

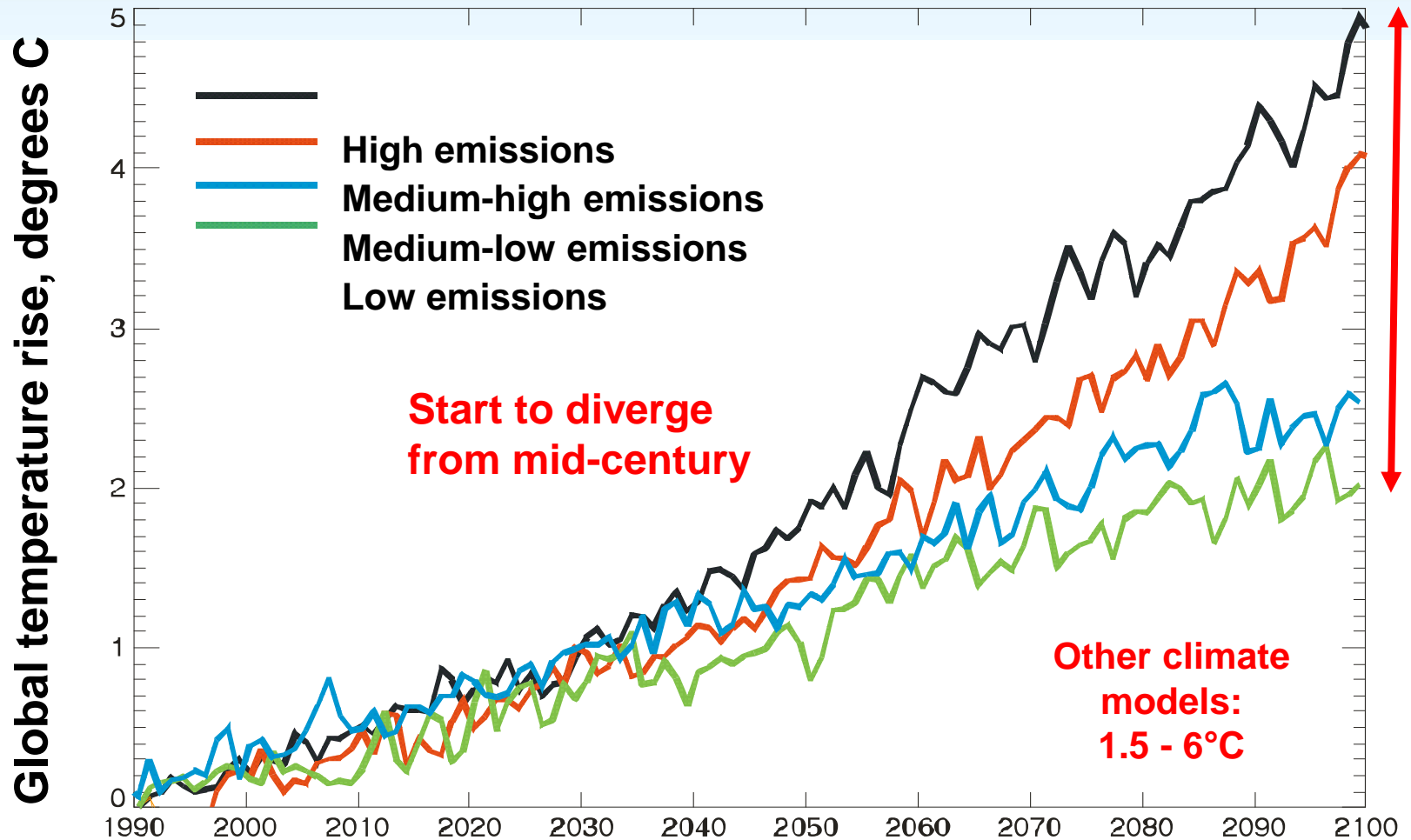
Climate change and forest fires in the UK – possible impacts

Karl Kitchen (Met Office)
and
Andy Moffat, Matthew Wilkinson,
Sebastien Lafont (Forest Research)

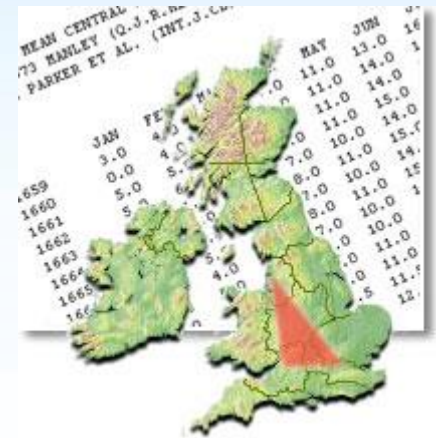
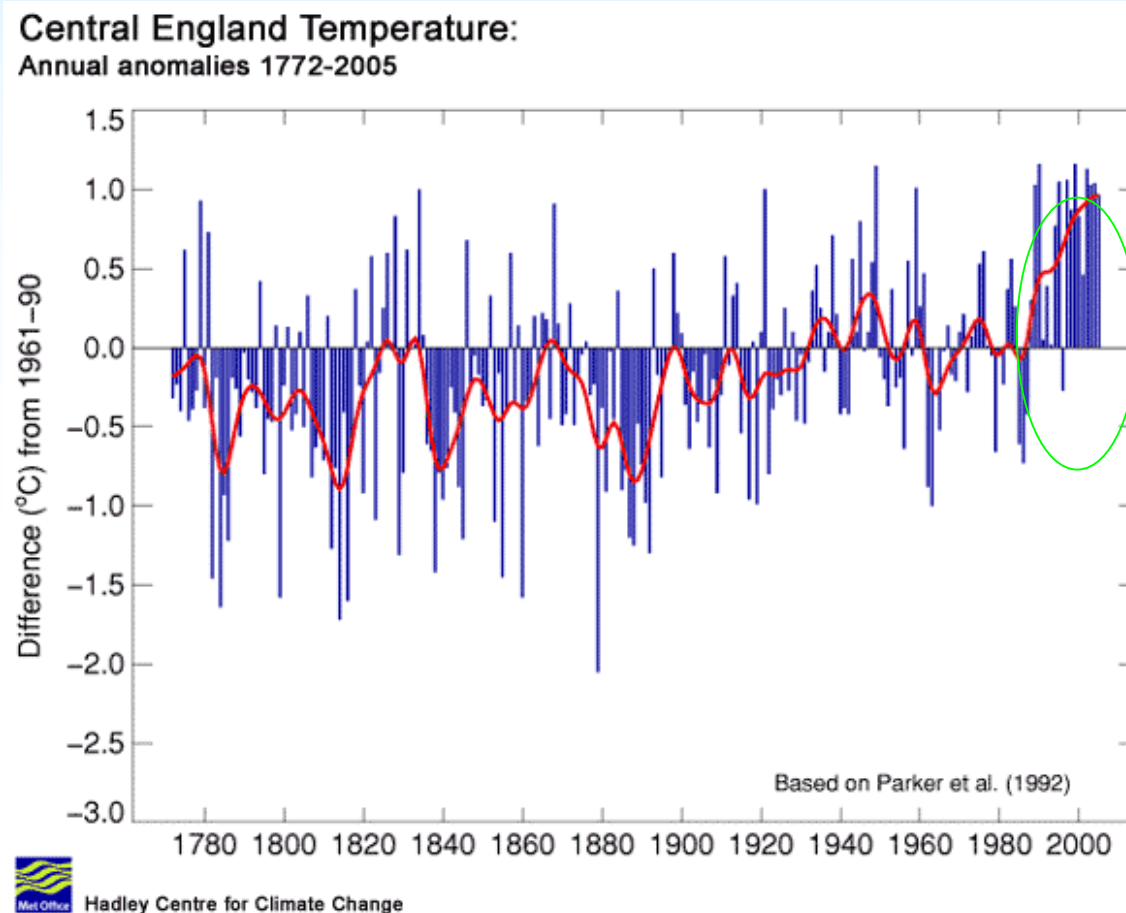
Introduction

- Climate Change - science and scenarios
- Effects on forests and forestry
- Effects of forestry policy (forward looking)
- Conclusions
- Further research

Global temperature rise



Central England temperature (anomaly °C)



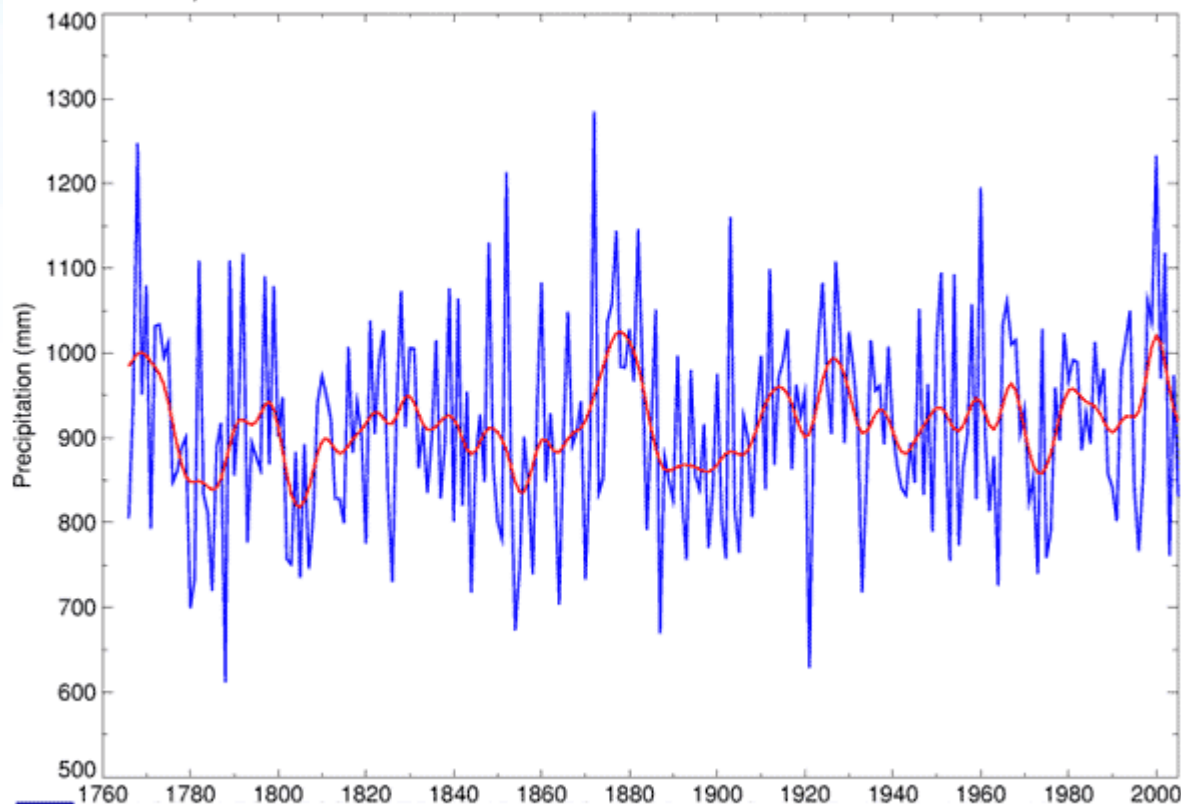
- Individual years
- Decadal filter

CET = longest available instrumental record of temperature in the world

2006 = warmest on record

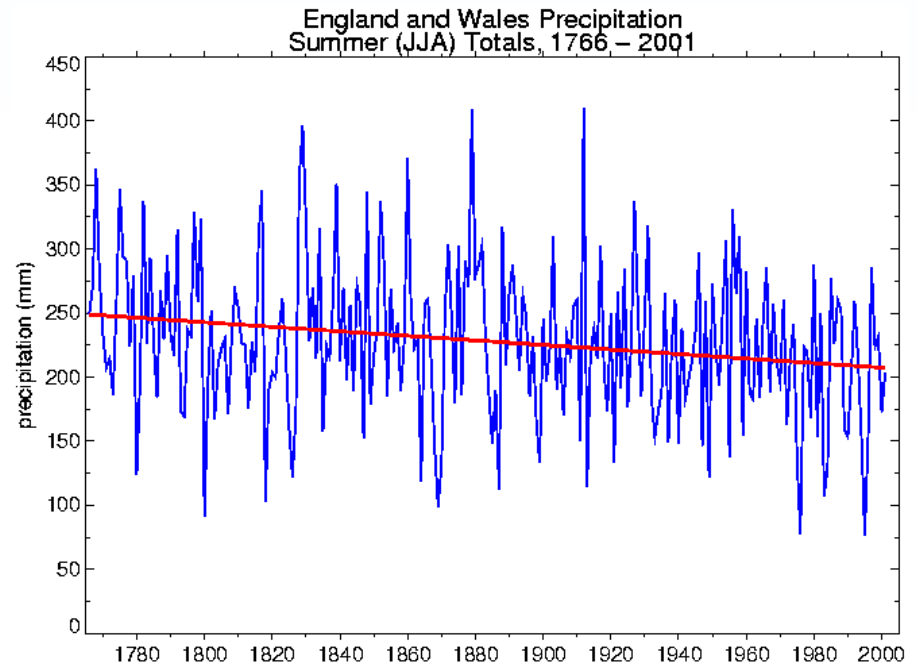
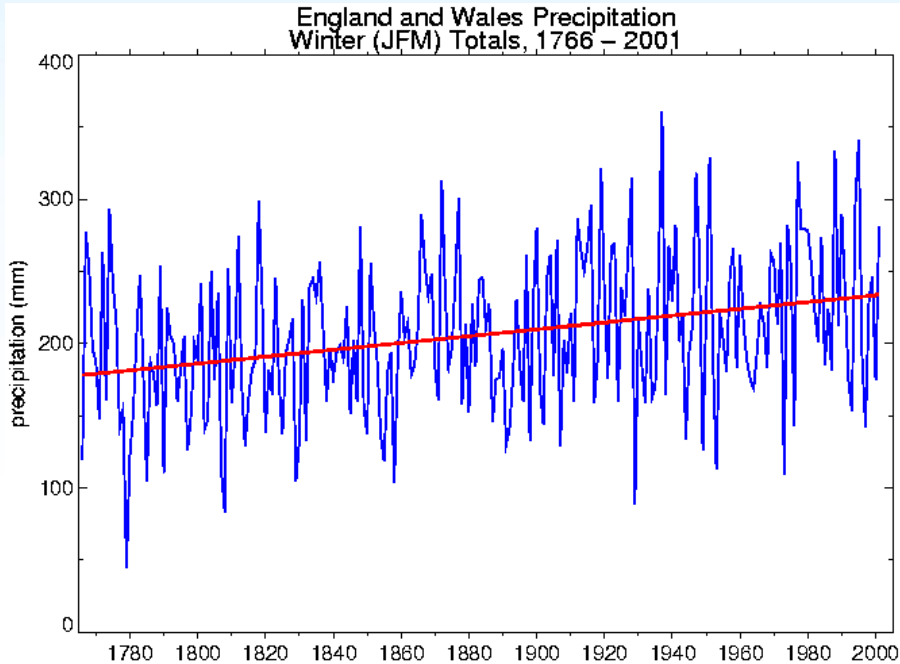
England and Wales precipitation (mm)

England and Wales Precipitation:
Annual totals, 1766-2005



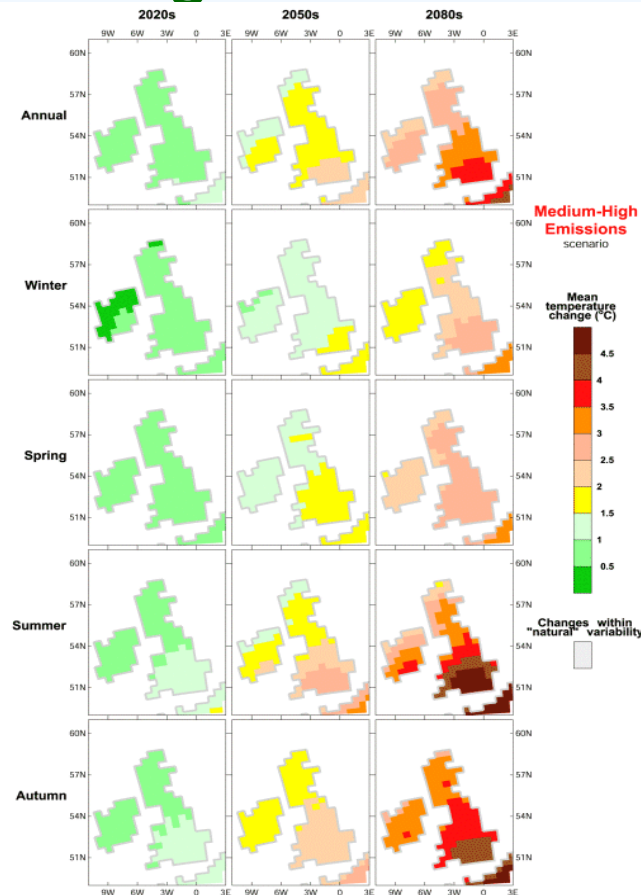
Hadley Centre for Climate Change

England and Wales seasonal rainfall



- Opposing seasonal trends
- High inter-annual variability

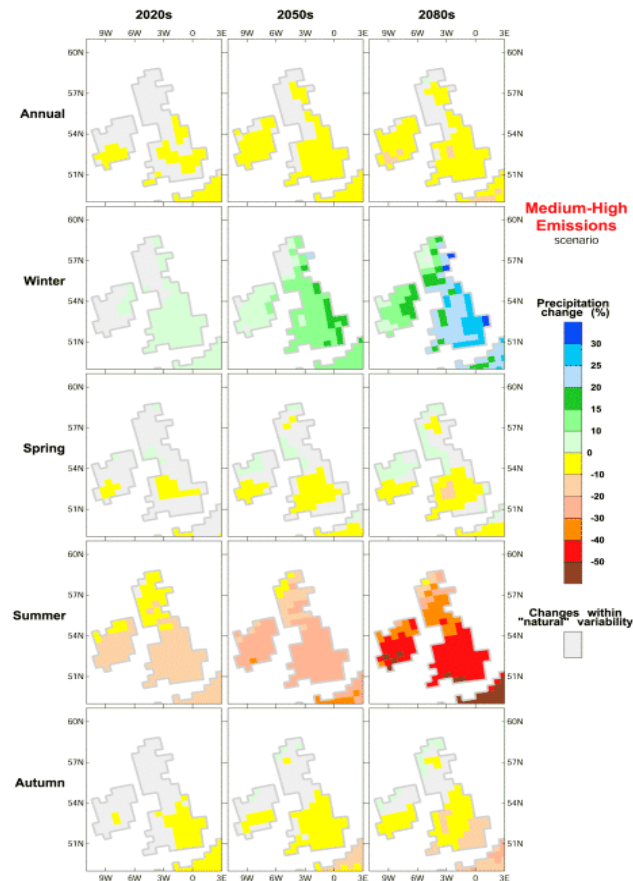
Change in UK temperature by the 2080s (seasonal mean) Medium – High emissions scenario



Source: UKCIP02 Climate Change Scenarios (funded by DEFRA, produced by Tyndall and Hadley Centres for UKCIP)

UKCIP02

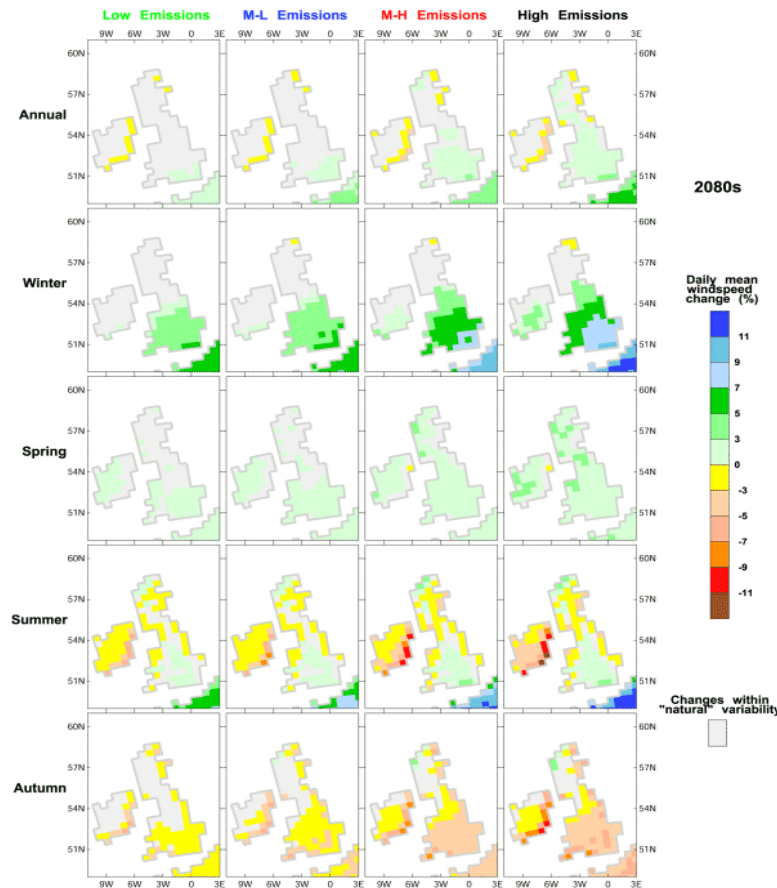
Change in UK precipitation by the 2080s (seasonal mean) Medium – High emissions scenario



Source: UKCIP02 Climate Change Scenarios (funded by DEFRA, produced by Tyndall and Hadley Centres for UKCIP)

UKCIP02

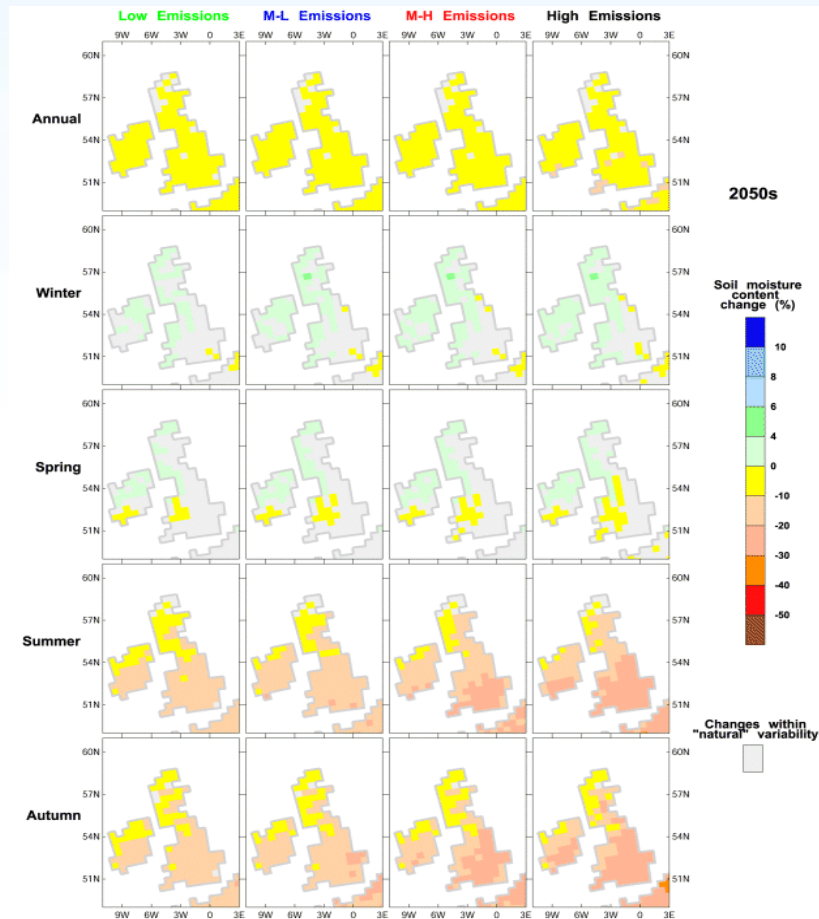
Change in UK Wind Speed by the 2080s (seasonal mean) Medium – High emissions scenario



Source: UKCIP02 Climate Change Scenarios (funded by DEFRA, produced by Tyndall and Hadley Centres for UKCIP)

UKCIP02

Change in UK Soil Moisture by the 2050s (seasonal mean) Medium – High emissions scenario

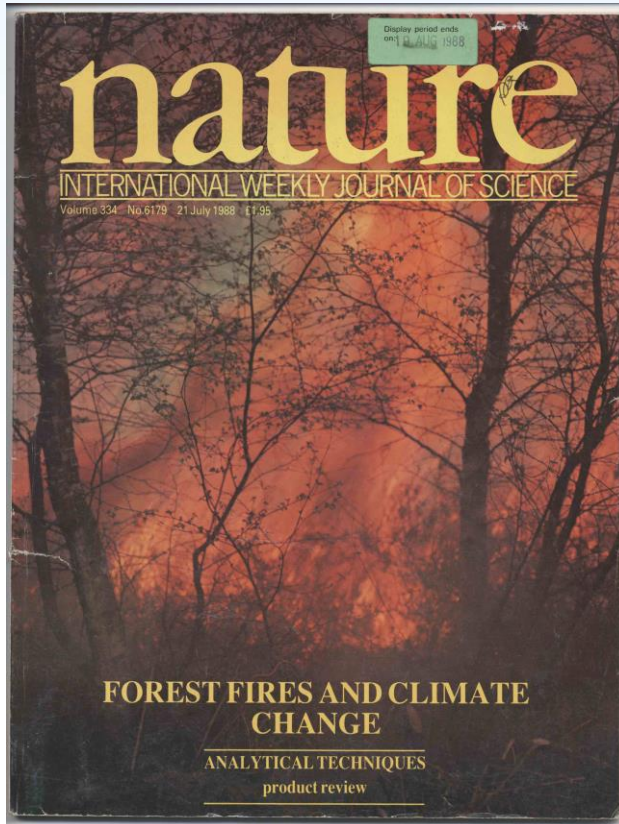


Source: UKCIP02 Climate Change Scenarios (funded by DEFRA, produced by Tyndall and Hadley Centres for UKCIP)

UKCIP02

Possible forest responses and implications for forest fires

A new area of concern?

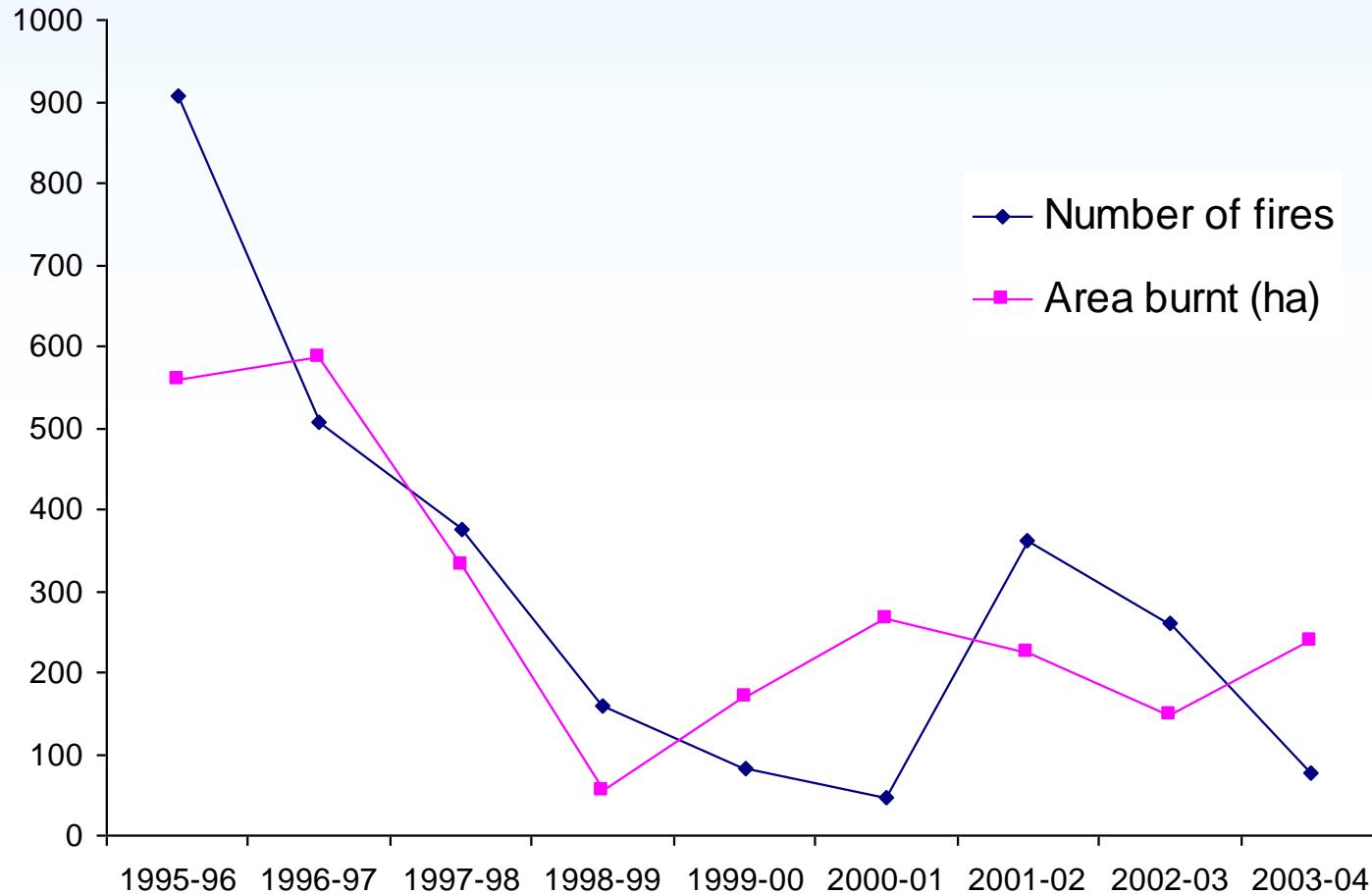


James S. Clark Nature Vol 334 (1998)

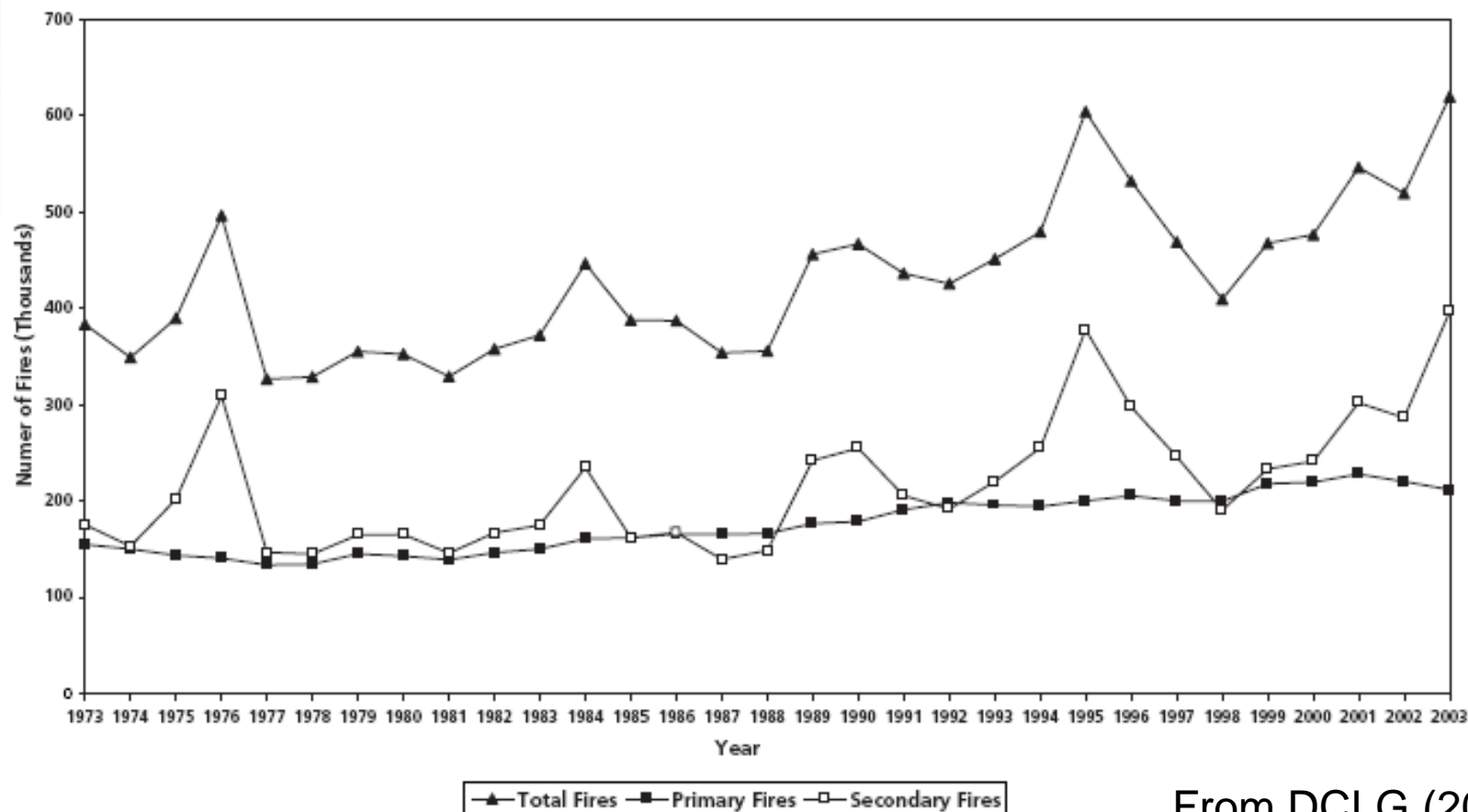
- used charcoal records to study fire regimes over the past 750 years
- maximum abundance and frequency occurred in the warm, dry fifteenth and sixteenth centuries.
- fire importance decreased dramatically with the onset of the “little ice age” about AD1600

Forest fires

(from Forestry Statistics (2004))



Number of fires in the UK, 1973-2003




From DCLG (2006)

index - Mozilla Firefox

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http://www.fire-tan.org.uk/Fire_Safety/index.html




South Wales Fire Service --- Education 'Web Site'


Menu




Outdoors
**Caravan and camping
Barbeque safety
Forest and grass fires
Firework safety



Home safety




Escape



Fire investigation

*** Comig Soon*




Grass and forest fires

Grass and Forest Fires

Grass and Forest fires are the greatest single drain on the resources of South Wales Fire Service.

In the year 2000/2001 South Wales Fire Service attended 3551 grass and forest fires.



In the year 2001/2002 South Wales Fire Service attended 5239 grass and forest fires. An increase of 32% on the previous year. These figures represent the 3rd highest of all UK Fire Services. 98% of these fires are deliberate. Grass and Forest fires cost the taxpayer £5.7million in South Wales.


Page 1 of 3
Next

NERC - More fires, droughts and floods predicted - Microsoft Internet Explorer

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Address http://www.nerc.ac.uk/press/releases/2006/fires.asp Go Links



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More fires, droughts and floods predicted

14 August 2006



As temperatures rise with global warming, an increased risk of forest fires, droughts and flooding is predicted for the next 200 years by climate scientists from the University of Bristol, UK.

Despite the commitment we have already to global warming, even if we stopped emitting greenhouse gases now the researchers predict that Eurasia, eastern China, Canada, Central America, and Amazonia are at risk of forest loss (up to 30% probability for a global warming of less than 2°C and increasing to more than 60% for a ...)

Related links

- » [Quantifying & Understanding the Earth System \(QUEST\)](#)

External links

- » [A climate change risk analysis for world ecosystems](#)

Press links

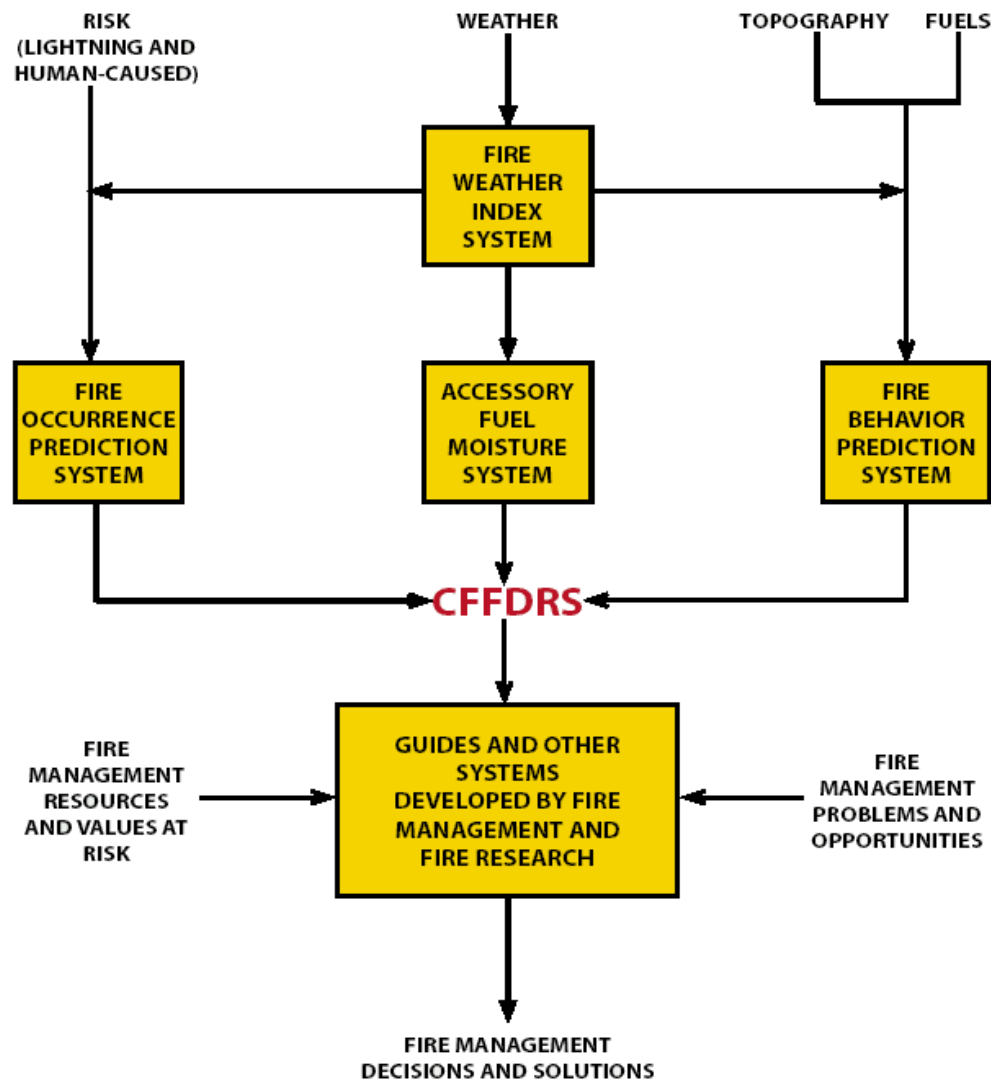
- » [Latest press release](#)
- » [All press releases](#)

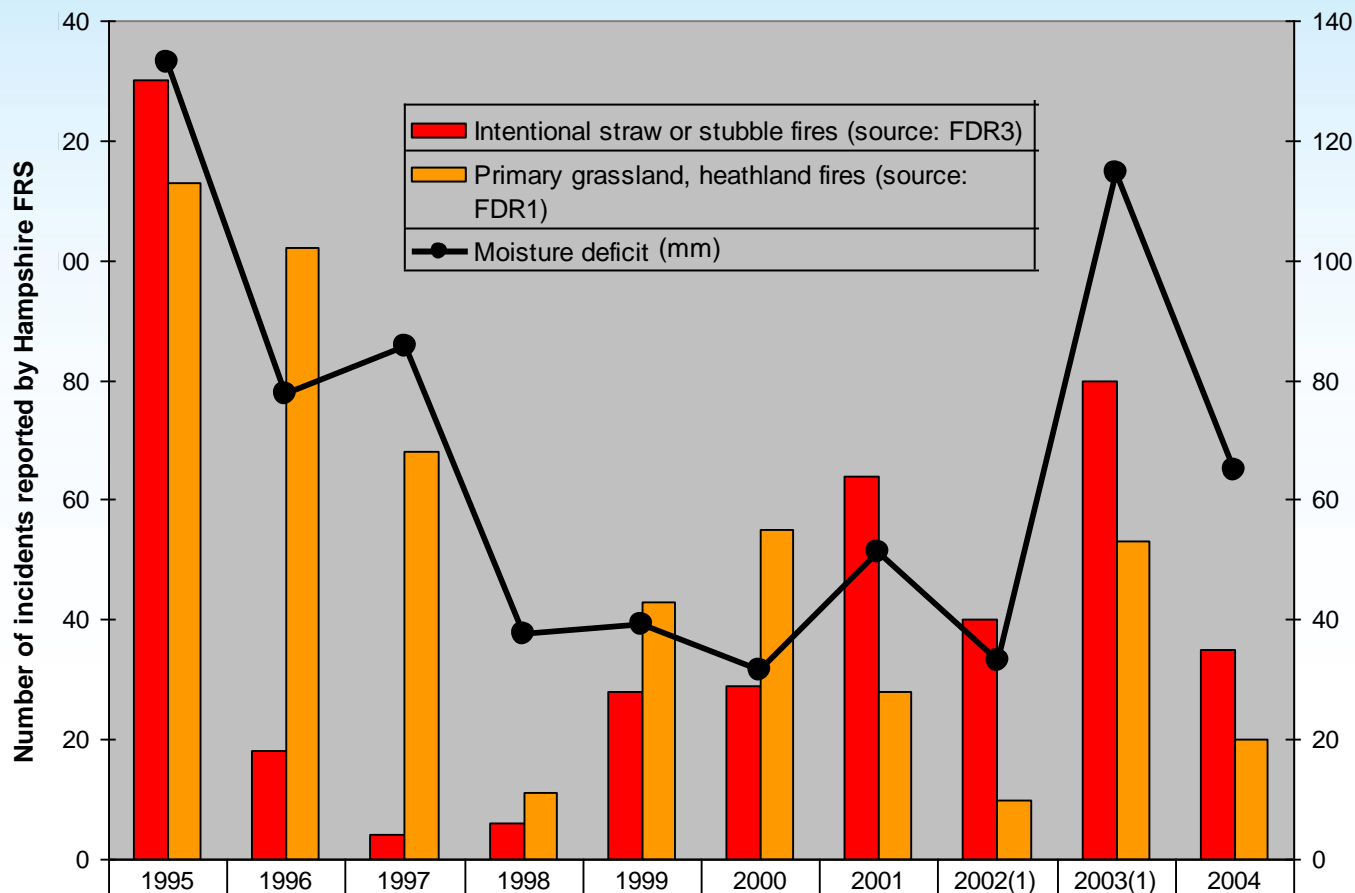
Draw AutoShapes

Slide 1 of 2 Default Design

Internet

CANADIAN FOREST FIRE DANGER RATING SYSTEM (CFFDRS)





Moisture deficit recorded at Alice Holt research station compared with straw (FDR3) and grassland/heathland (FDR1) fires reported by Hampshire FRS (from Gazzard, 2006)

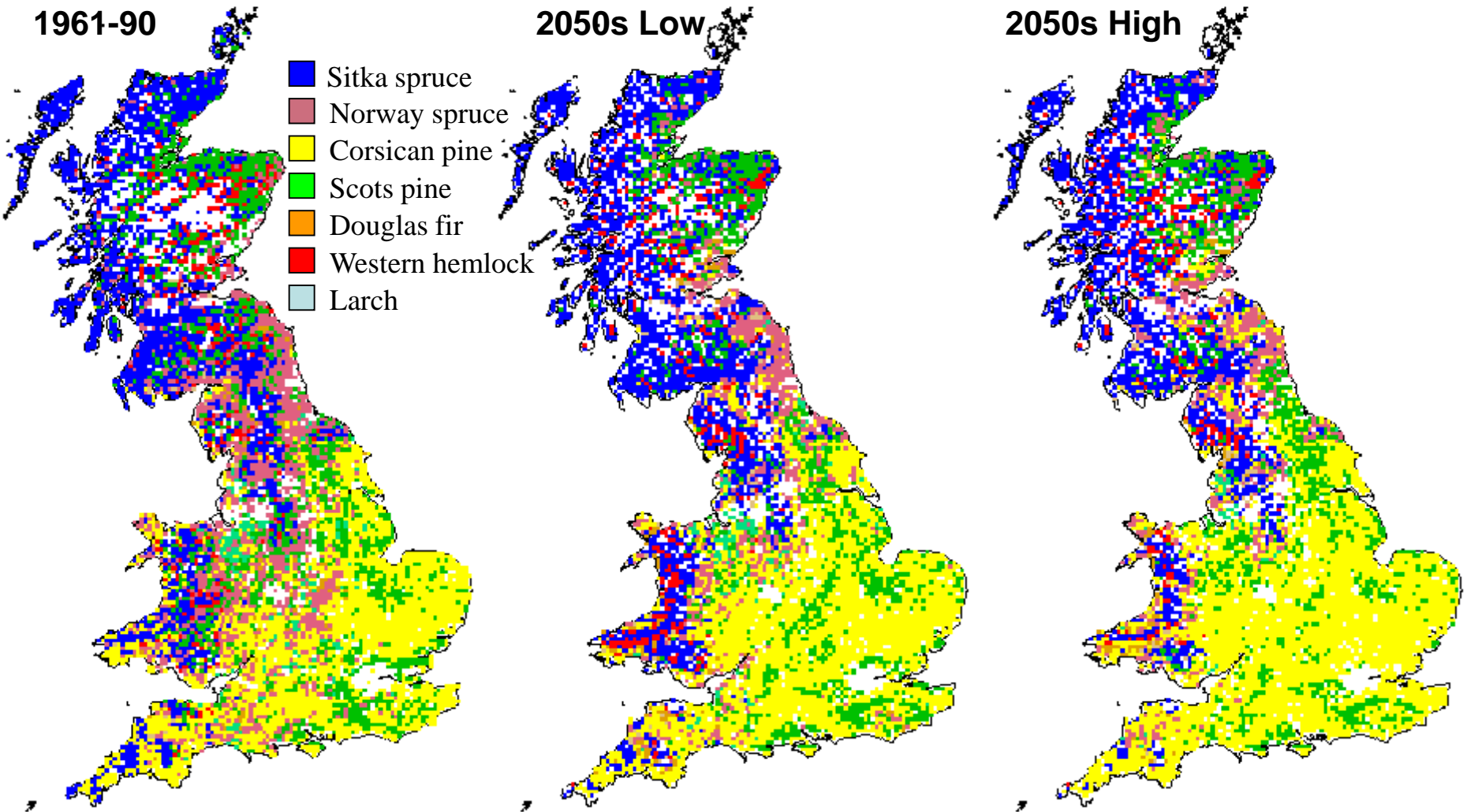
Conifer species suitability

1961-90

2050s Low

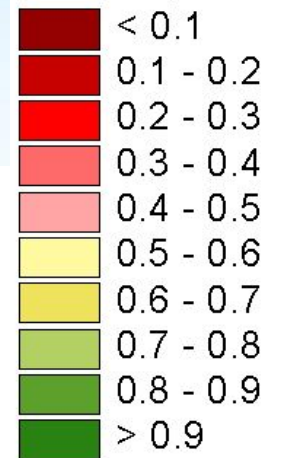
2050s High

- Sitka spruce
- Norway spruce
- Corsican pine
- Scots pine
- Douglas fir
- Western hemlock
- Larch



Beech suitability

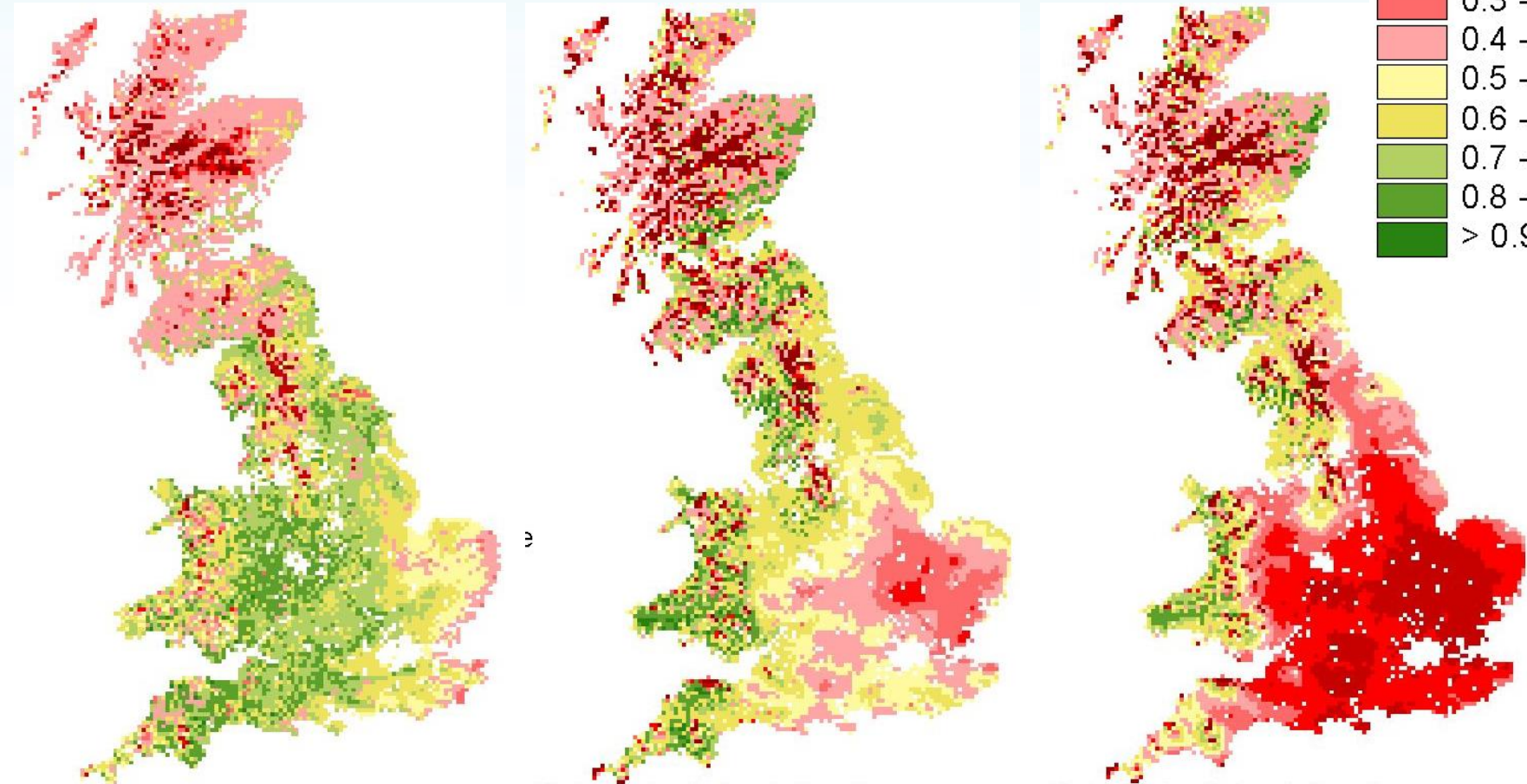
Suitability Score



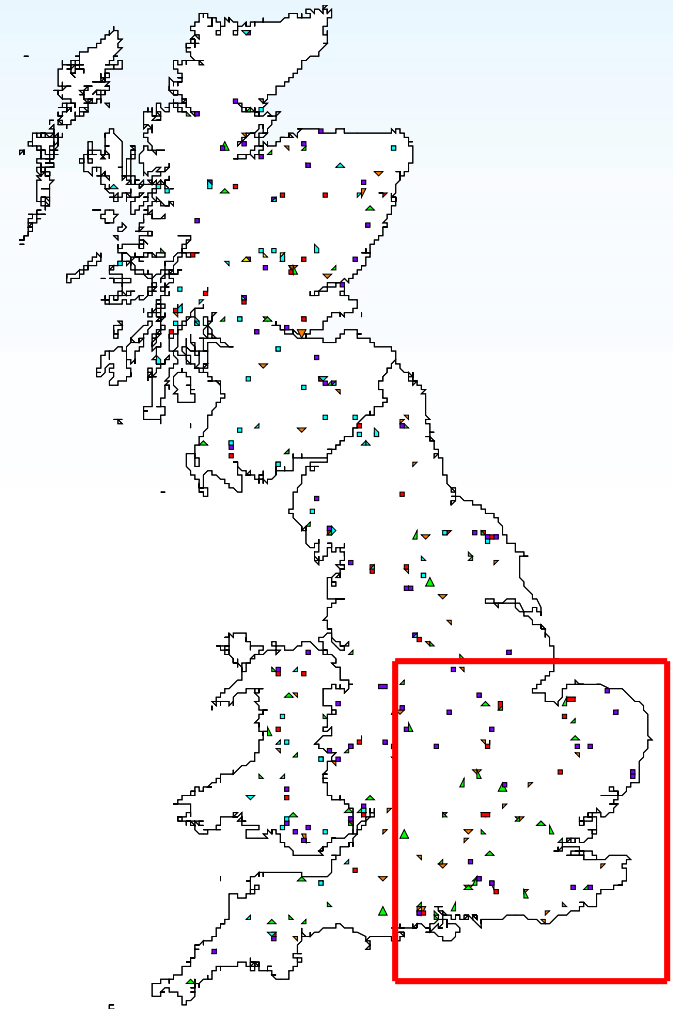
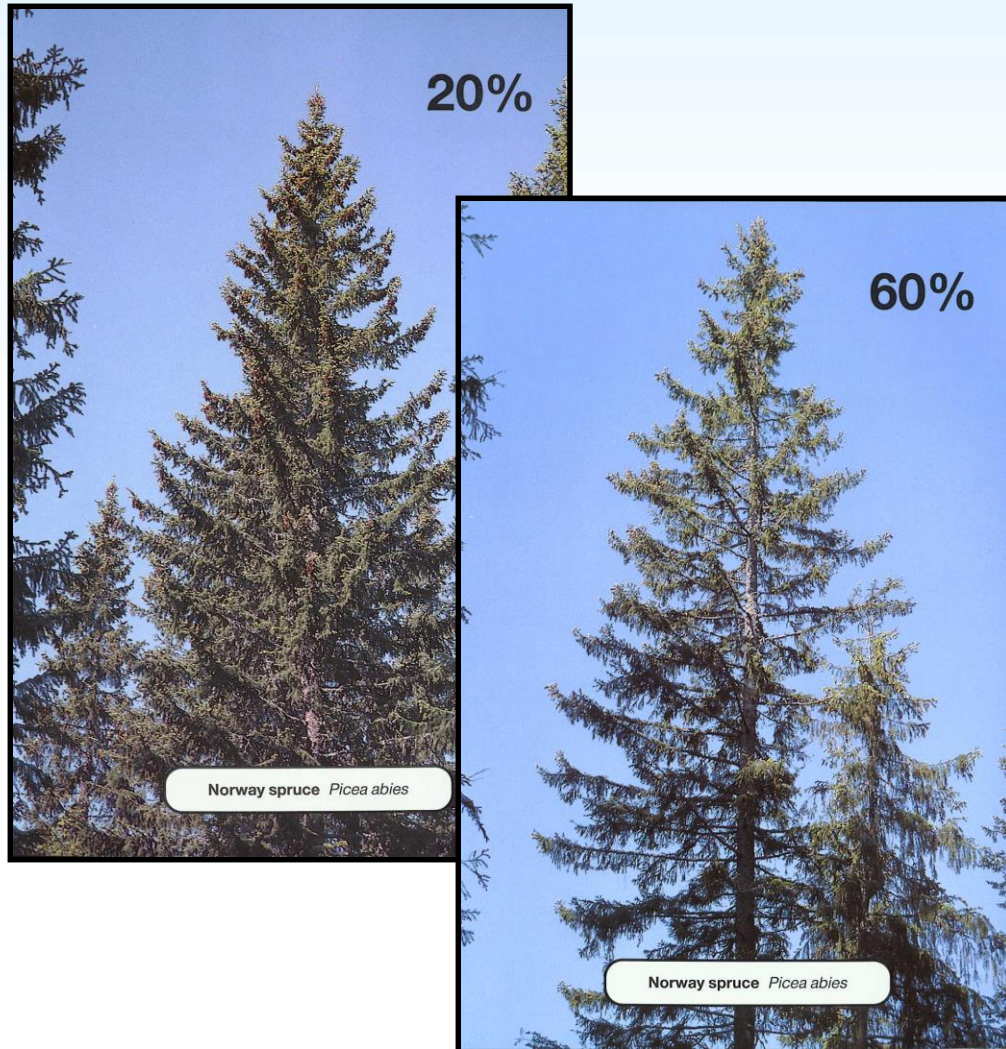
1961-90

2080s Low

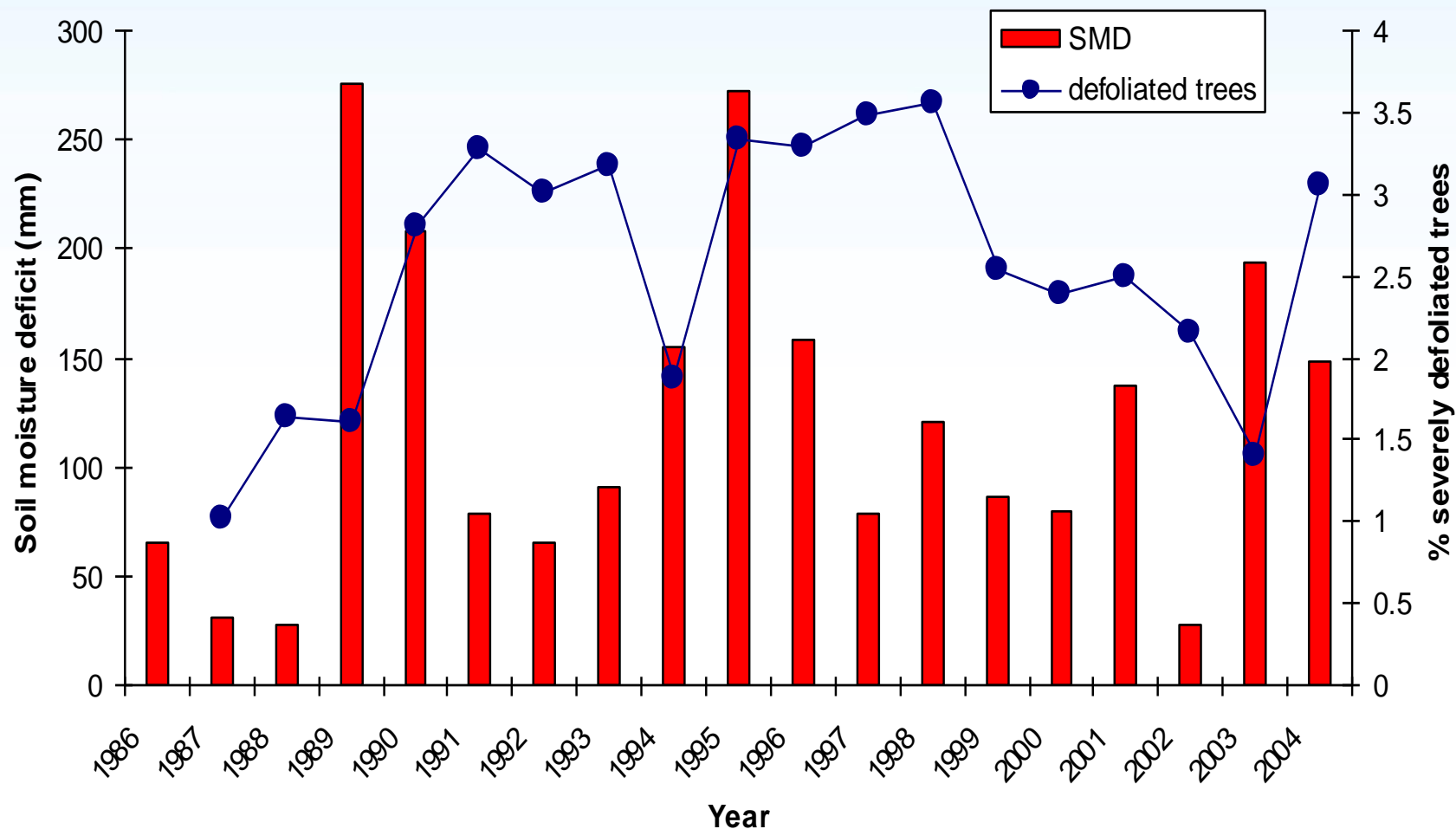
2080s High



Forest condition survey: crown defoliation assessment



Drought impacts in southern England

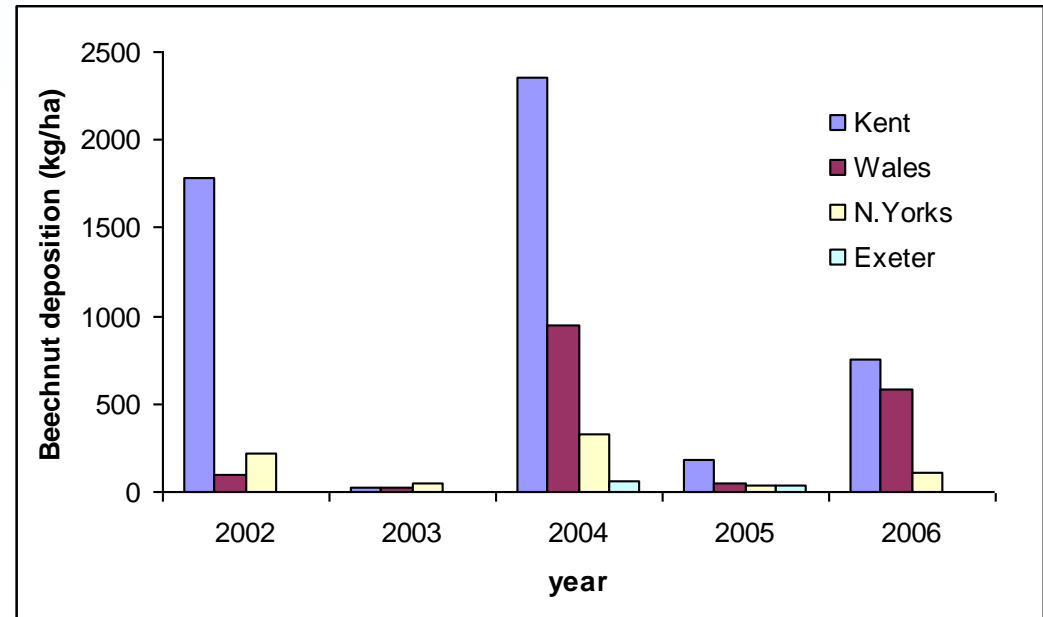


Forest Intensive Monitoring Plots

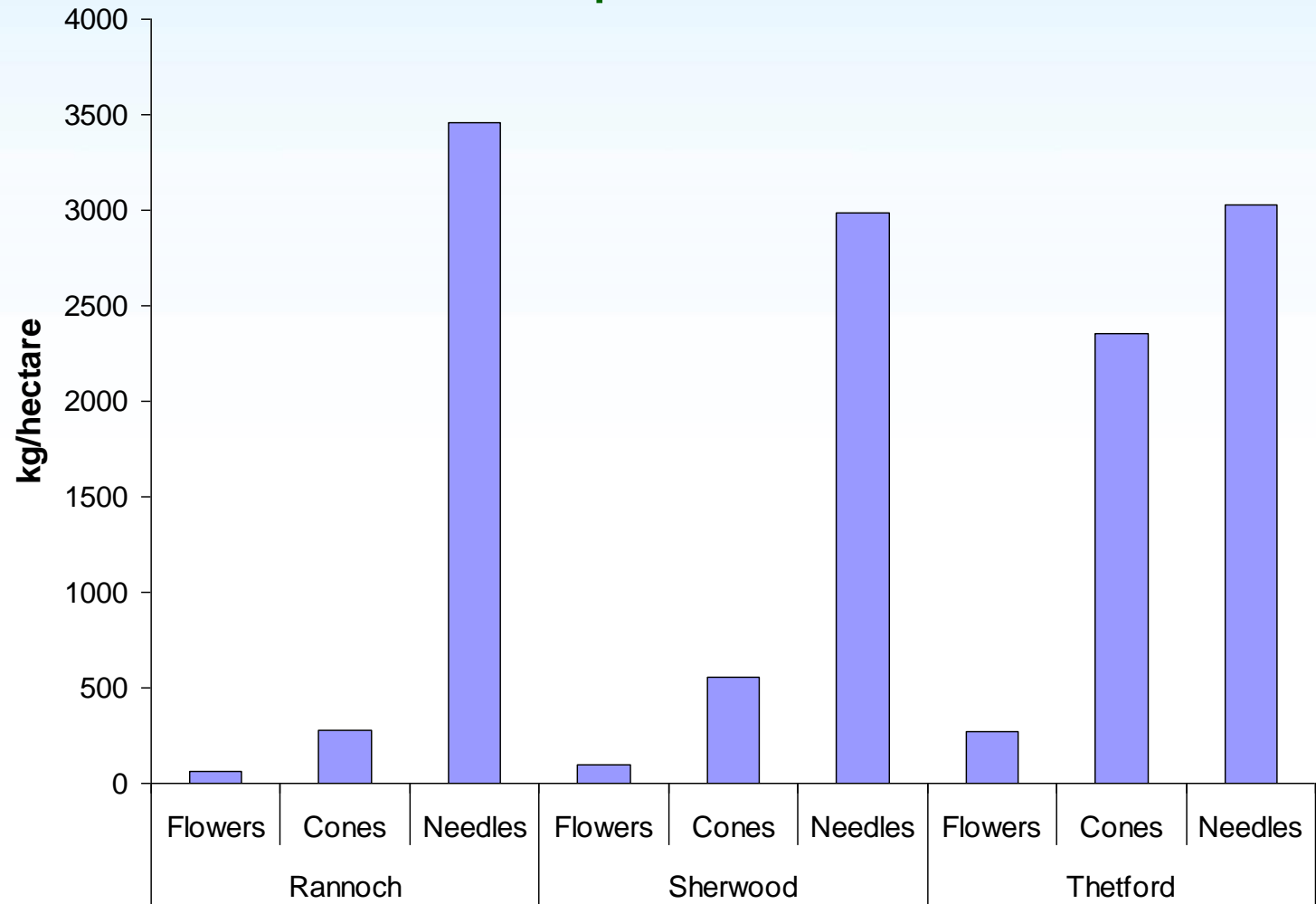




Increased masting

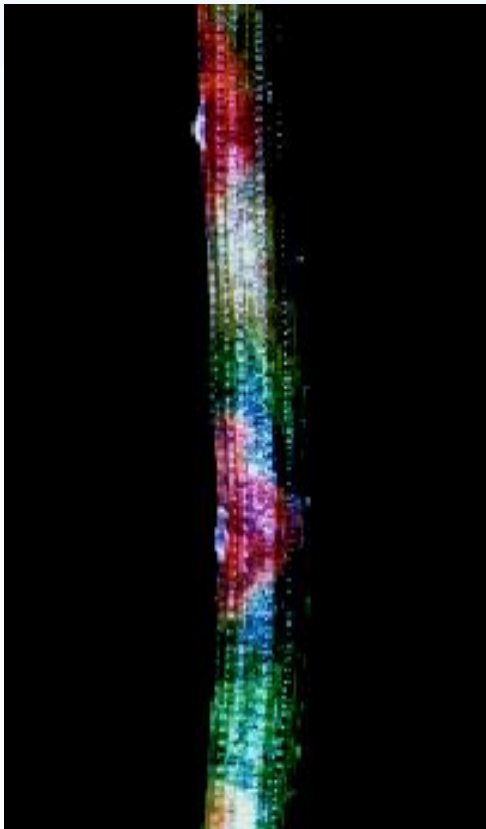


Amount of 'litter' reaching the forest floor in Scots pine stands



Effects of forest pests and diseases

- red band needle blight



Fire and UK forestry policy

Examples

- Public access
- Woodland conversion: PAWS/heathland
- Forest management: woodfuel strategy
- Employment profile

Woodlands and forests and public usage



English Forestry Policy:

- “to support healthy living policies by encouraging people to use woodlands for physical activities”
- “to provide, for everyone who could benefit, information about the accessibility and public use of local woodlands”

12 April 2007 - Press Release - Mozilla Firefox

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http://www.southwales-fire.gov.uk/SWFSCMS/News/News120402.htm Go

South Wales Fire and Rescue Service Gwasanaeth Tân ac Achub De Cymru

English

Home > News

Easter Grass Fire Numbers Soar!

South Wales Fire and Rescue Service is experiencing one of its busiest ever times during this year's Easter school holidays.

From 1st April 2007 to April 10th inclusive, South Wales' Firefighters have attended 901 grass fires. This is in addition to the 74 building fires and 93 special service calls including road traffic collision and other rescues.

Control room staff have dealt with 5448 calls from members of the public in just 10 days, with 3,251 of these being repeat calls about fires which have already been responded to.

However, this job can be extremely difficult and it must be clearly established between the caller and the operator that they are not calling to alert the Fire Service to a separate incident. This takes a great deal of time and patience for control room operators based at headquarters in Pontyclun.

Principal Fire Control Officer Jennie Griffiths, said the unprecedented work rate of her staff had been unfaltering, but it was a stressful time for both the control operators and the firefighters on the frontline.

She said, "Control staff have certainly felt the pressure of this significant increase in calls to the Fire Service. The operators need to be extremely thorough with every call, drawing the right information from the caller to establish whether they are calling about an incident that we are already on our way to deal with."

during this year's Easter school holidays.

Environment

Fire risk restricts Peak District access

Right to roam suspended in tinder-dry conditions

Bank holiday warning as blazes rage across Britain

John Vidal and David Ward

The right to roam over the Peak District national park was yesterday suspended because of a high risk of moorland fires caused by one of the warmest and driest Aprils on record. The suspension came as firefighters tackled dozens of grass, gorse and woodland blazes across Wales, and the government's nature advisers warned people to take extra care this weekend.

The mini-drought so early in the year has already led to more than 1,500 heath and grass fires in Wales, and several hundred across southern England. In the past few weeks more than 60 square miles of grassland and forestry have been destroyed by fires in Scotland.

The past six weeks have been exceptionally dry across much of Britain. The Environment Agency reported yesterday that south-east and eastern England had received no more than 2mm of rain in April, about 5% of the average. Wales, the south-west, central and northern England had around 20% of their April average.

Yesterday the Met Office's fire severity index showed that large parts of Surrey, Hampshire, Somerset and Devon were exceptionally vulnerable to fires.

"We need to shift our attitude to fire more in line with Californians, southern Europeans and Australians," said Roger Ward, head of the access programme at government agency Natural England. "With increasingly hot and dry conditions looking set to become a fact of life during English summers, we must all learn to take extra care and vigilance."

2mm

The amount of rain in south-east and eastern England in April, about 5% of the average rainfall for the period

"April was exceptionally dry and we had seven or eight fires," said Sean Prendergast, head of access at the Peak District national park. "We had to respond hard and fast to prevent the decimation of the park's ground-nesting birds. It only takes a spark to cause a devastating blaze, from which the moorland habitats and wildlife take years to recover."

He added: "This does not mean that the Peak District is closed. Walkers are still welcome to use footpaths and rights of way, but the freedom to wander granted by the Countryside and Rights of Way Act 2000 has been temporarily removed. People are welcome to walk all over the national park as long as they stick to public footpaths. There are still 2,200km of rights of way fully open."

Signs have been erected at access points in the Peak District to warn walkers of the suspension, which will be lifted as soon as the risk subsides. Visitors are urged not to smoke, light fires or have barbecues anywhere near moorland areas in Britain.

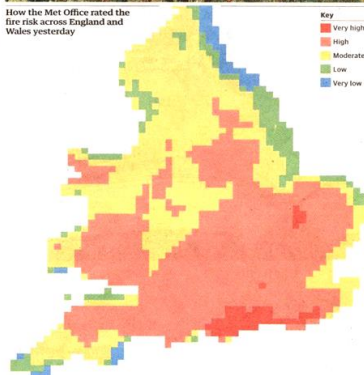
Firefighters in Wales are on full alert this weekend. The Easter bank holiday was one of the worst they had experienced for grass, gorse and forest fires. More than 500 fires were reported, and South Wales fire service said that the vast majority had been started deliberately by youngsters.

"Everything is tinder dry. We have had a period of rain but that unfortunately has done nothing to dampen down the condi-



Park and walk
The right to roam has been suspended in the Peak District national park but walkers may still walk anywhere in the park as long as they stick to the footpaths
Photograph: Alamy

How the Met Office rated the fire risk across England and Wales yesterday



SOURCE: COUNTRIES COUNCIL FOR WALES, NATURAL ENGLAND

"We need to shift our attitude to fire more in line with Californians, southern Europeans and Australians"

Roger Ward, Natural England

"It only takes a spark to cause a devastating blaze from which moorland habitats and wildlife take years to recover"

Sean Prendergast

"If dry weather continues through May and into June there is a risk that water restrictions may be needed"

Environment Agency

tions," said mid-Wales fire service.

Britain has relatively uniform annual rainfall with no regular dry season but short droughts can lead to catastrophic wildfires, the Forestry Commission said.

A recent fire raged through 12 square miles in the Galloway Forest Park in south-west Scotland, destroying a site of special scientific interest and a special area of conservation.

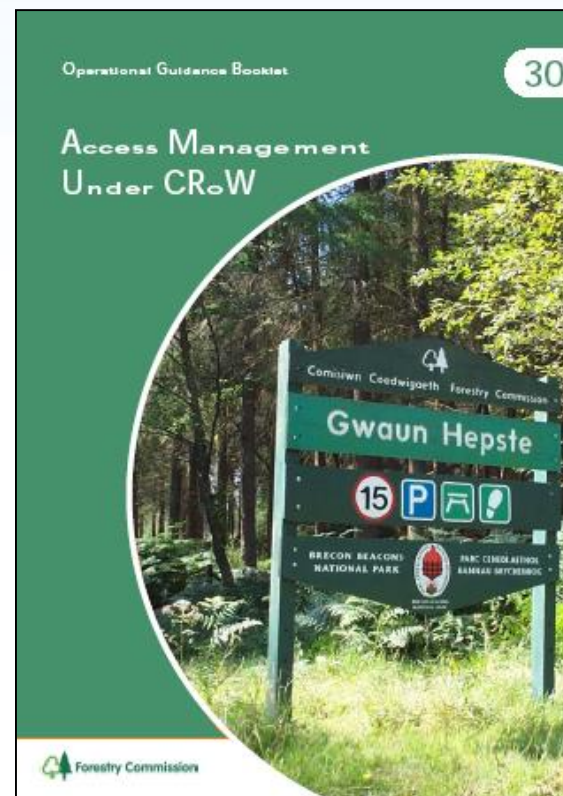
The army, foresters, firefighters and a helicopter tackled a fire of nearly 130 hectares of moorland, and several hectares of woodland near Harbottle in the Upper Coquet Valley of Northumberland.

River flows and reservoir levels have also started to decline earlier than expected, but the Environment Agency said no water shortages were expected. "Some stream support systems have been turned on in East Anglia earlier than normal and if the dry, warm weather continues and river flows continue to drop this could cause problems for fish and wildlife."

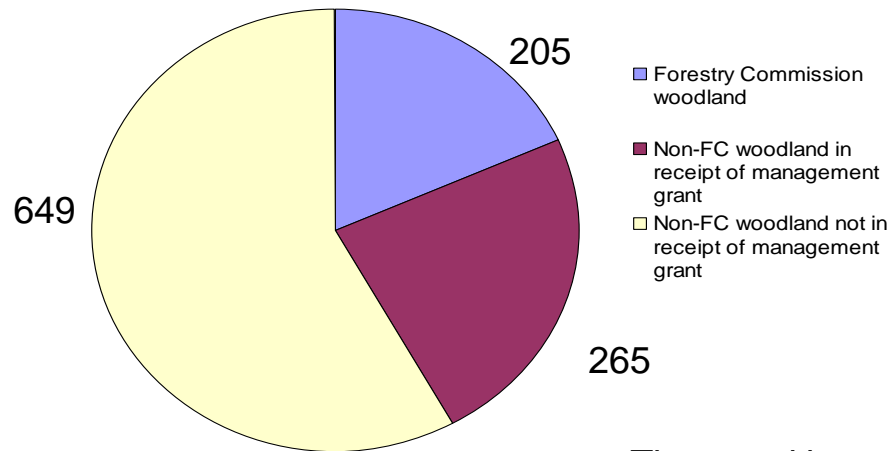
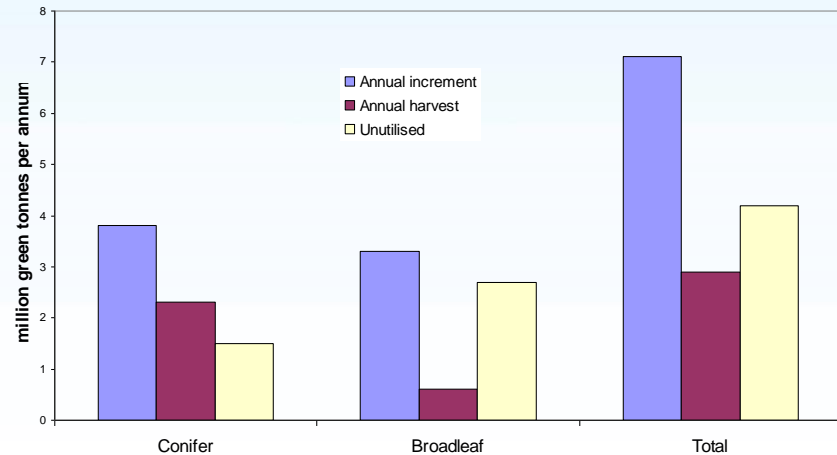
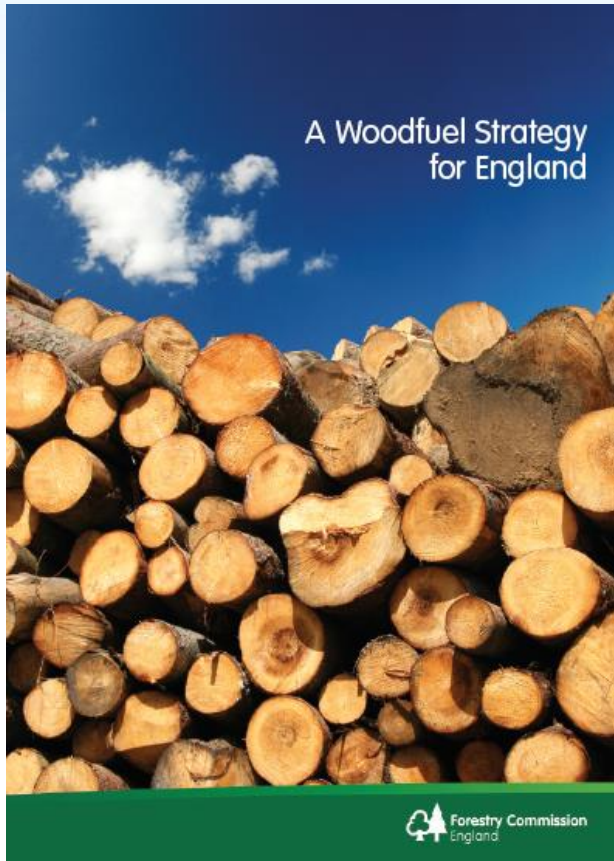
"If the dry weather continues through May and into June, there is a risk that restrictions may be needed to protect the environment."

The Met Office forecast that the warm, sunny conditions would continue into the bank holiday weekend, but with the possibility of rain for most places on Sunday. There are no restrictions on water use anywhere.

Effect of fire risk on public access



Forest management: woodfuel strategy



Thousand hectares

Potential environmental impacts of implementing a woodfuel strategy

“Positives”

Tree regeneration and coppice cycle reinstated
Reversing recent increases in shadiness
Increase in ‘thicker’ habitat and temporary open space
Increased edge & rides habitat
Acceleration of Plantations on Ancient Woodland Sites (PAWS) restoration

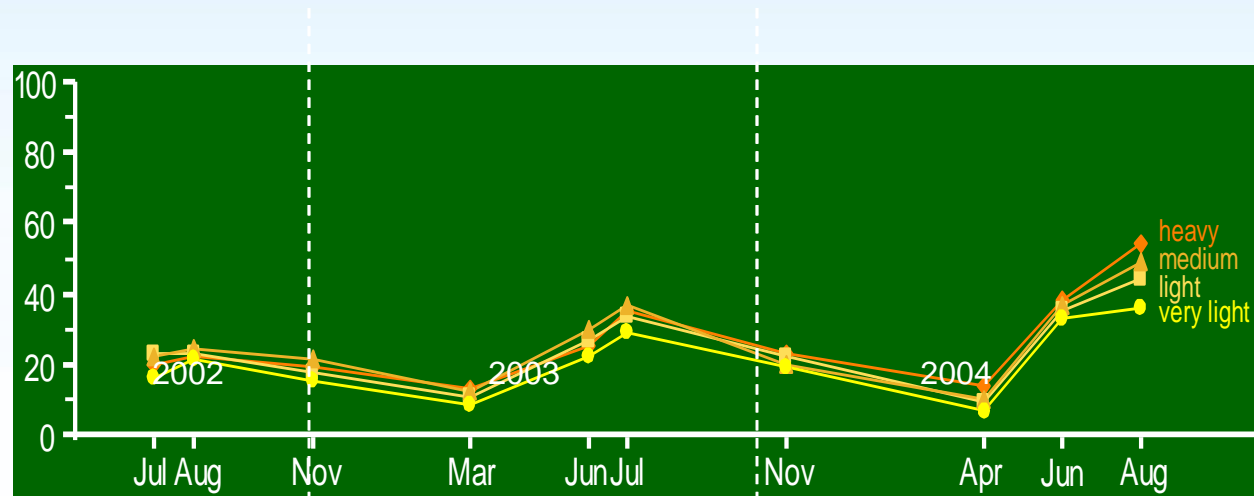
Woodland habitat

“Negatives”

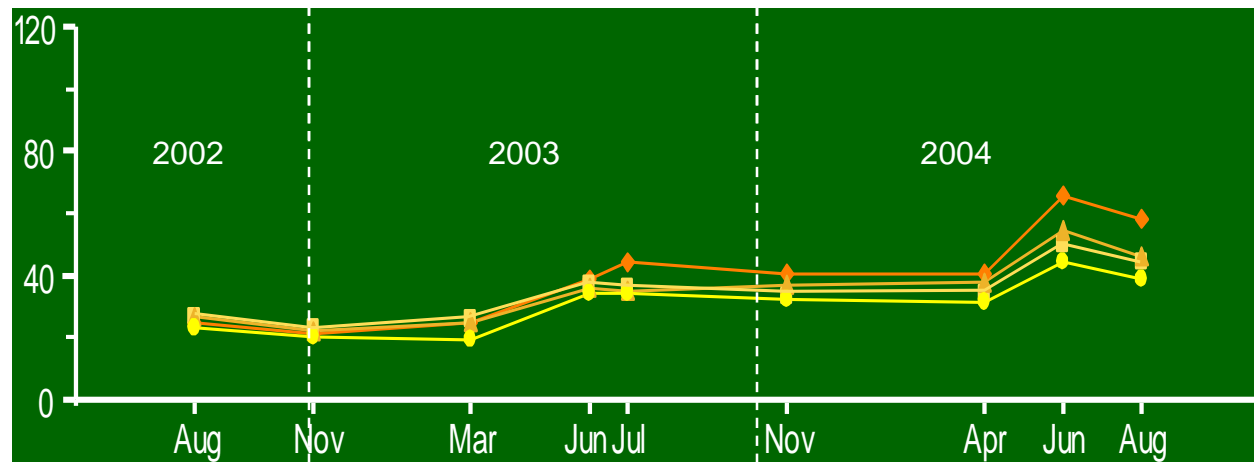
Inadequate regeneration following cutting due to deer
‘Unnaturally’ high proportion of younger growth stages
Reduction of deadwood and loss of ‘old growth’ conditions
Loss of woodland to tracks/roads
Restoration could be too fast or ‘low thinning’ could be too common

Fuel source, as affected by thinning

Bramble cover
in %



Bramble height
in cm

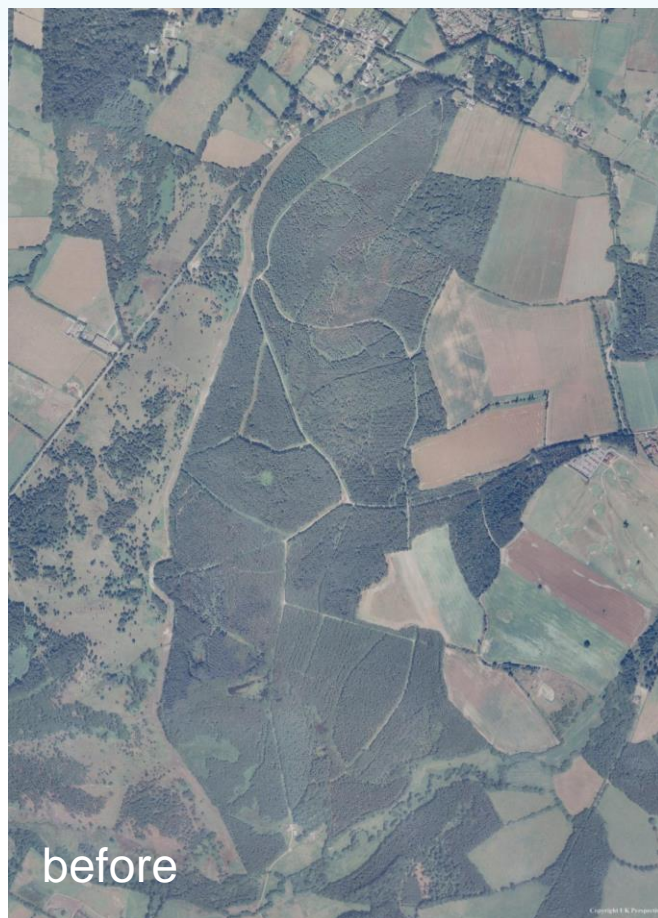




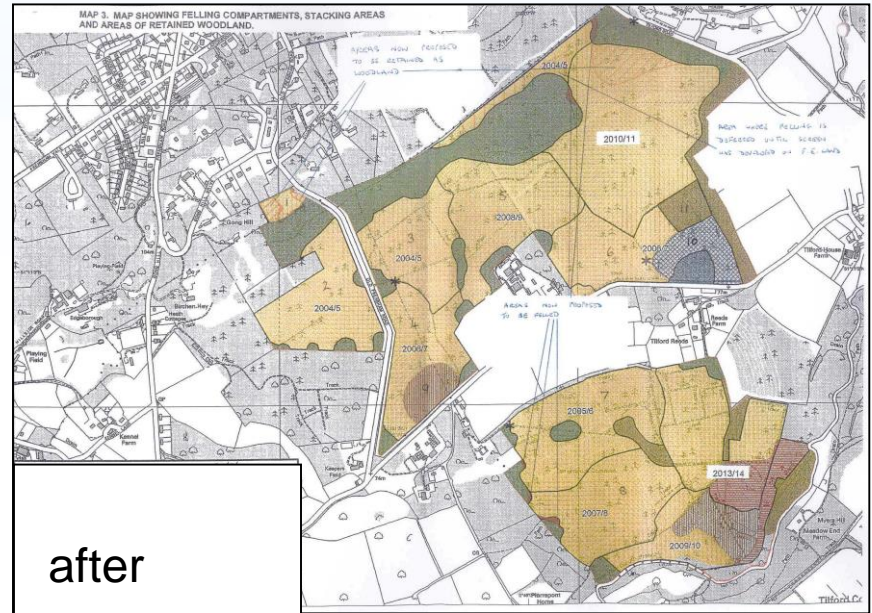




Heathland restoration: example from New Forest

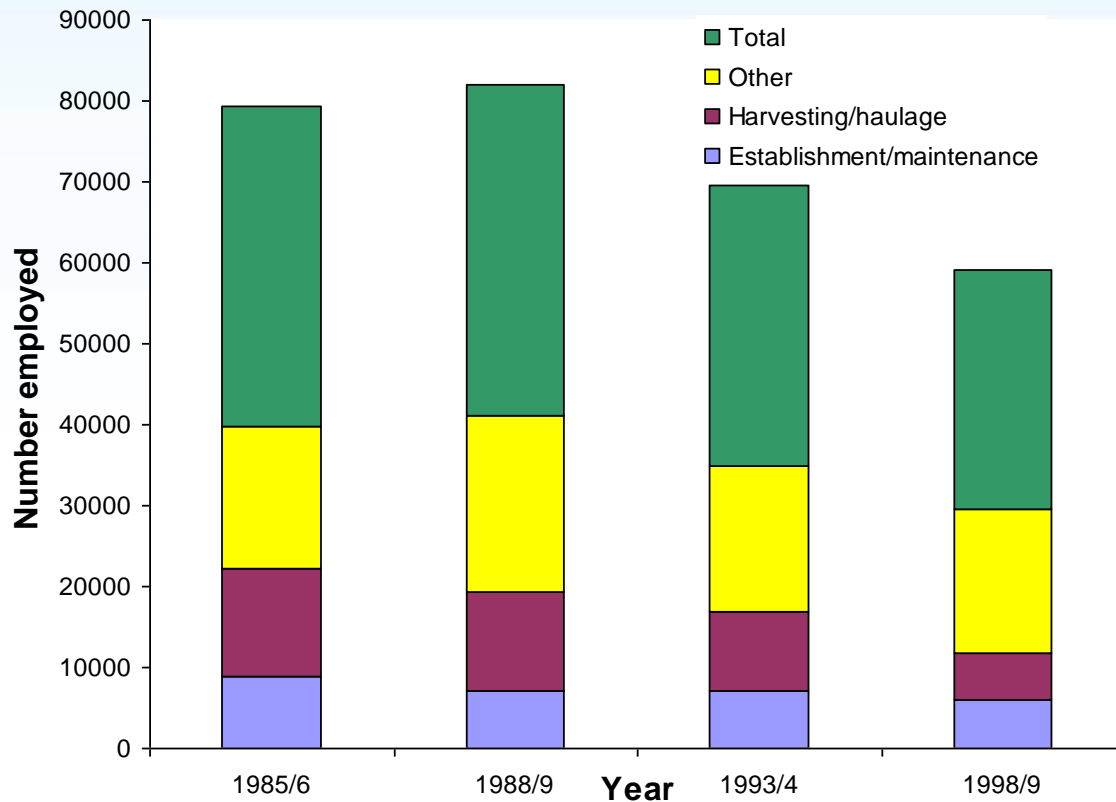


Heathland restoration: example from Surrey





Forestry employment



Conclusions

- Forest fires in UK already linked to *climate*
- Climate change scenarios suggest likely increase in forest fire frequency, but no research on size of change
- Climate change will affect forest physiology and management, with likely increase in fuel source in some cases
- Forestry policy, itself responding to climate change, may also increase fire risk in certain circumstances

Further research

- Use UKCIP02 scenarios as input into Met Office Fire Severity Index (MOFSI) model
- Develop FR modelling capability to predict fuel source under different silvicultural management regimes
- Examine recent and predicted future social dynamics of woodland/forest usage



Thanks for listening

Any questions?

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