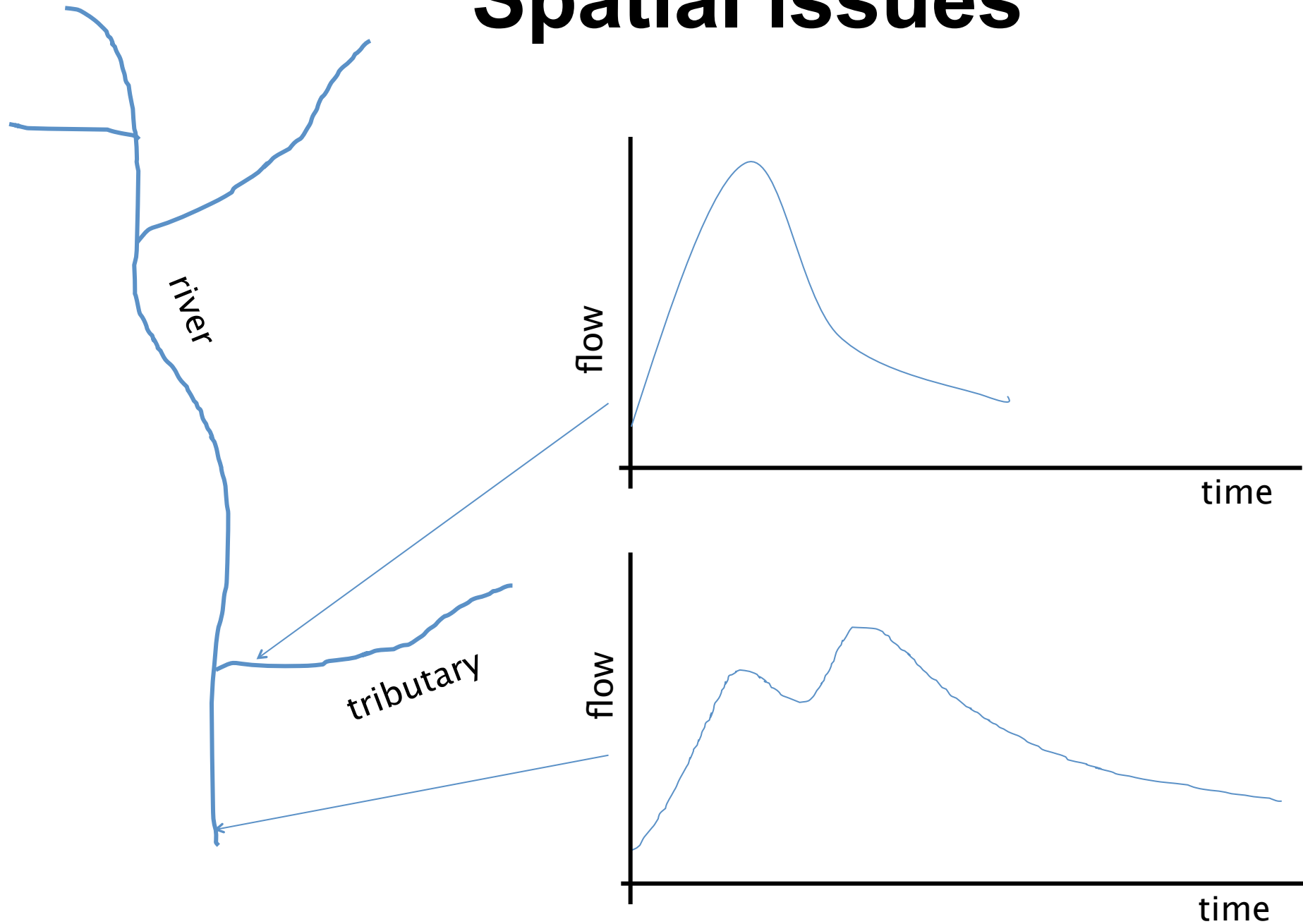


Scale issues

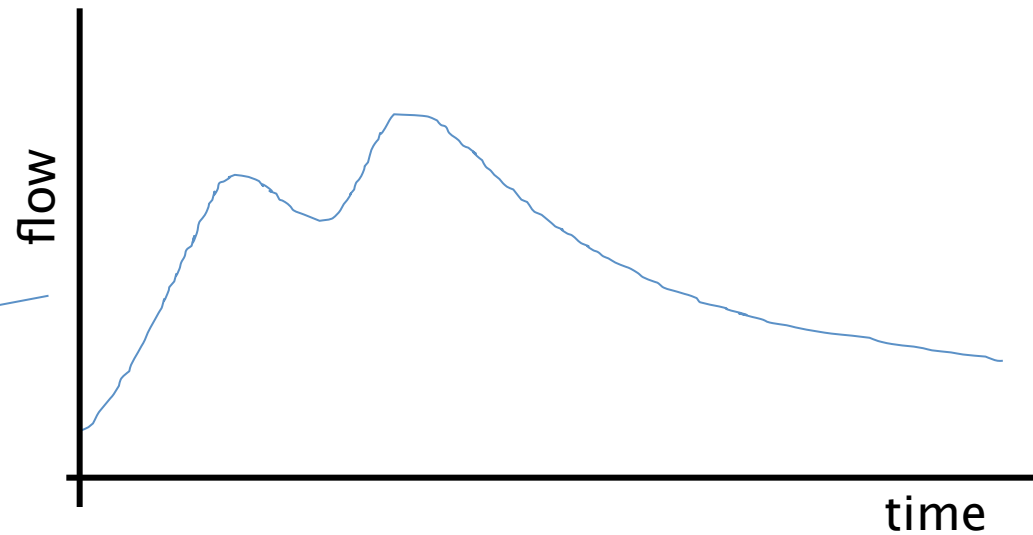
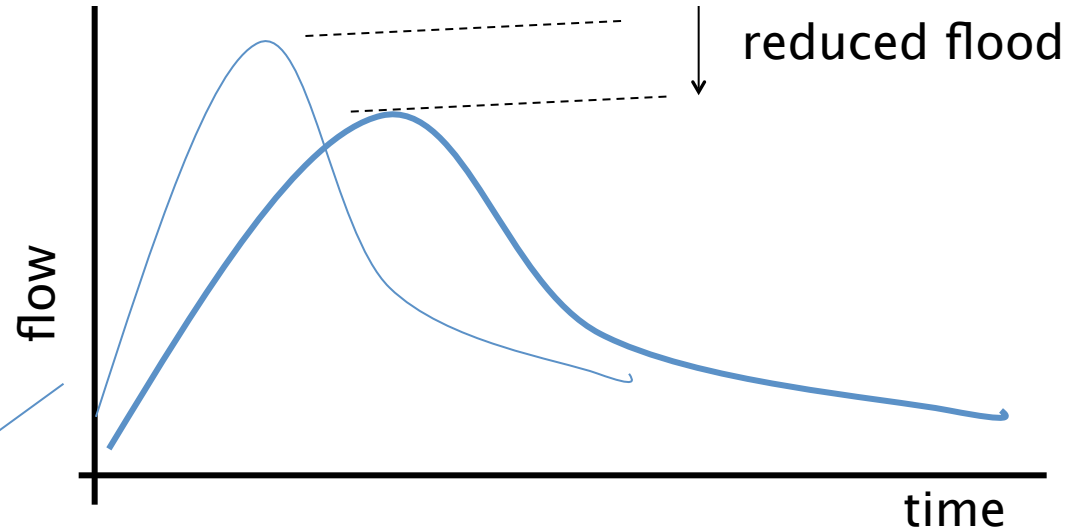
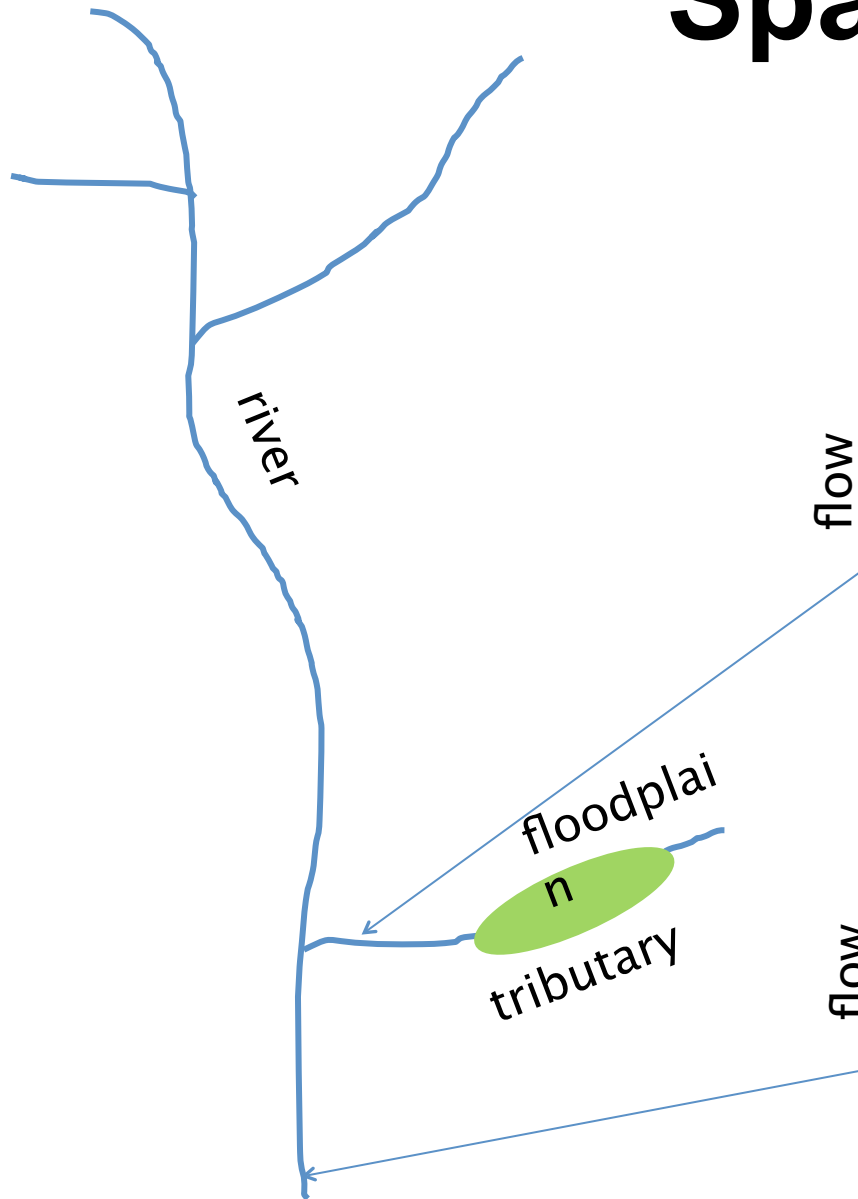
- During major floods, whole catchment is saturated
- Land cover type has little impact



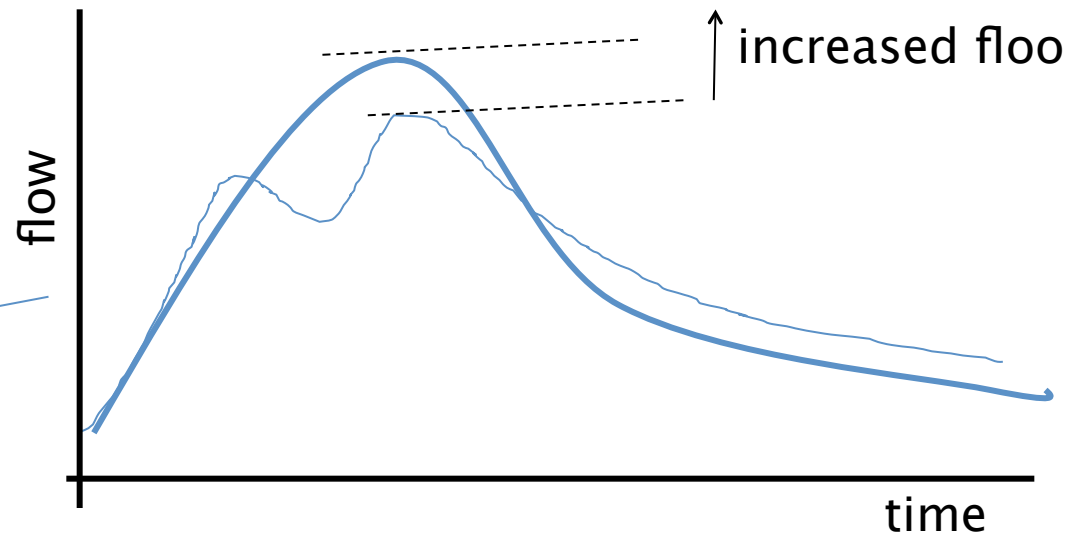
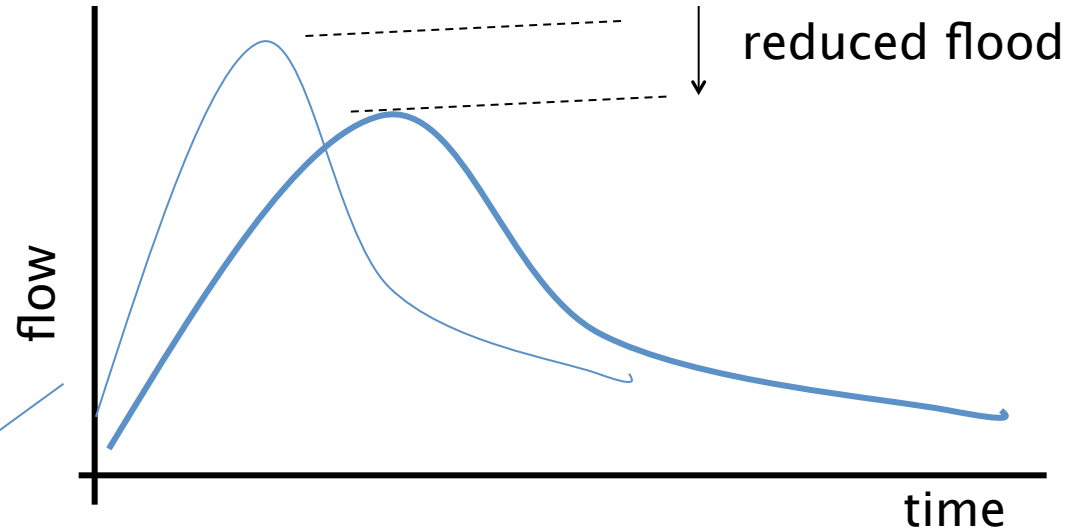
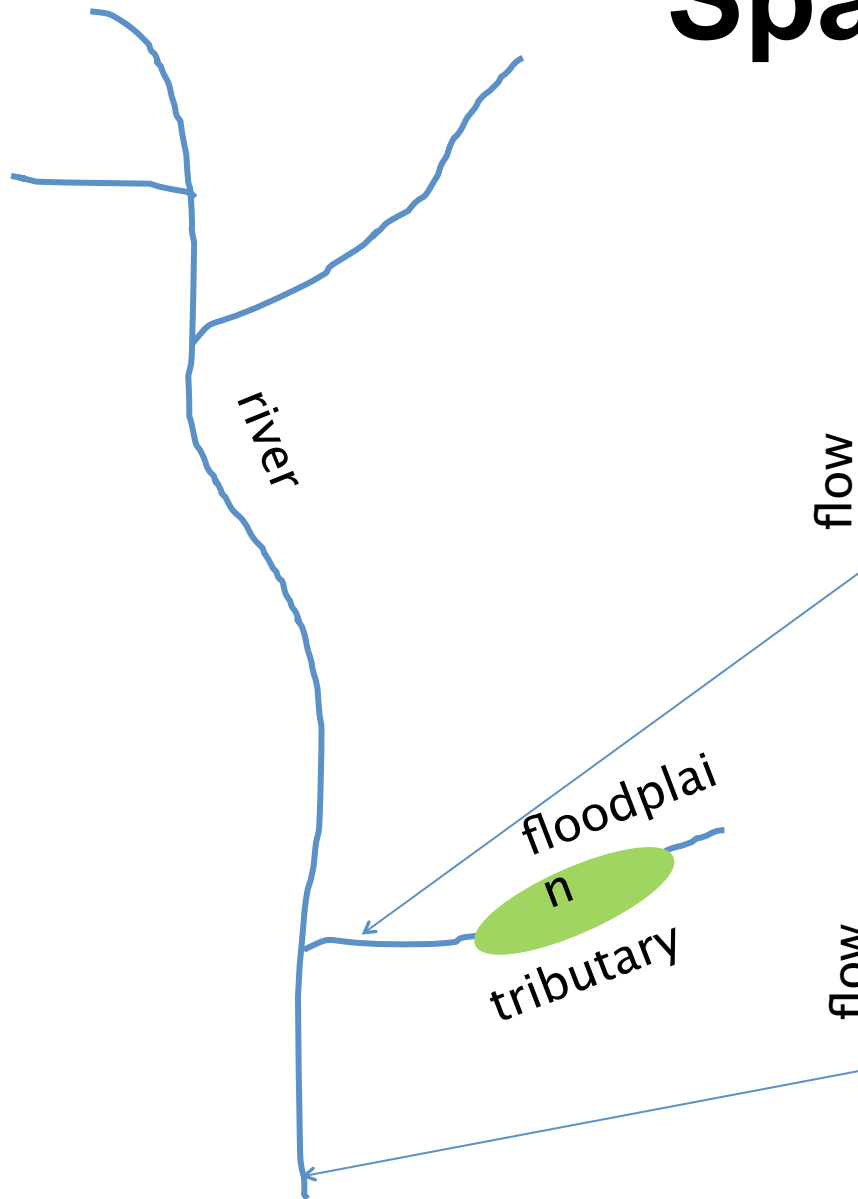
Spatial issues



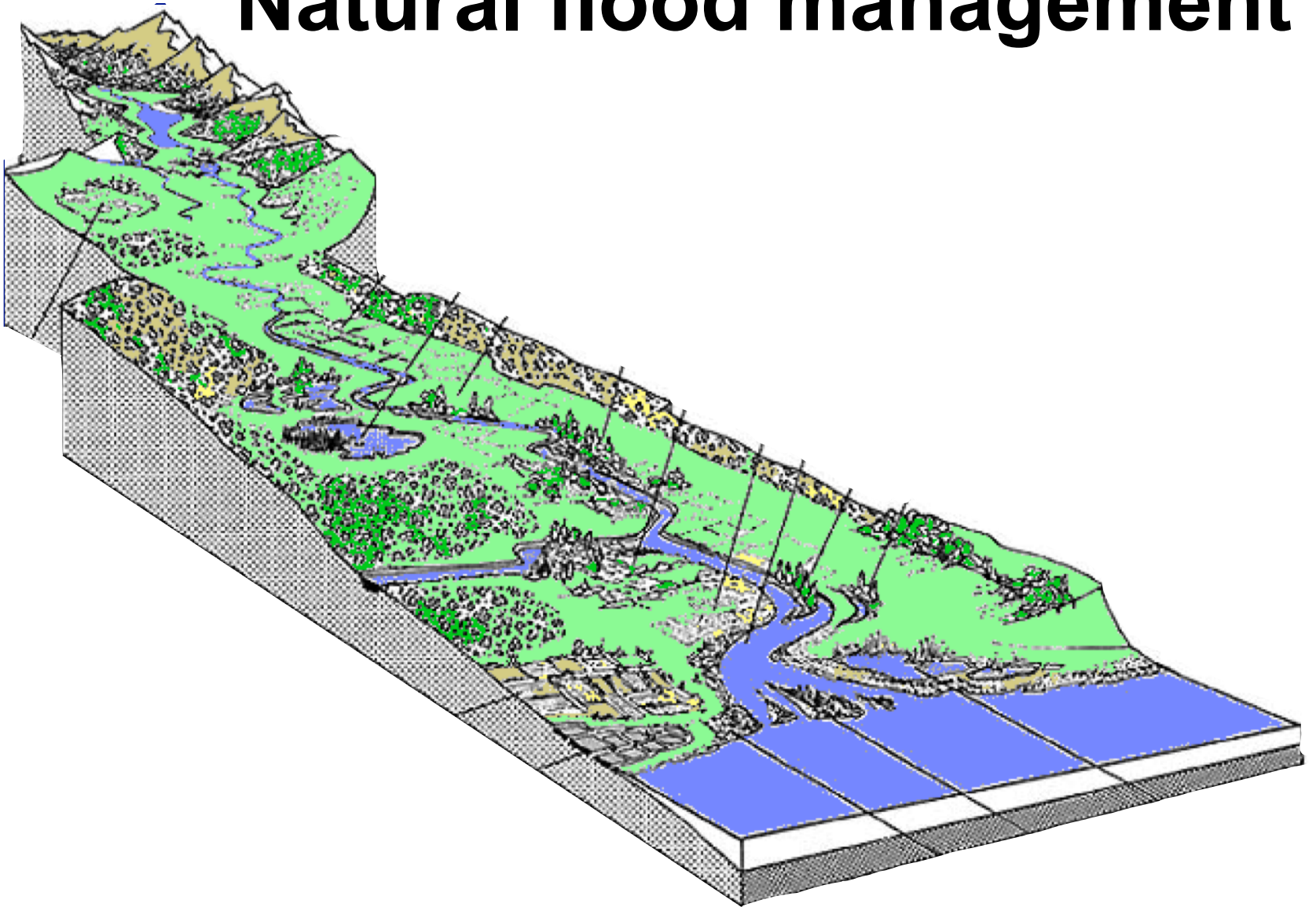
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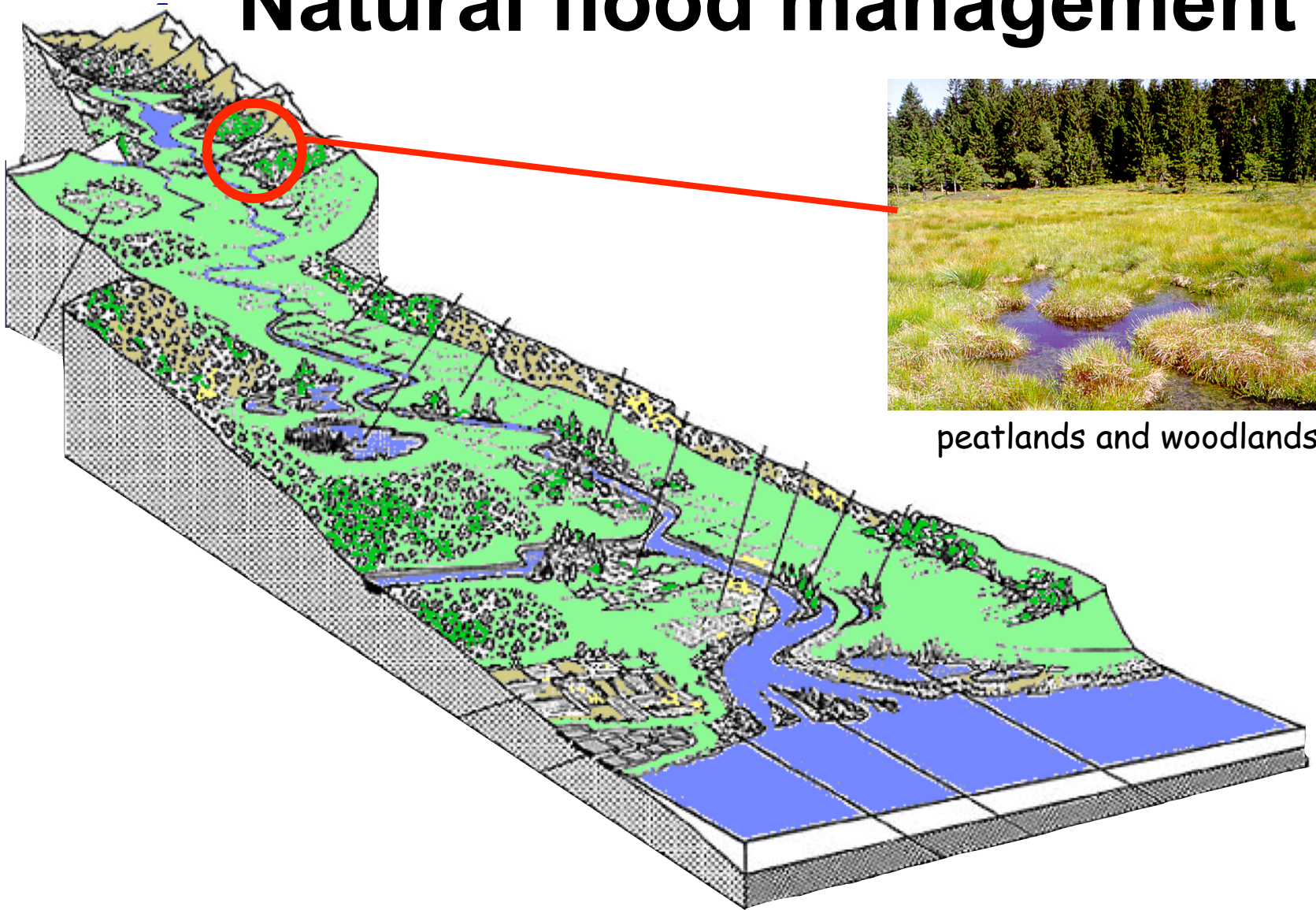
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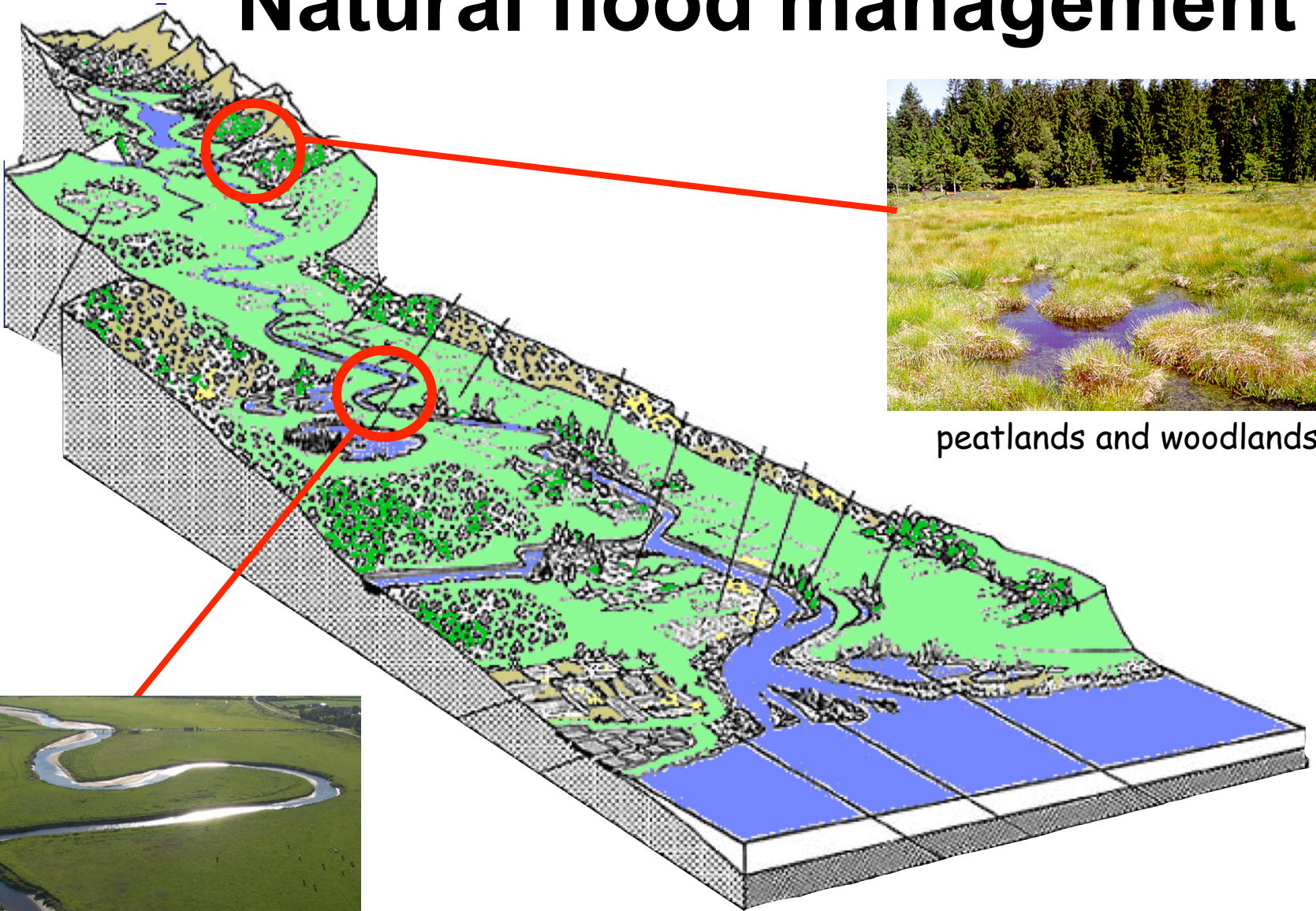
Natural flood management



Natural flood management



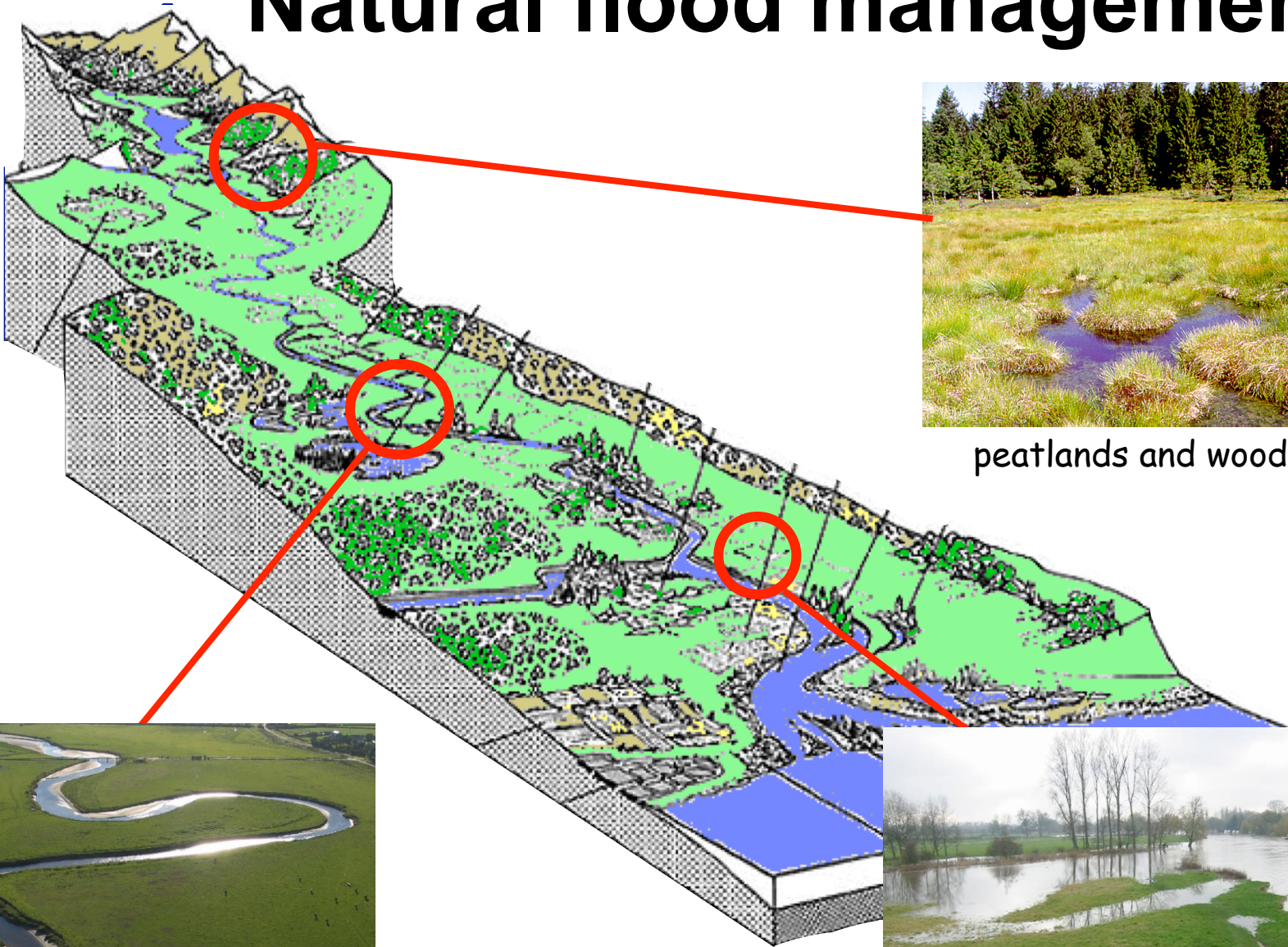
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peatlands and woodlands

meanders

Natural flood management



peatlands and woodlands

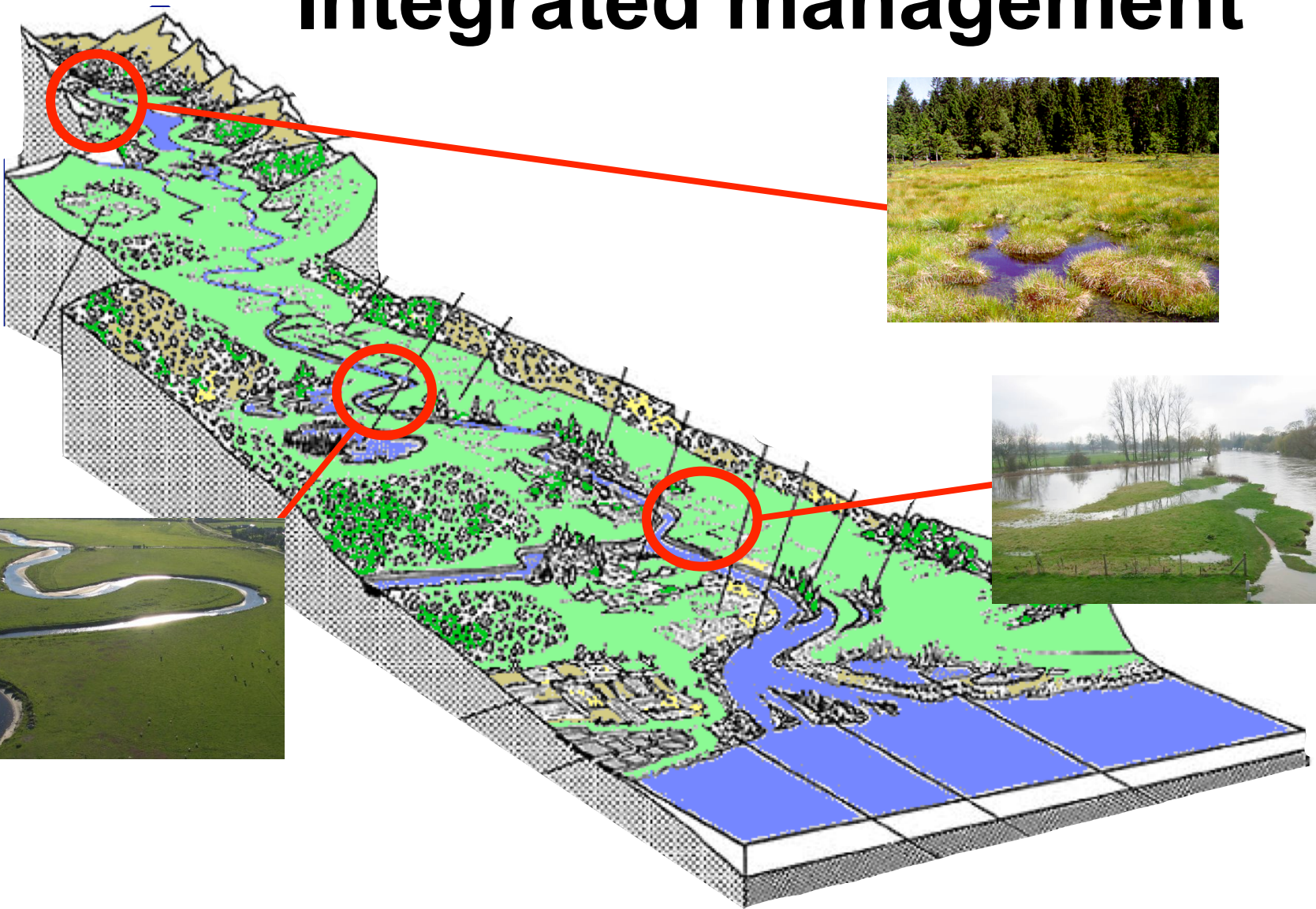


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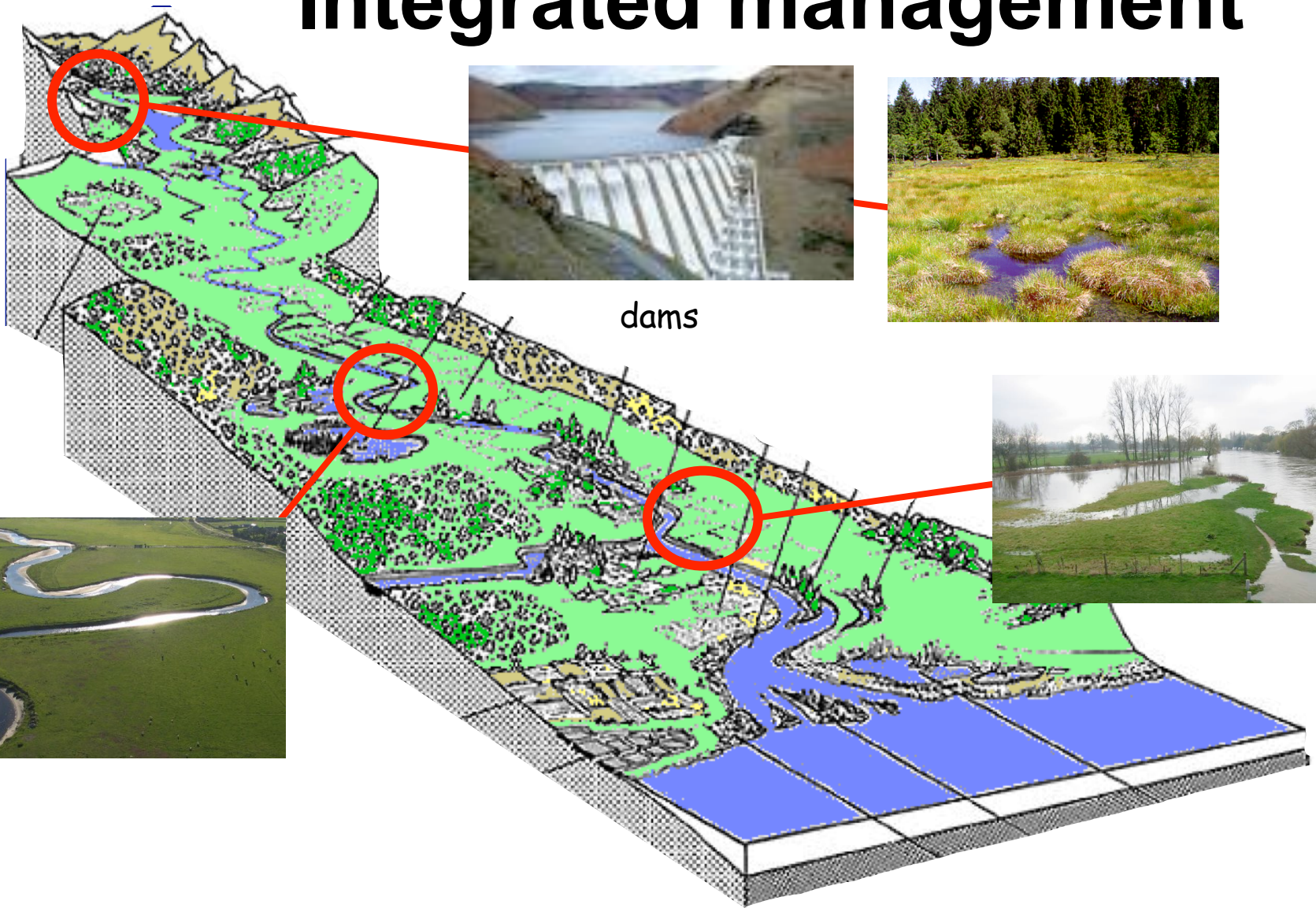


floodplains

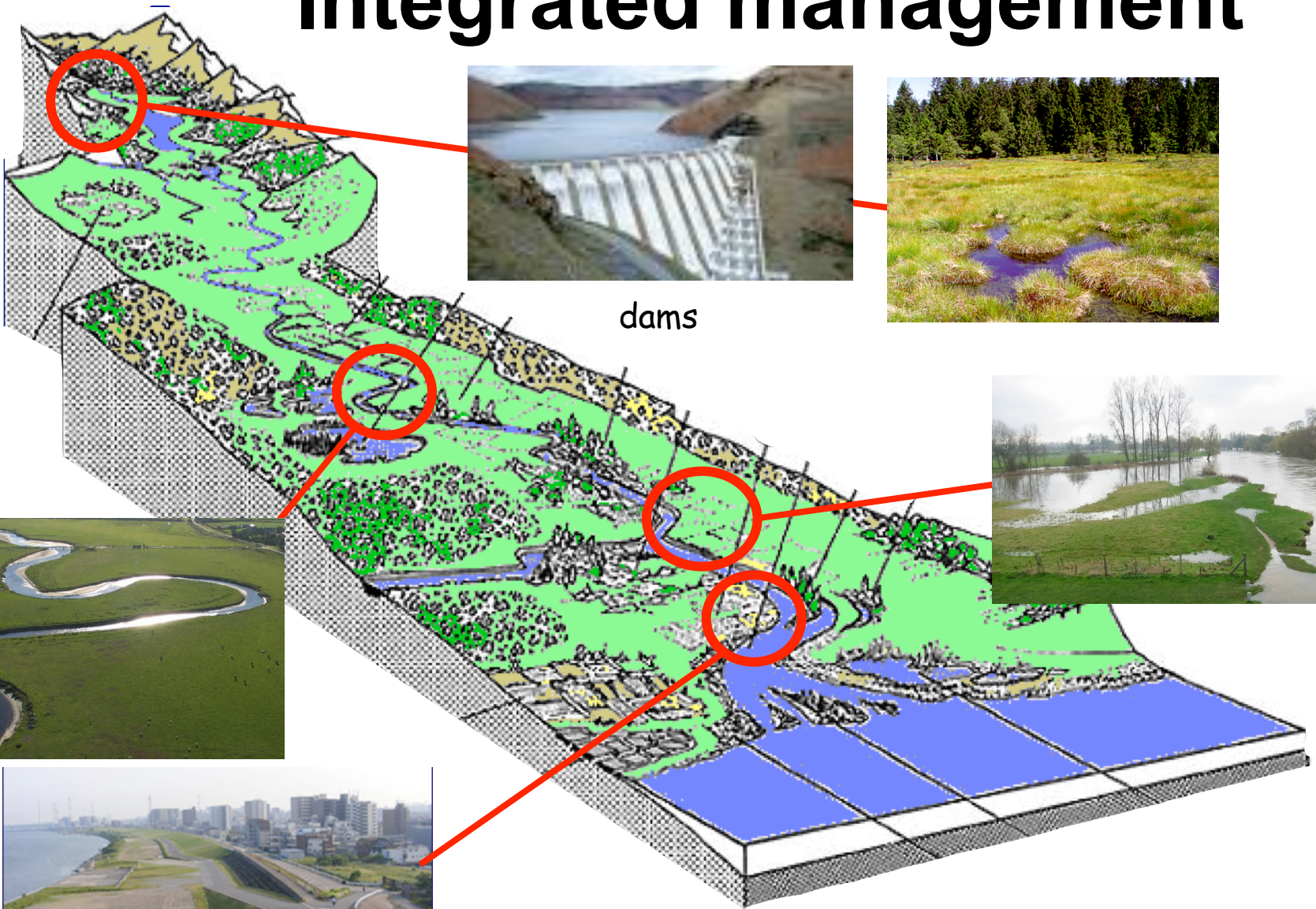
Integrated management



Integrated management



Integrated management

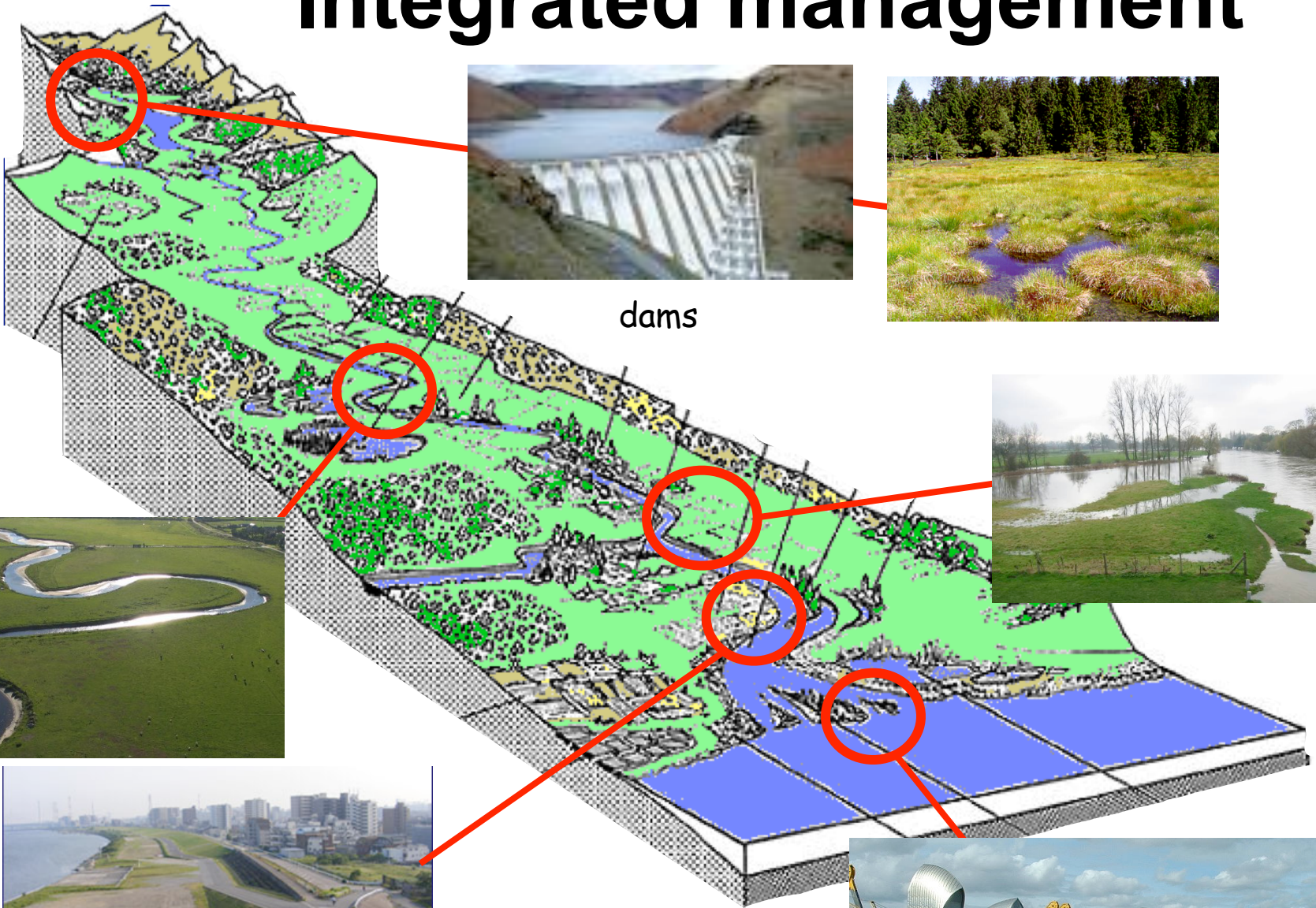


dams



embankments

Integrated management



dams



embankments



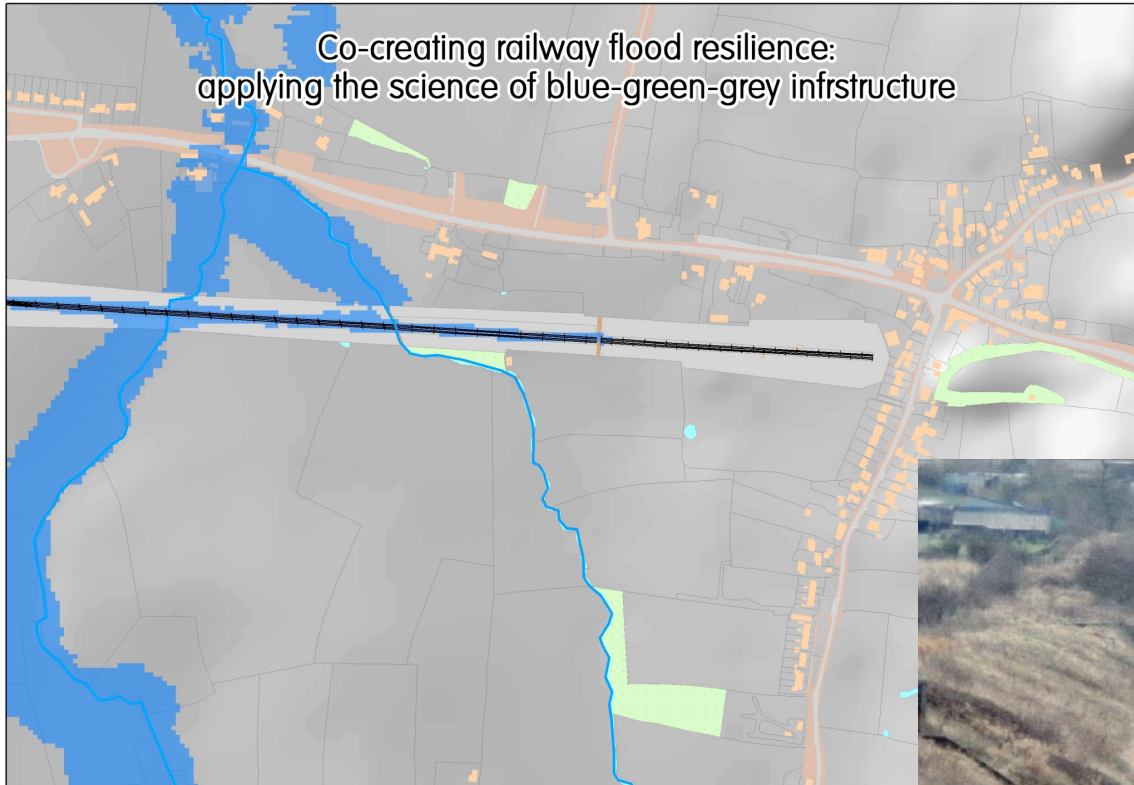
barrages

Who is doing it?



Upstream Thinking is South West Water's flagship programme of environmental improvements aimed at improving water quality in river catchments in order to reduce water treatment costs.





Chipping Sodbury Tunnel



University of the
West of England



Some key messages

- We can't stop floods, work with them, not against them
- Natural processes can be augmented
- Individual schemes may have small benefit, need a landscape approach
- Look for multiple benefits
- Science is not perfect, need better knowledge & “adaptive management”
- Business opportunities



Thanks for listening



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