



United Nations  
Educational, Scientific  
and Cultural Organization



## Climate Change: adapting naturally

**North Devon's  
Biosphere Reserve**  
world class by nature



# Format of presentation

- The Biosphere Reserve
- Climate and North Devon
- Research on the changes
- Adaptation methods



# The World's Great Places

# What the Biosphere Reserve is about?

- Sustainable development
  - Supporting sustainable economies
- System Scale approaches
- Education and Research
- Being recognised as a world leader as well as being one of the world's great places.
- **WORLD CLASS BY NATURE**



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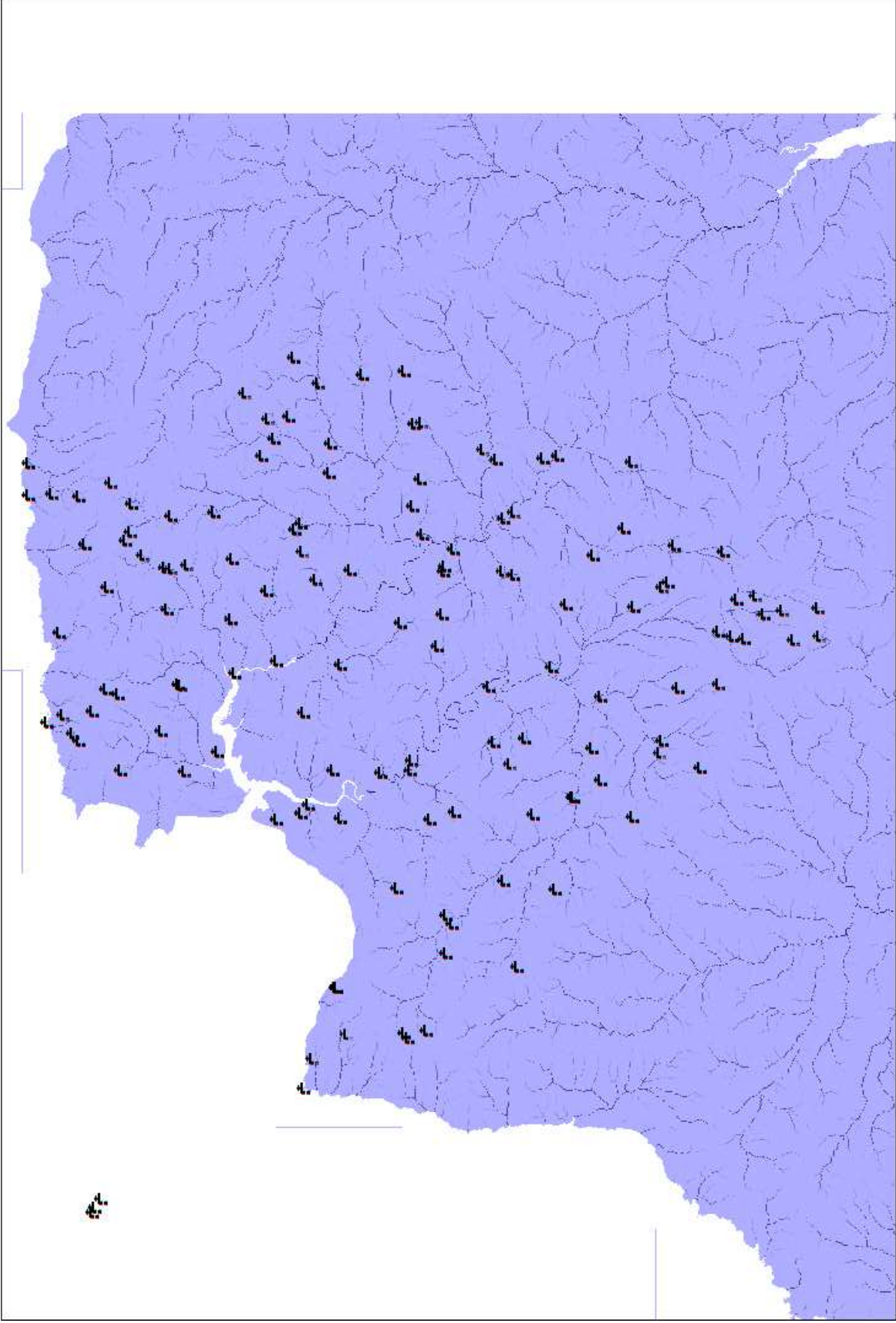
**NORTH DEVON**  
 Areas of Outstanding  
 Natural Beauty



world class by nature

WORTH BY ON  
Areas of Outstanding  
Natural Beauty

We are all talking about the weather.... How many rain gauges are there?

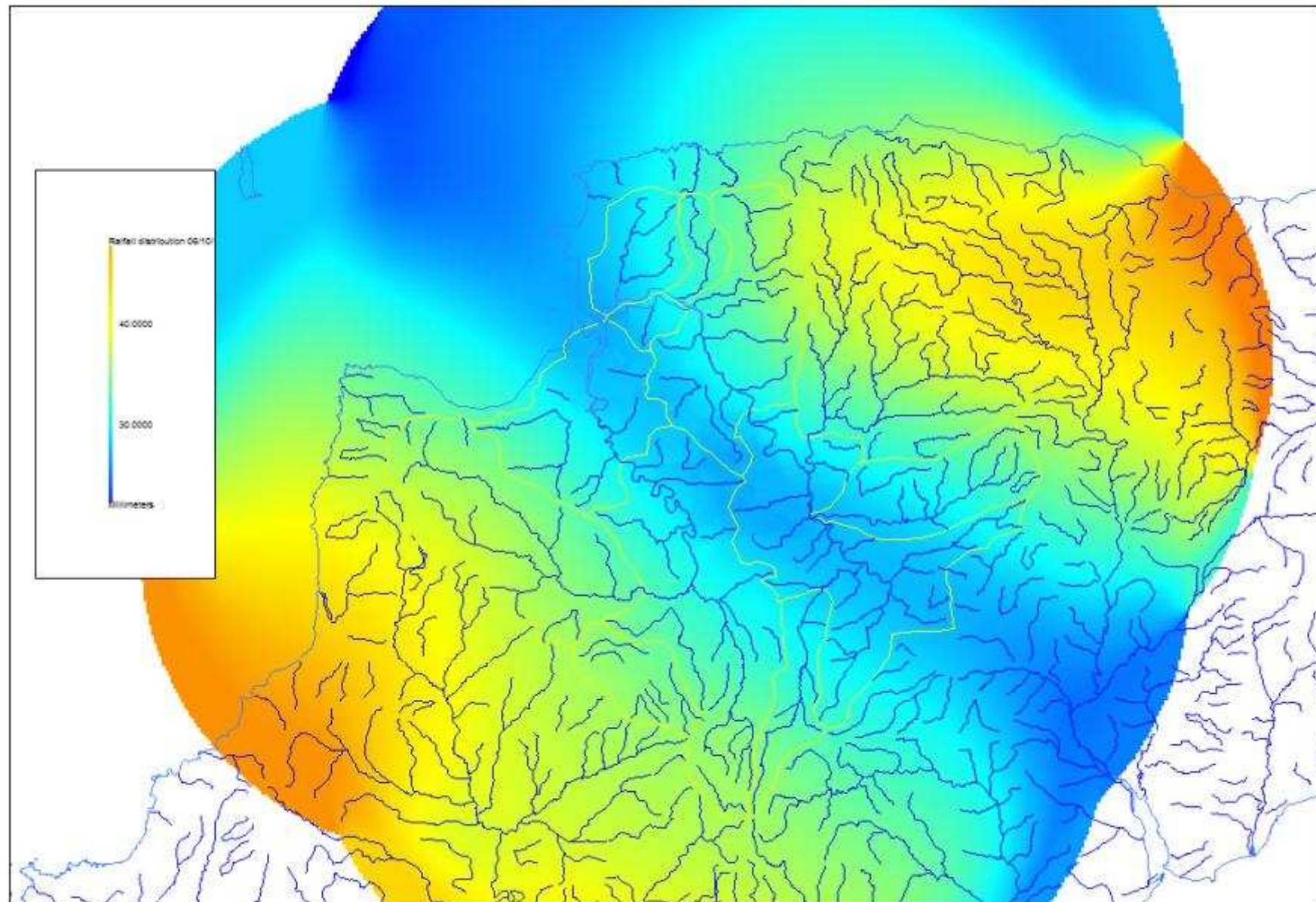


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# Rainfall distribution Oct 5<sup>th</sup> 1992





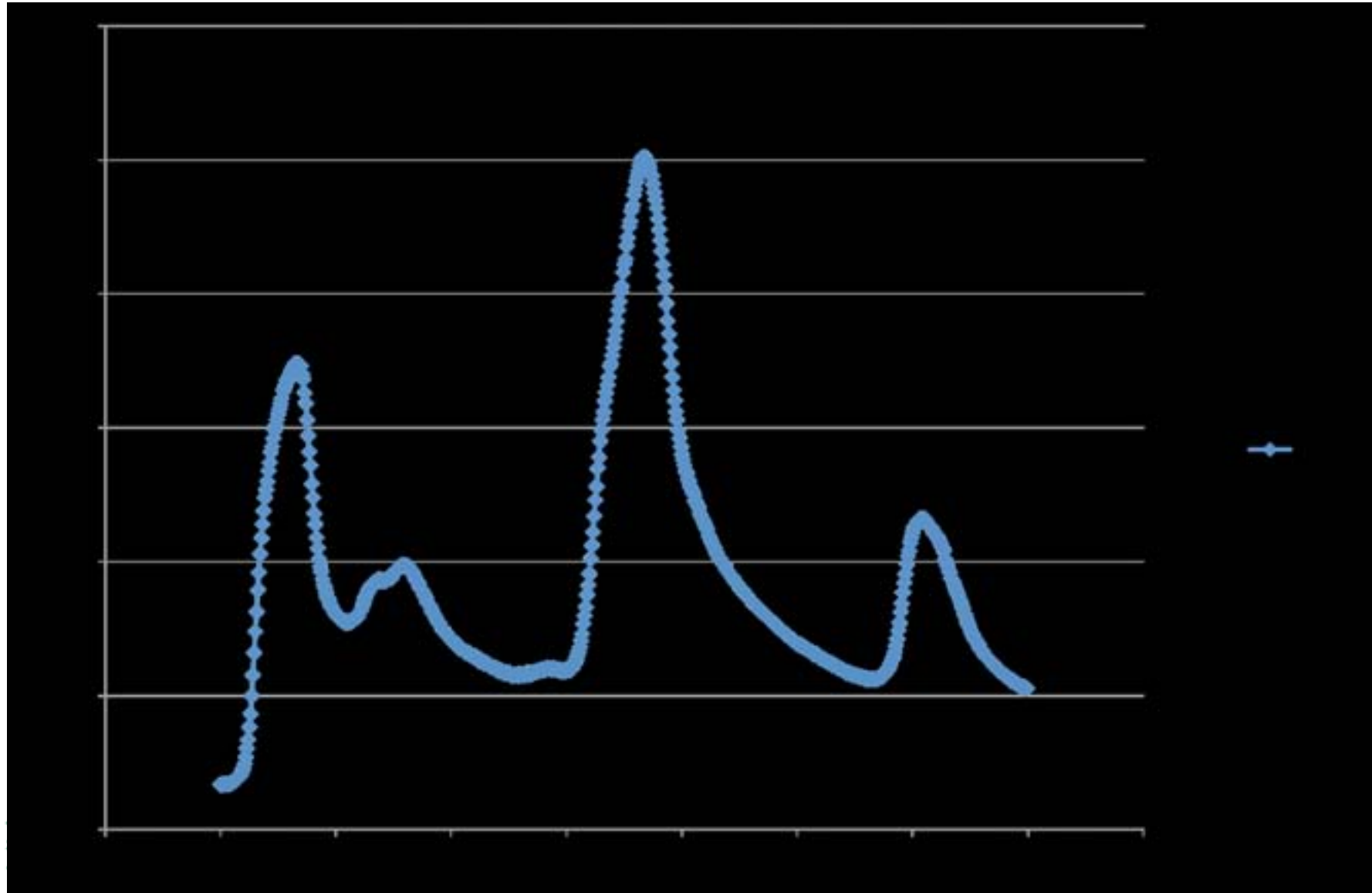


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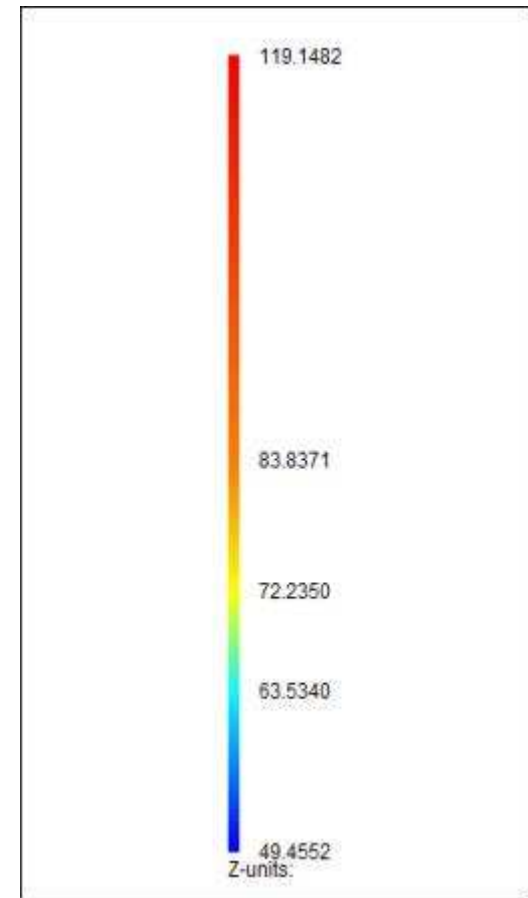
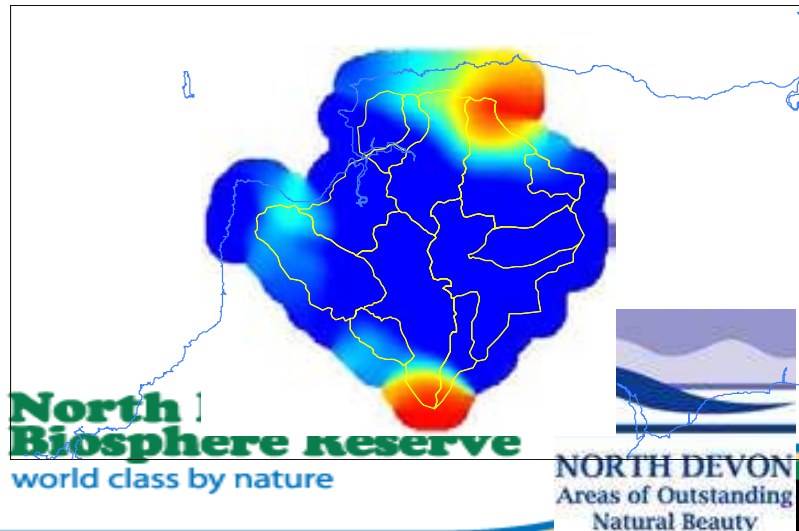
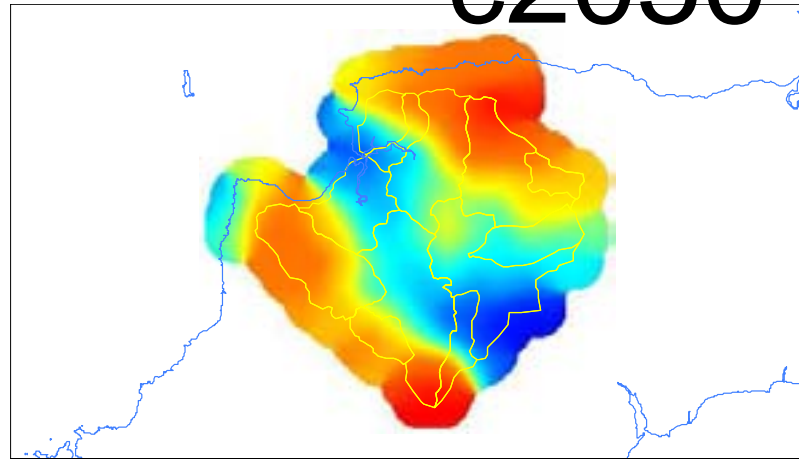
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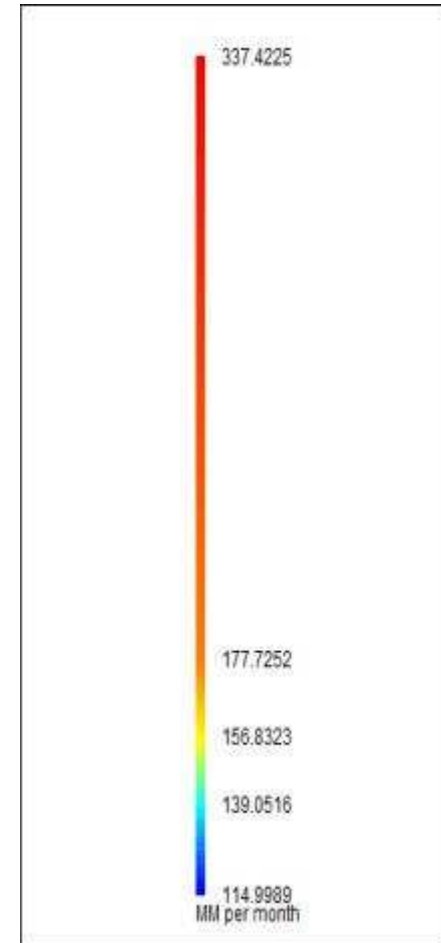
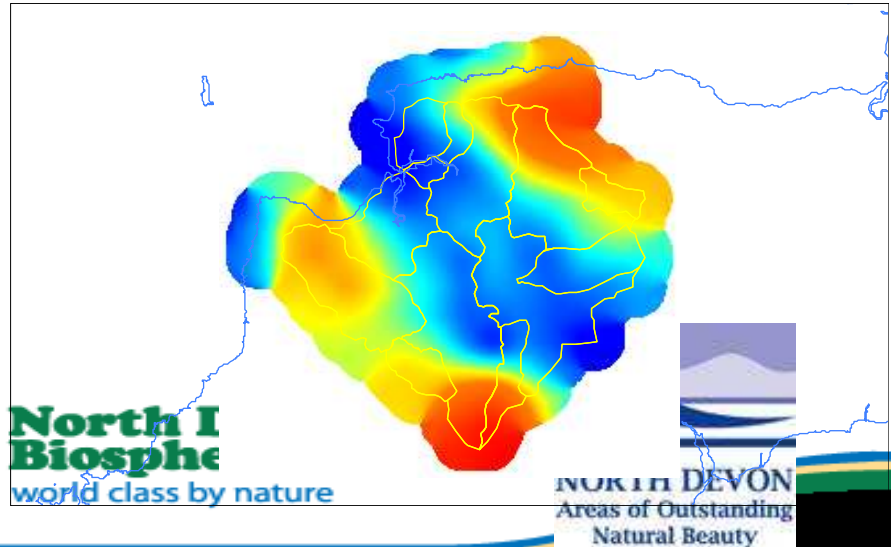
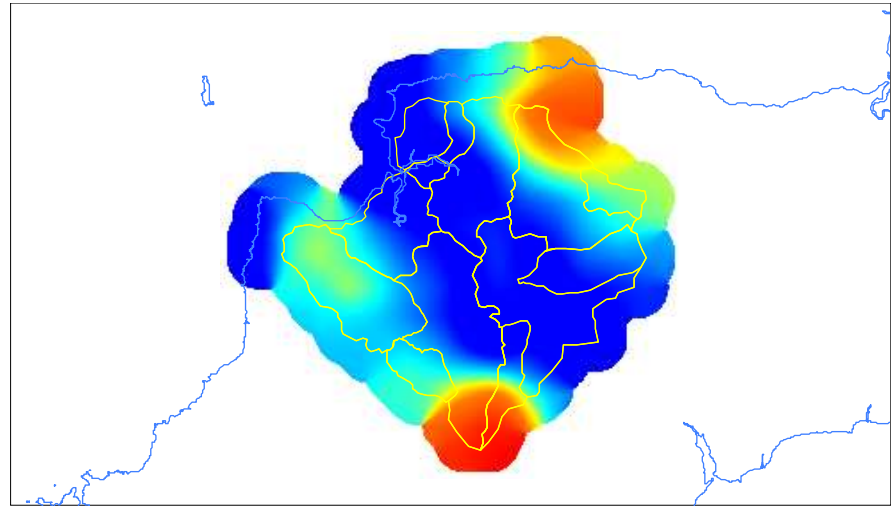
# Hydrograph of Taw at Umberleigh



# Summer rainfall present and c2050 (UKCP09)

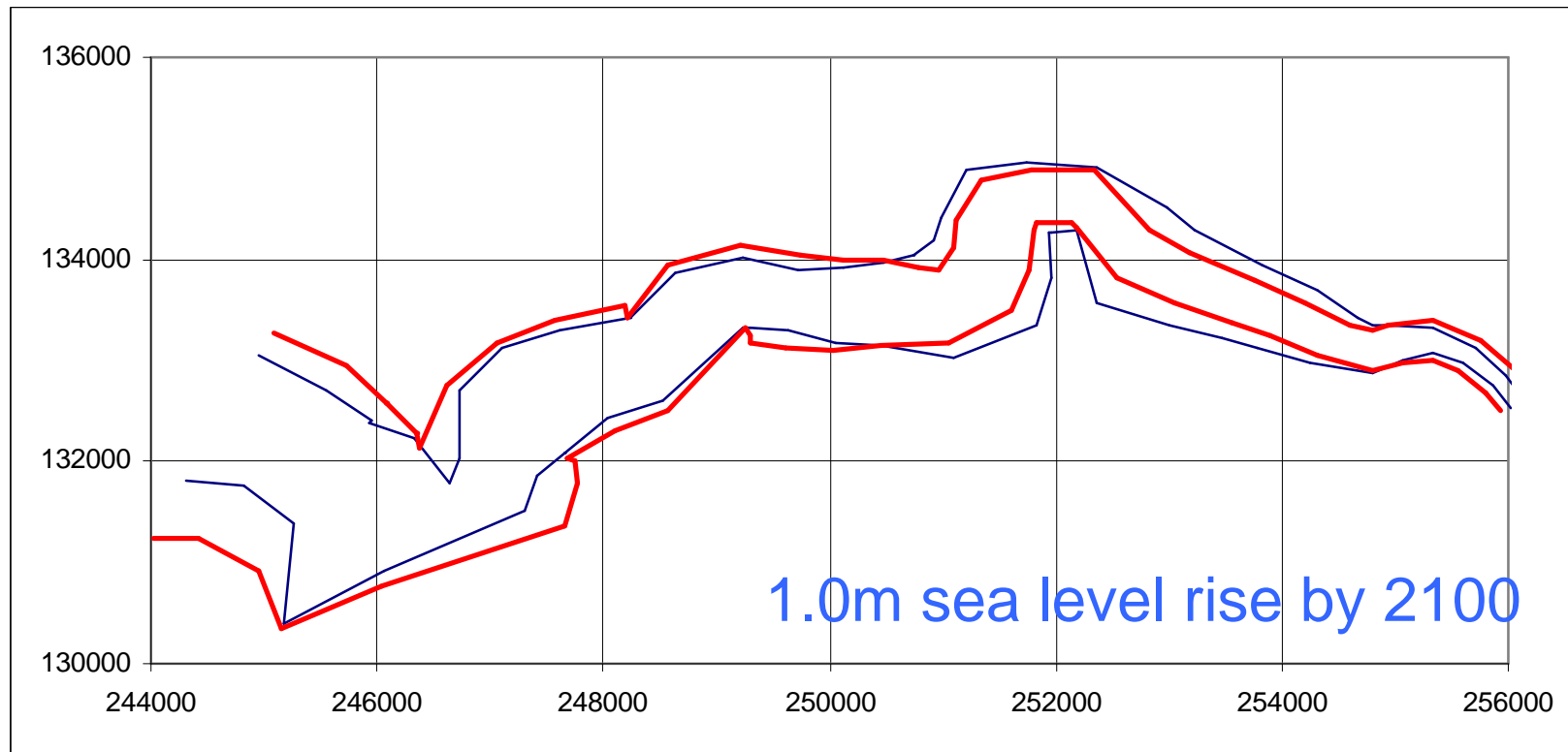


# Winter rain present and c2050 (UKCP09)

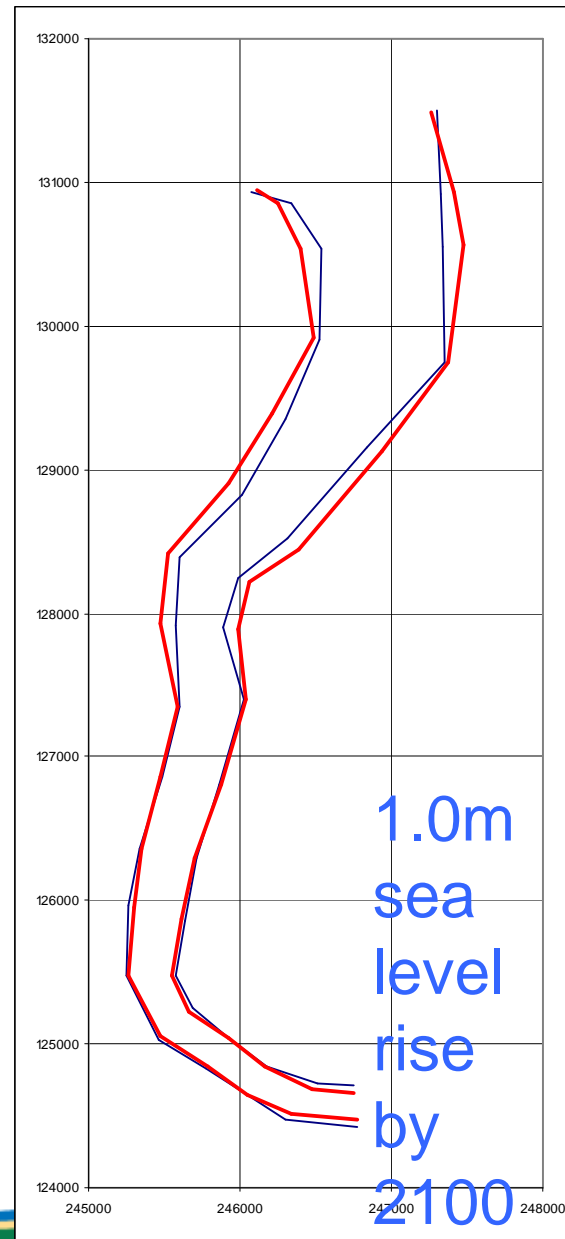




# Sea level rise: Taw



# Sea level rise : Torr ridge



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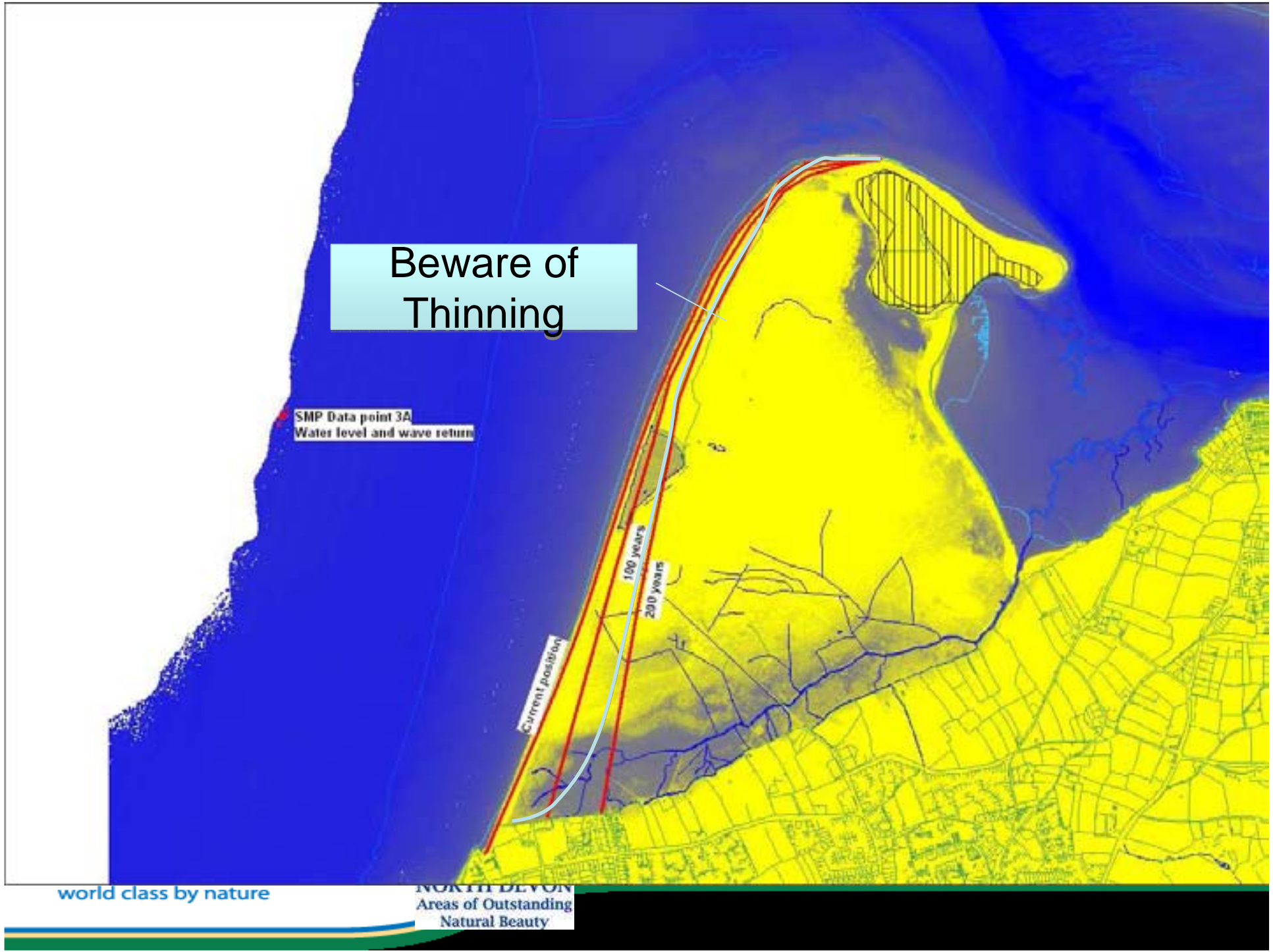
Beware of Thinning

SMP Data point 3A  
Water level and wave return

Current position

100 years

200 years



# DEVELOPING THE INTEGRATED “NATURAL” SOLUTION



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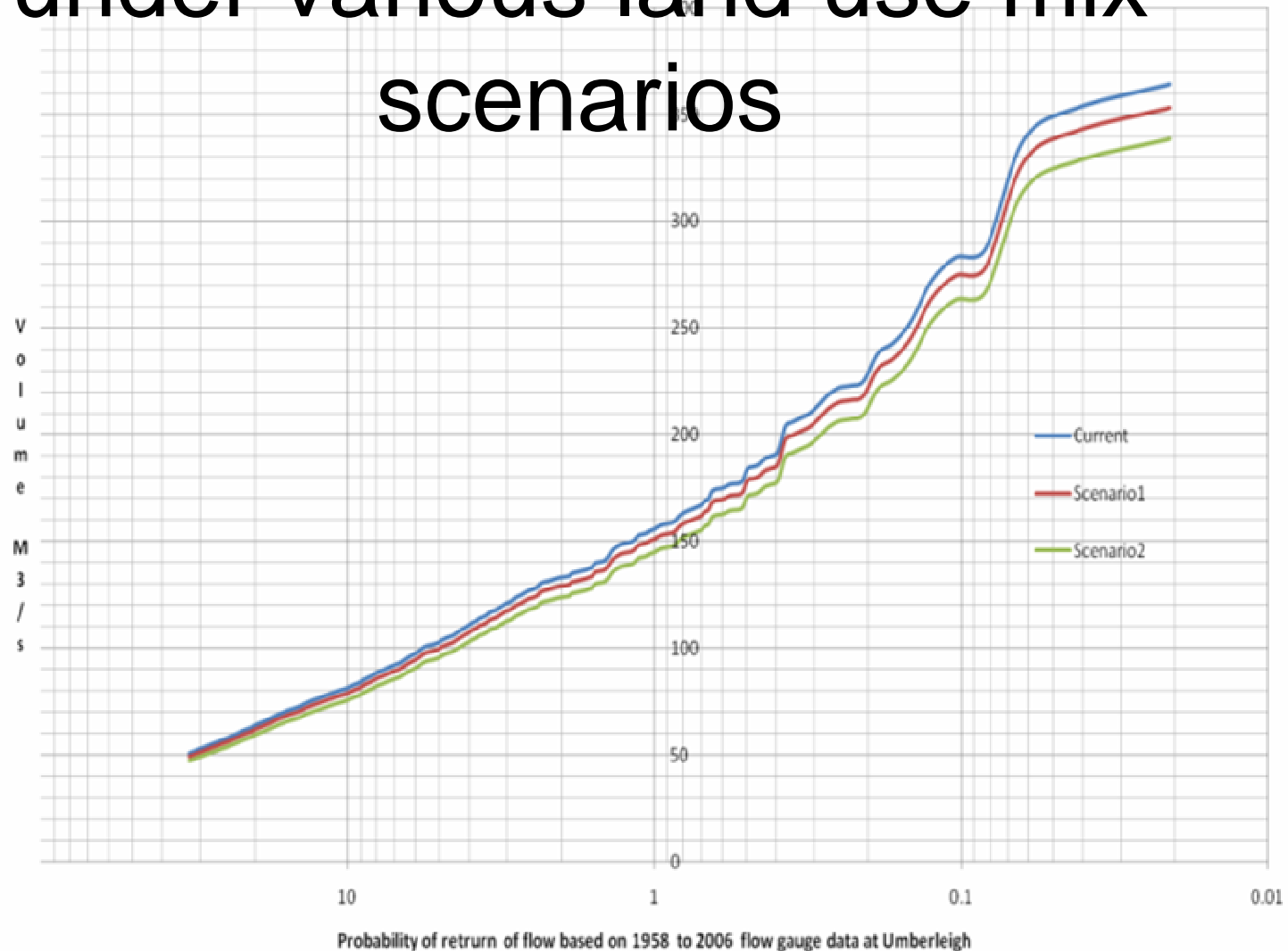
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# The What:

## Change the land-use mix

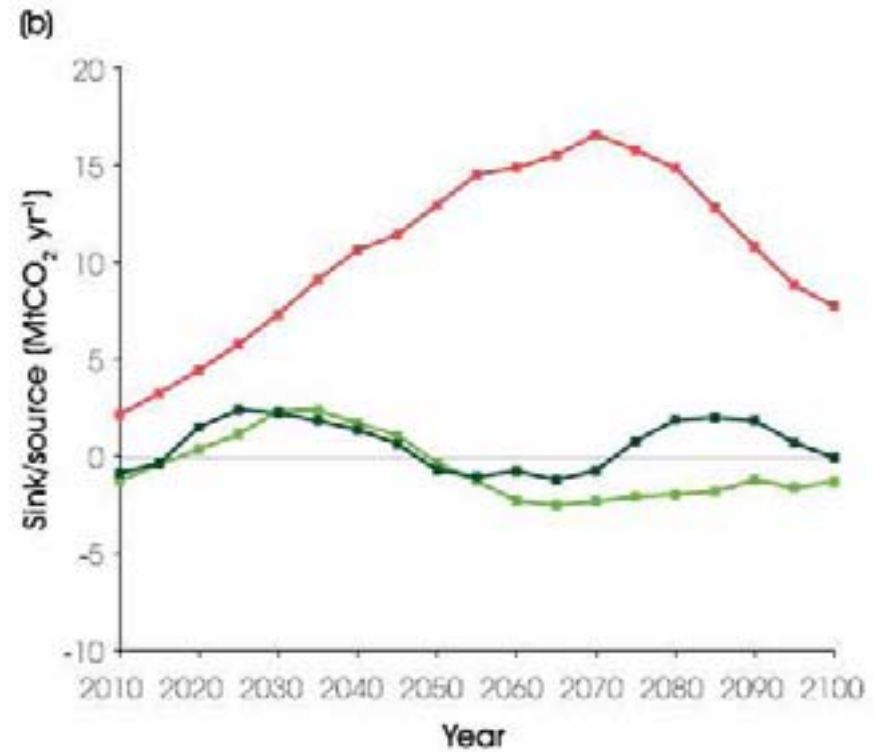
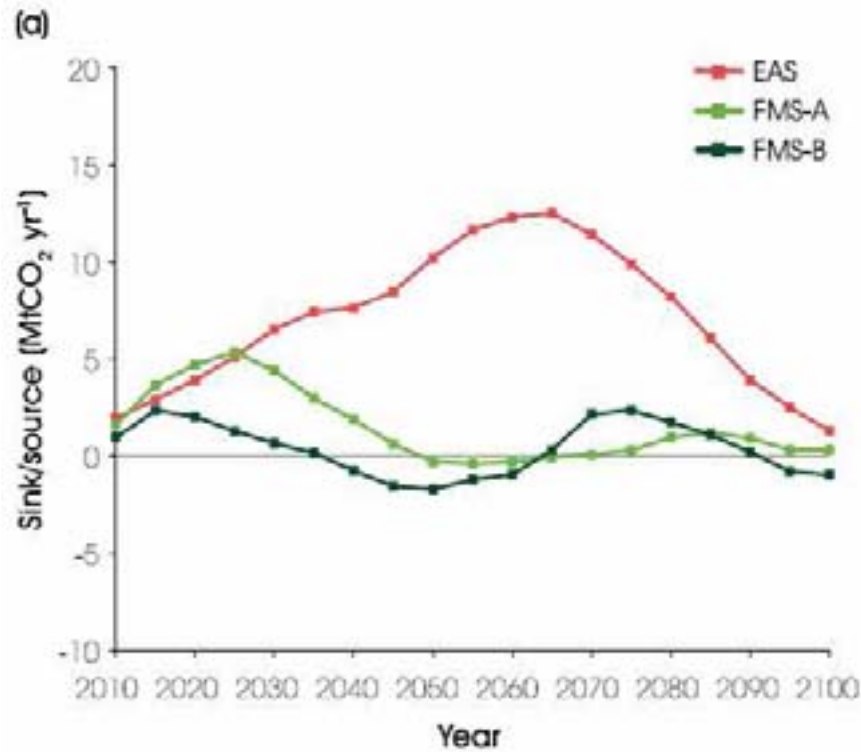
- Woodland Cover
- Temporary Grassland
- Permanent Grassland
- Arable

# Probability of flows at Umberleigh under various land use mix scenarios



# Why woodland creation for carbon?

(a) The uptake/release of CO<sub>2</sub> by trees, litter and soils only. (b) The total abatement potential, i.e. as (a) but including carbon stored in harvested products, in product substitution, and saved as a result of fossil fuel substitution under the different scenarios.

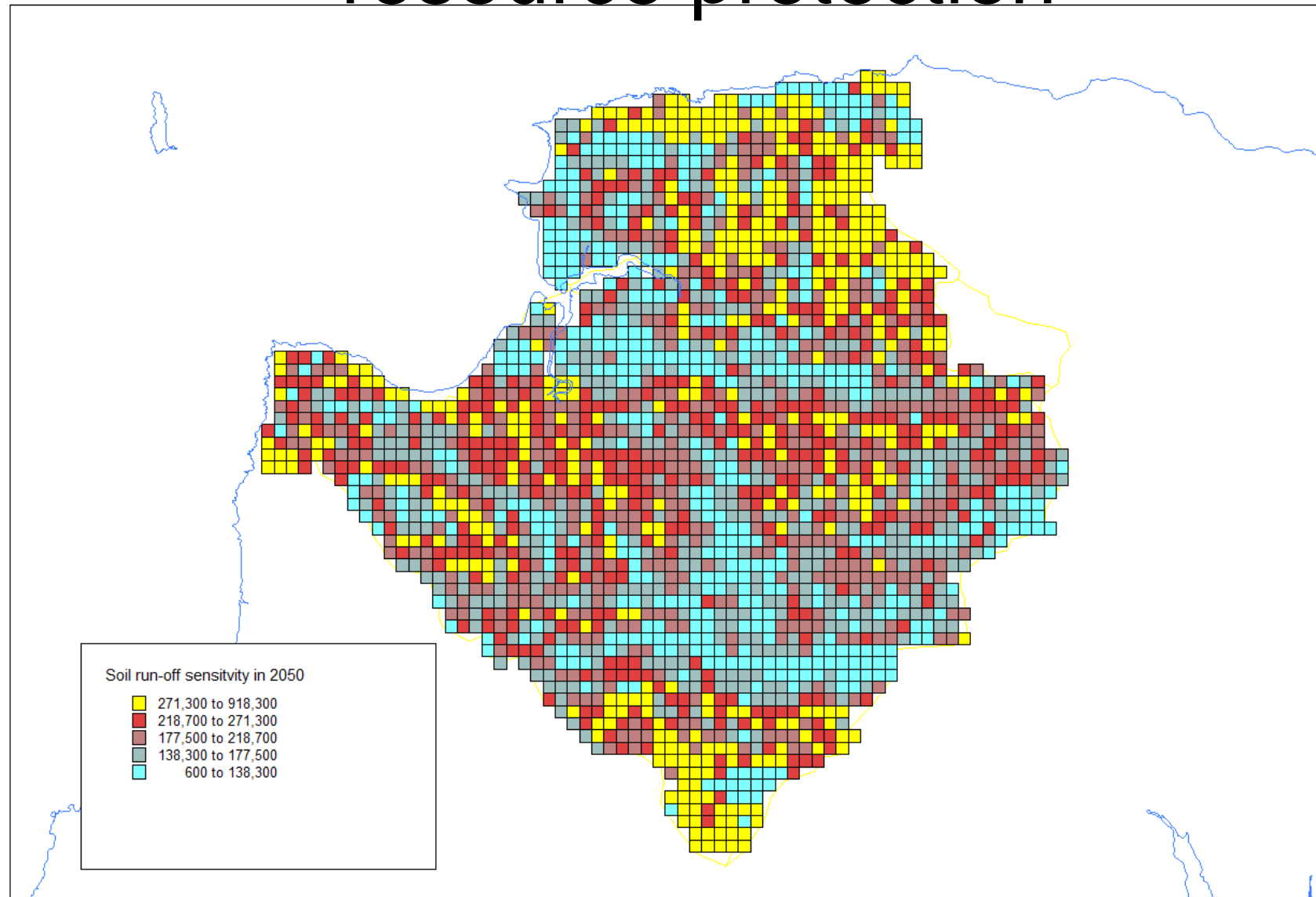


- EAS = Enhanced afforestation
- FMS-A = Manage for max retained carbon
- FMS-B = Manage for max timber

# Woodland carbon

- 'Storage' costs of less than £100/t CO<sub>2</sub> = cost effective
- New native broadleaved: £41/t CO<sub>2</sub>
- Multipurpose forestry: £0 to £26/t CO<sub>2</sub>
- High production forestry: £<0 as timber value can exceed establishment costs
- 
- PLUS other co benefits

# The Where: Example of soil resource protection



# Climate mitigation can be calculated (CLIO, 2006)

Comparison of Biofuels, Biomass and Land-Use Change Options. Range of carbon benefit based on 100 hectares.

	Fossil Fuels used to process	Renewables used to process	Additional sequestration in soil	Additional sequestration in woody biomass
	tCeq/a saved	tCeq/a saved	tC/a	tC/a
Oilseed rape (Biodiesel)	37.9	61.1	x	x
Wheat (Bioethanol)	72.3	107.1	x	x
Sugar beet (Bioethanol)	154.3	525.3	x	x
	tCeq/a saved			
Miscanthus to substitute grid electricity	449.3		x	x
coal	928.9			
<b>Short Rotation</b>				
Coppice			x	x
Chips for grid electricity	129.6			
Chips for coal	263.7			
Pellets for grid electricity	104.3			
Pellets for coal	234.2			
Arable to Permanent Grass	25 - 33		70	x
Arable to Woodland	25 - 33		70	180

# Some Examples

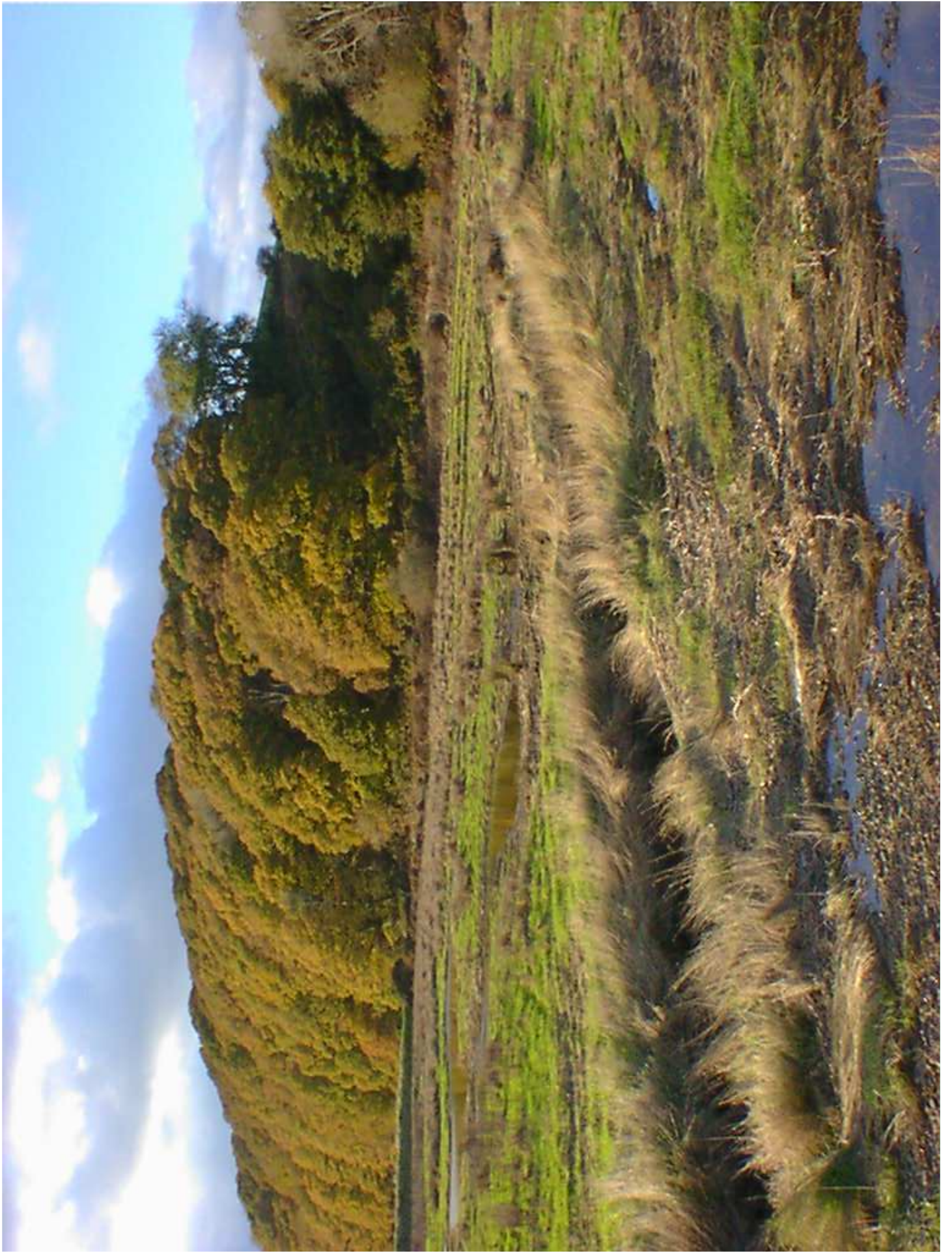


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# Funding options

- Agri Environment Funds
- Carbon Credits
- Biodiversity Credits
- Private contributions

# Working with businesses

- Implementation of projects needs resources.
- Visitor gifting can be one mechanism
- Businesses need support to be green and climate friendly



 investing in nature  
North Devon's Biosphere

  
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# Summary

- Adaptation using natural systems is effective (cost and performance)
  - Multiple benefits
  - Adaptation is not going to be enough
- Methods of financing the changes needs to come from a variety of sectors

# Vauban, Freiburg, Germany



- ‘Solar City’ with longstanding culture of promoting sustainability
- Strong leadership from city
- Uses CHP and solar power
- Car free – creating home zones and play spaces
- Design commissioned by cooperatives made up of small number of families
- Small scale development built by small contractors



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# Ecos Trust, Somerset



- Great Bow Yard, Stride Treglown Architects 2006/7 **CSH 3**
- and Stawell 2010 **CSH 5**



- Ecos Trust a charitable organisation with a clear mission to develop sustainable design and technology
- Readily shares learning – running visits and seminars



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# Houndwood Housing, Street Somerset



- Landowner Clarks with Crest Nicholson 2009/10
- Feilden Clegg Bradley and Grant Associates
- Eco Homes Excellent – equivalent of **CSH 4**
- Mendip District Council proactively use Building for Life standards
- BfL 19/20



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# Welsh Future Homes, Ebbw Vale



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- Blaenau Gwent Council, BRE Wales and United Welsh Housing Association 2010
- Larch House, **CSH 6 (£1650/m<sup>2</sup>)**  
Bere Architects
- Eight welsh joiners trained to manufacture passive house standard windows.
  
- Ty Unnos, **CSH 5 (1500/m<sup>2</sup>)**  
Design Research Unit Wales
- Uses Sitka Spruce, Sycamore Slate, Oak, Corus Urban standing seam roof, Warmcel and Rockwool  
  
(£1200/m<sup>2</sup> typical for social housing)