

# Impact of burn management upon peatlands

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# What does the review cover?

- Biodiversity
- Hydrology
- Greenhouse gases and carbon
- Socio-economic impacts
- Dominated by study of UK upland peats
- Does draw upon studies from across the Northern Hemisphere



# Methodology

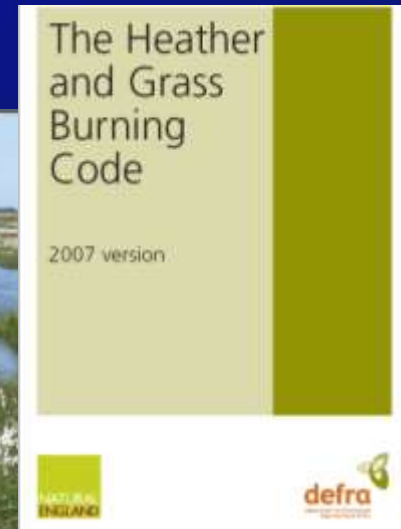
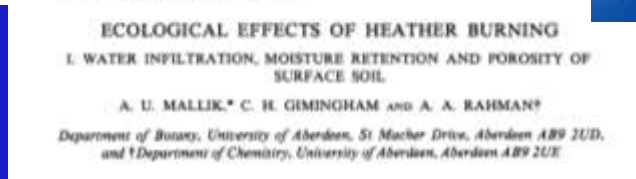
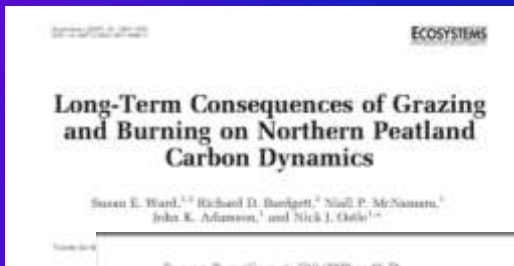
## ■ Considered:

- Published papers and 'grey' literature e.g. reports
- Significant effect or not
- Direction of effect size

Author	Soil Respiration	Primary productivity	Methane	DOC	POC	Dissolved CO <sub>2</sub>
Ward et al. (2007)	↑	↔	↓	×		
Worrall et al. (2007a)				↓		
Ball (1974)		↔				
Garnett et al. (2000)		↔				
Clay et al. (2009b)				×		
Imeson (1971)		↓			↑	
Tallis (1987)					↑	↑

# What limits are there on the review?

- Definitions
- Does not include:
  - Effects of wildfire
  - Peat burning as fuel
- Includes both peer-reviewed and 'grey' literature
  - Peer-reviewed studies are taken at face value



# The aims of burning

- Ancient vegetation management practise as old as farming
- Grouse moor burn management as we know it comes from late 19<sup>th</sup>, early 20<sup>th</sup> Century
  - Lovat review (1911) codifies practise
- Purpose of burning
  - Create a mosaic of *Calluna* stand ages
  - Promote forage for grouse and sheep
  - Leave cover for birds
  - Limit fuel load
- Timing, location, practise and suggested rotation length are now covered by national burning codes



# Trends in burning

- Estimates of areal extent vary
  - 15% for England
    - 114 km<sup>2</sup> burnt a year in England
    - 1000 km<sup>2</sup> subject to burning
  - 18% for UK
    - 3150 km<sup>2</sup>
- Regional variation is great
  - 1-2% in Borders
  - 20% in North Pennines
- Burn rotations
  - Limited by codes of practise
  - Regionally controlled by growth rates in *Calluna*
- Is burning area/frequency increasing?
  - Yes, in some areas, but not all
- Increasing use of technology
  - Use of pressurized burners and foggers





# Biodiversity

- Winners

- E.g. golden plover

- Losers

- E.g. some bryophytes

- Issues:

- Local variation in effect



- Can we change burn practise to promote overall biodiversity?  
Or to favour peat forming species?

# Hydrology

- Mixed water quality results
  - Increases and decreases for water colour
  - Limited data on metals and nutrients
- Can we change burn practise to improve hydrology?
  - Rewetting areas





# Water quality

- There has been debate over the impact of burning on DOC/water colour
- Studies differ on whether they measure soil water, runoff water, stream water, catchment or plot scale
- Studies are more or less balanced in number

Study	DOC/Water Colour	Location	Scale
Worrall et al., 2007	↓	North Pennines	Plot
Yallop and Clutterbuck 2009	↑	North Yorkshire and South Pennines	Catchment
Clay et al., 2009	×	North Pennines	Plot
Ward et al., 2007	×	North Pennines	Plot
Chapman et al., in press	×	North Yorkshire	Catchment
Helliwell et al., 2010	↓	Scottish Highlands	Plot
Yallop et al., 2010	↑	South Pennines	Catchment

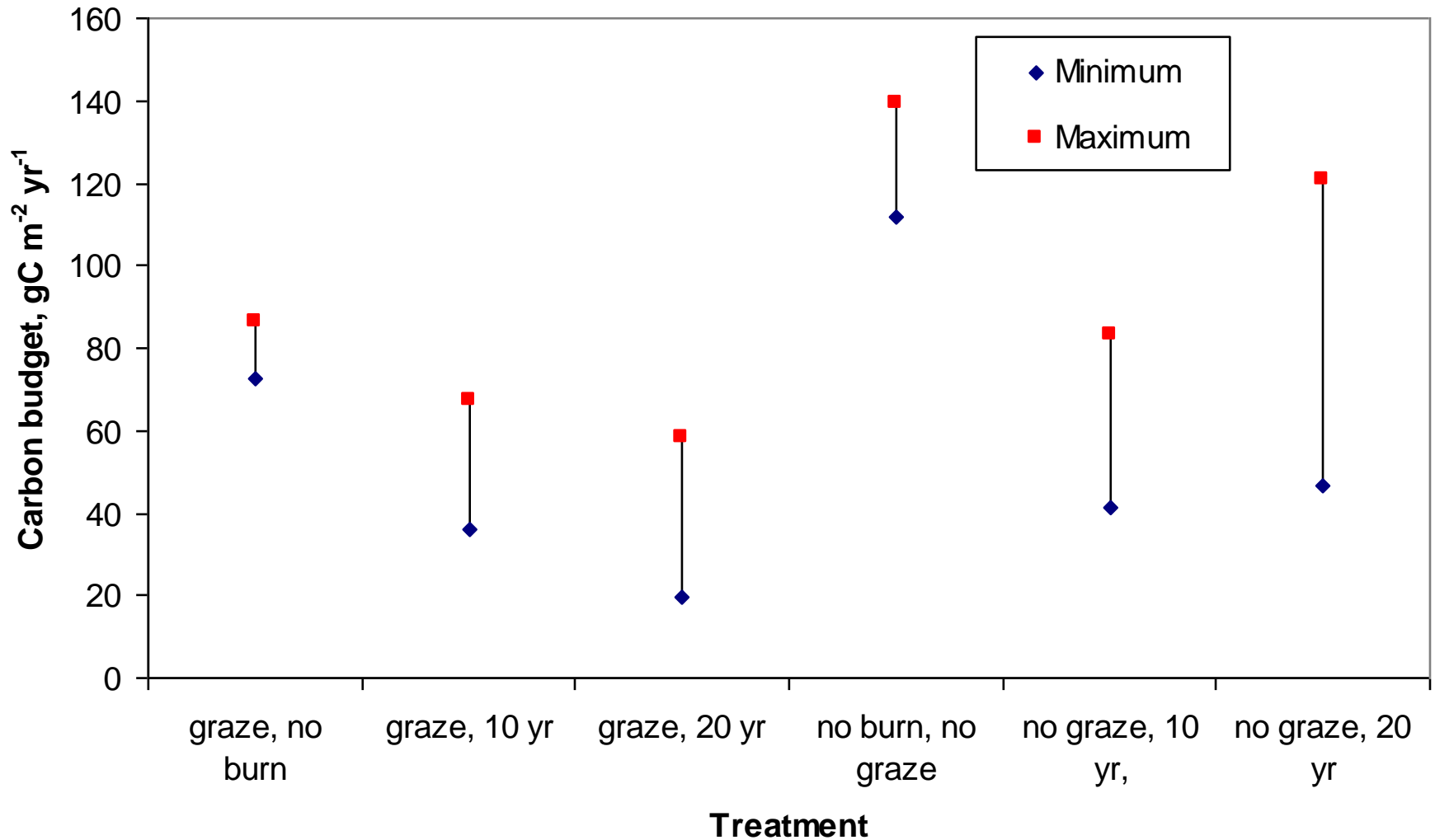
# Greenhouse gases & carbon

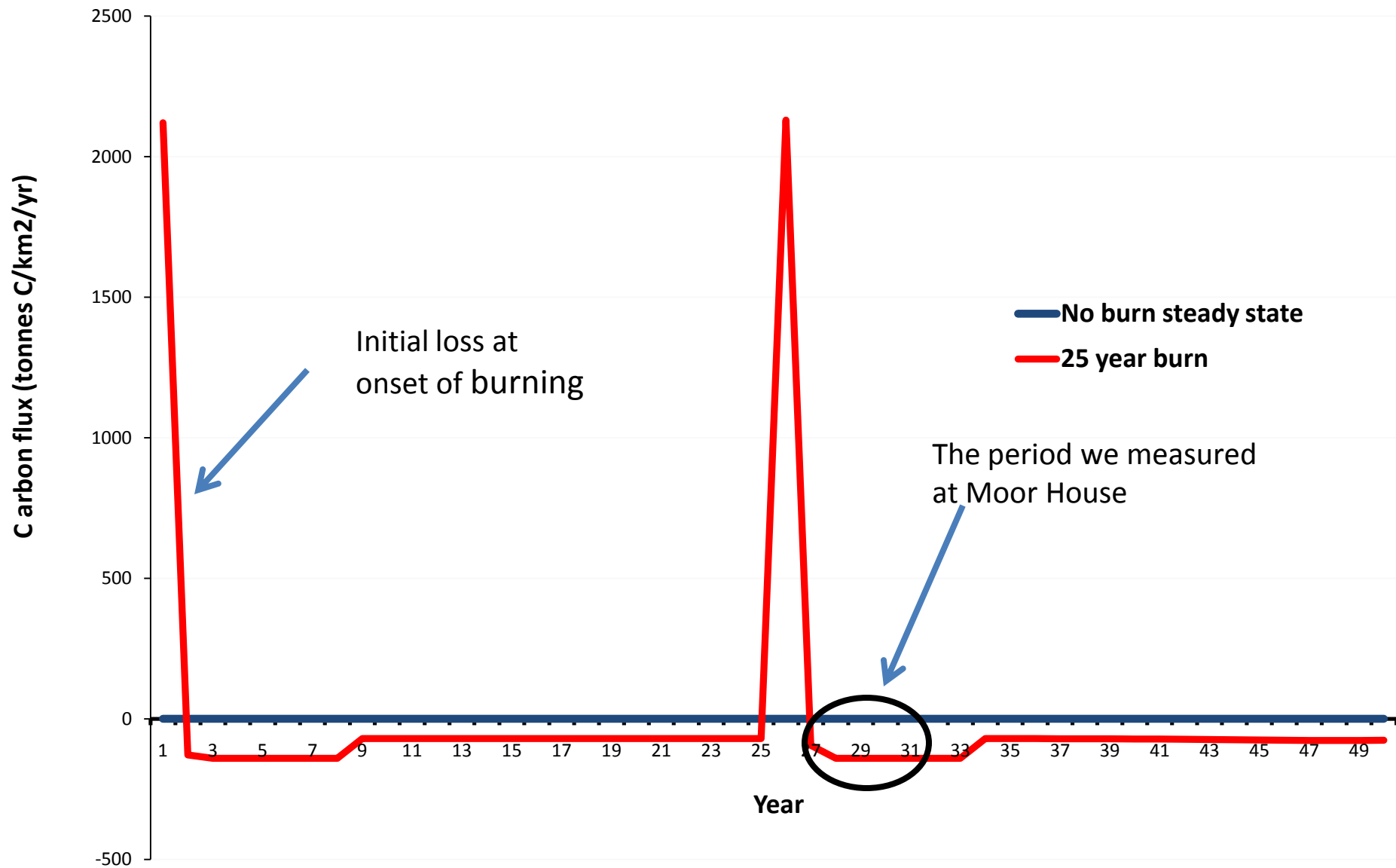
- There are individual studies of individual components
  - Few monitor multiple pathways
- Effect on soil erosion
  - Increased in POC and suspended sediment
- Only one complete study
  - Based at Moor House

*“What is needed is a study of the full carbon budget which takes account of all vegetation types across several sites under different management regimes and in different geographical and climatic areas”*



# Carbon budget of treatments





# Socio-economic benefits

- Grouse production and livestock production
  - Enhanced production rates
  - Limited data on the economic side
- Landscape value
  - Not much data in the UK
- Wildfire
  - Link between MB and WF



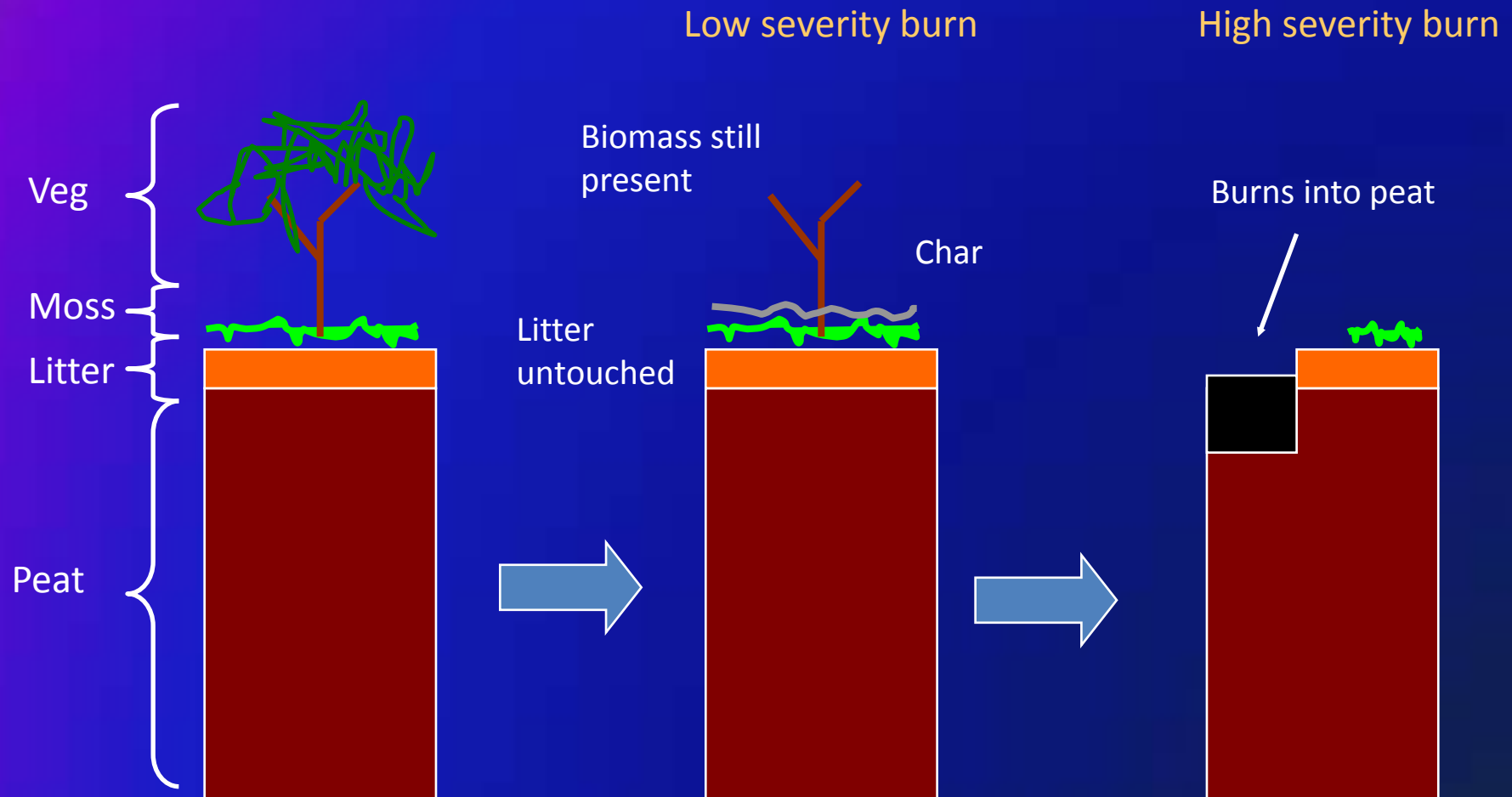


# Conclusions

- Outstanding research questions and issues
  - What is the UK fire regime?
  - Differences between styles of burning?



# Heterogeneity of burning



# Conclusions

## ■ Outstanding research questions and issues

- What is the UK fire regime?
- Differences between styles of burning?
- Particular issues could not be resolved in this review e.g. water quality and DOC
- Firmer scientific basis for some long-held assumptions

## ■ Feedback

- Table 9 in the report
- Consultation responses



A large, intense fire is burning in a forest, with bright orange and yellow flames rising from dark, charred trees. Thick white smoke billows from the fire, partially obscuring the sky. The scene is dramatic and powerful, capturing the raw energy of a wildfire.

Thank you