The River Thames: A study of change

Terry Marsh

Photo credits: Reading Library

CADRA November 2018

The Thames in the Ice Ages

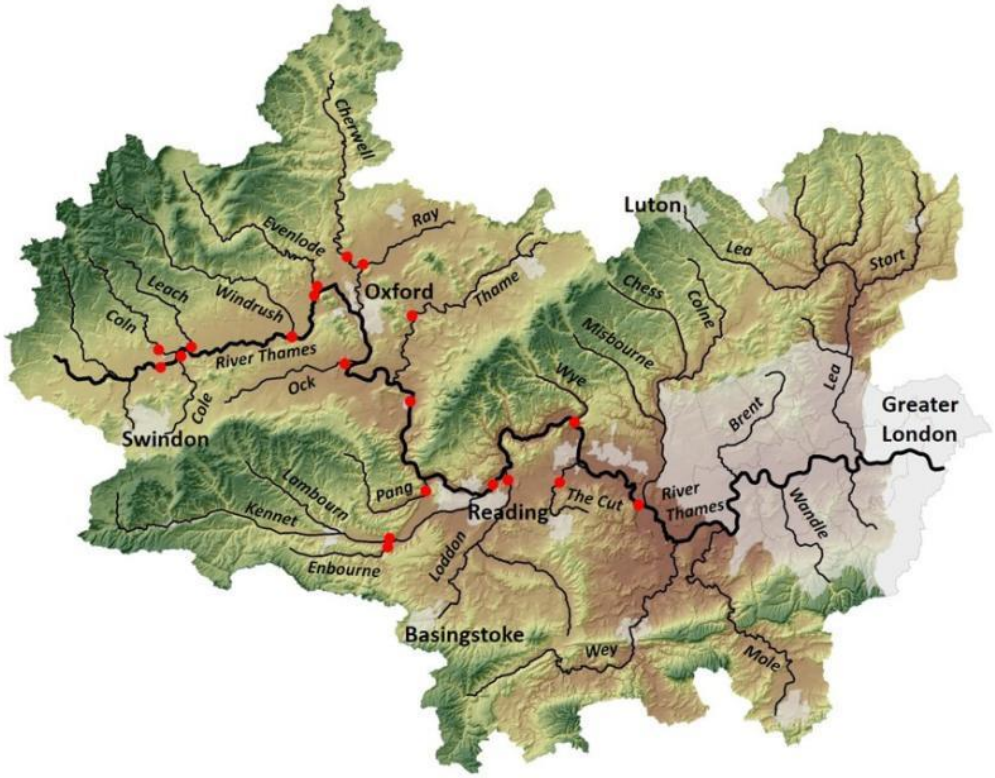
- Successive glaciations
- Major geomorphological changes
- Proto-Thames rose in north Wales
- Anglian glaciation – Thames becomes a tributary of the Rhine
- Major climate oscillations with corresponding changes in flora and fauna

Fig. 84.—The Mammoth (*Elephas primigenius*).

Photo: ZSL

The modern Thames Basin

The physical characteristics of the Thames basin and of the river itself have been very influential in determining its exceptional national and international significance



The Thames headwaters

- Rises in the Cotswolds
- 346 km from source to tidal limit
- The ‘source’ remains a matter of contention
- Old Father Thames exudes stability - but is misleading

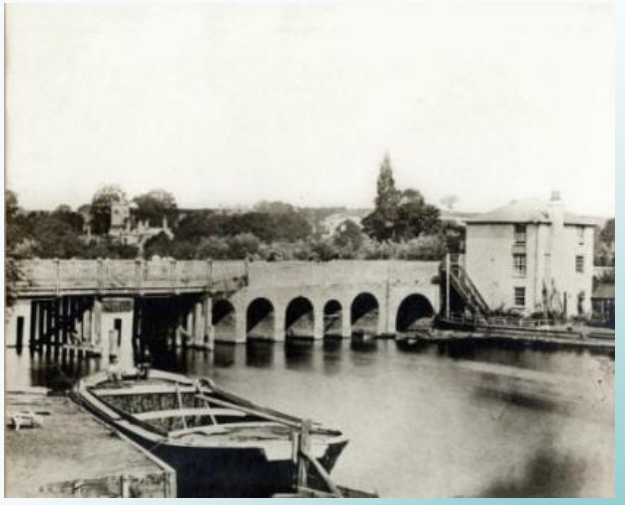
The Early Middle Ages

- The Thames and its tributaries were an important food source (eel, carp, salmon etc)
- Also of strategic importance in relation to transport, defence and economic development
- Roman, Saxon and Norman fortifications

Viking Museum

Reading Abbey

- William of Malmesbury 12C: '*Henry I chose the Abbey site between the Thames and Kennet in a spot calculated for the reception of almost all who might have occasion to travel to the more populous cities of England.'*



Mills in the Thames basin

- Many hundreds recorded in the Domesday Book
- Mostly very local
- Mapledurham built 15th-19th century but precursor in Domesday Book
- Supplied flour to London by barge
- Cheap imported flour from USA eventually undermined milling along the Thames
- Micro-scale HEP station installed

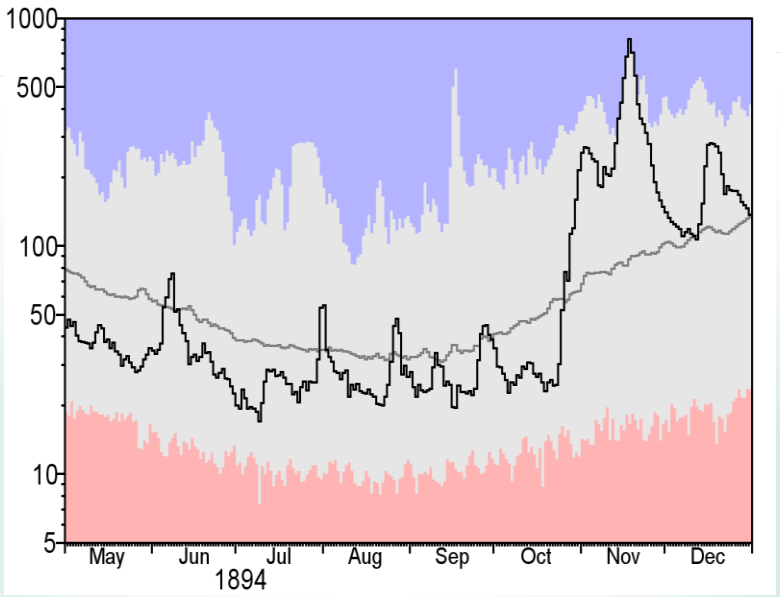
18th Century – Westminster Bridge

- Canaletto 1748
- 14-arch Bridge
- Relieved heavy pressure on London Bridge
- Thames still relatively clean
- Cess pits still predominated
- ‘Night soil’ marketable on the outskirts of London

The 19th century - pestilence

- London's population doubled to two million from 1800-1840
- Volume of raw sewage discharged into the Thames increased steeply
- 1831-32 first cholera outbreak – 6000 fatalities
- 1848/49 – 14000 die from cholera in London; typhoid fatal also
- 1858 – the 'Big Stink'…Parliament acts
- 1859 Joseph Bazalgette – N & S intercepting sewers constructed

The Thames exercising its natural sovereignty over its own floodplain – Nov 1894

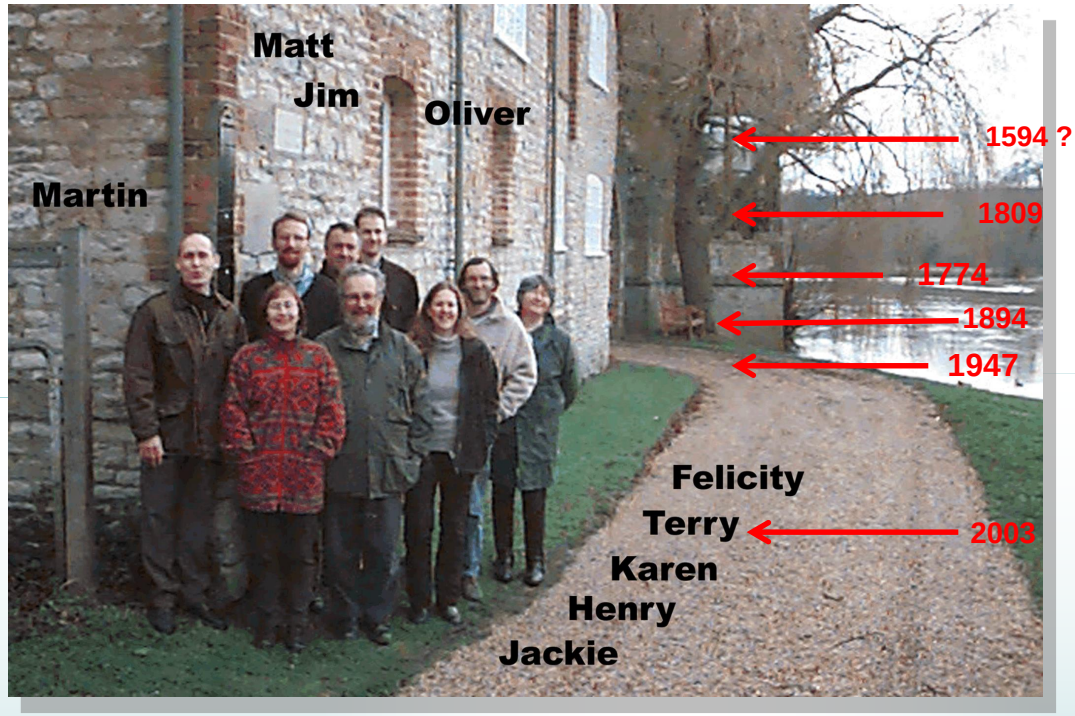


Source: RBC Strategic flood risk assessment (PB)

March 1947

Along the Thames *Brian Eade*

...& further back – Shillingford wharfe



Data source: Griffiths 1983 – a Chronology of Thames Floods

AD 48 – 'The Thames overflowed, the waters extended across four counties, 10,000 persons drowned and much property was destroyed'

Flash floods

Hampstead August 1975 Haycock

Rainfall records:
Maidenhead 1901: 92mm in an hour

Hampstead: 1975: 169mm in 2.5 hours

RISK INCREASING

Tidal flooding

Combating fluvial flood risk

Brian Eade – Dredging along the Thames

Moderating flood impact

Be prepared

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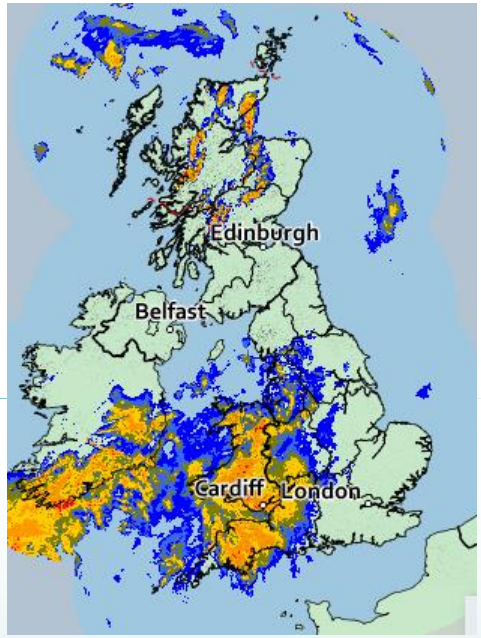
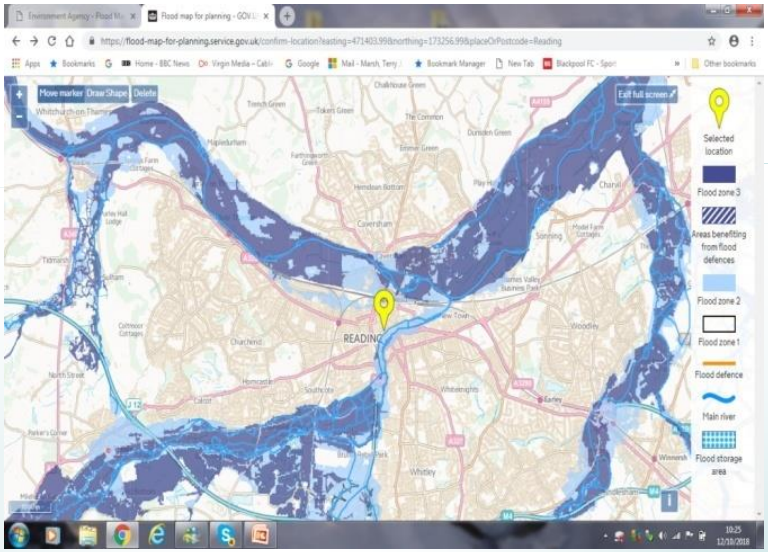
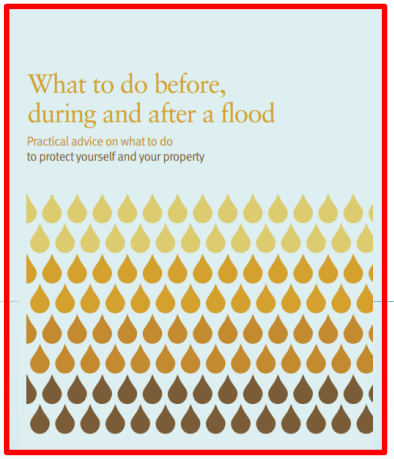


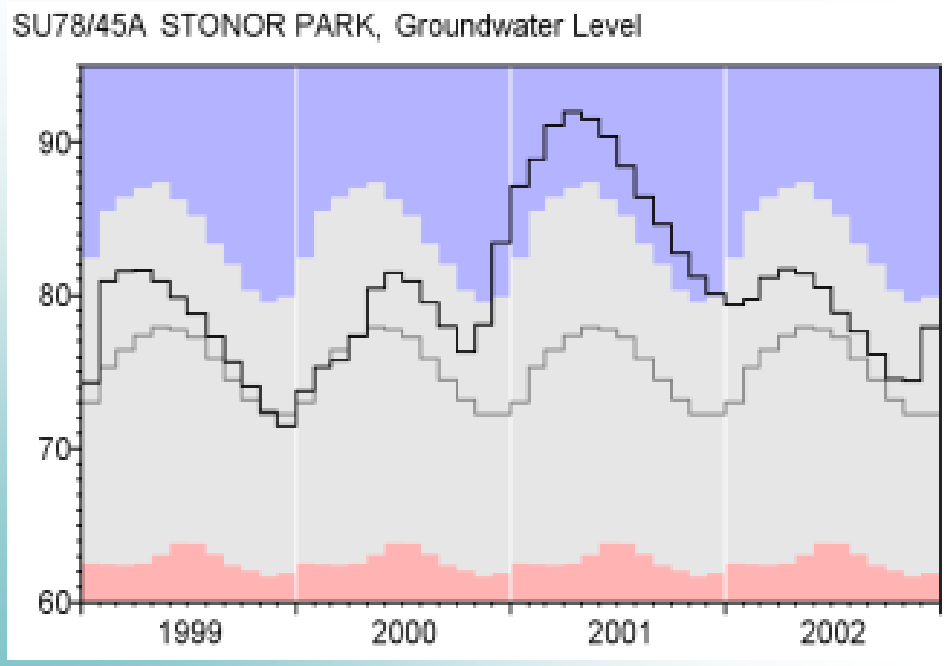
Industry standard methods for assessing flood risk in the UK





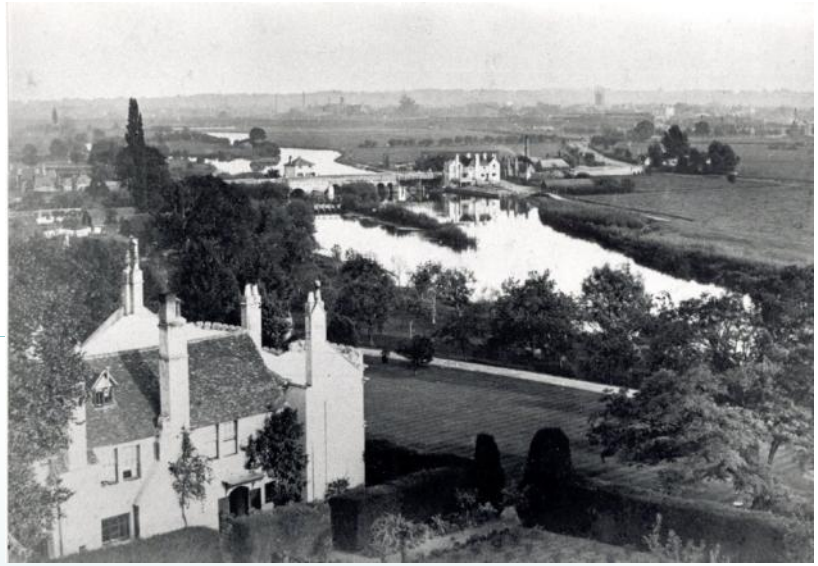
https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

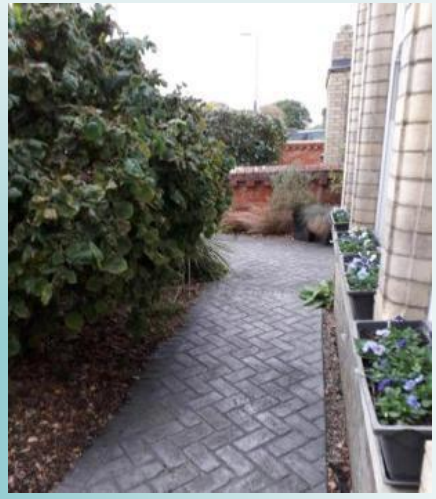
Groundwater flooding – relatively rare but persistent



The Flowing Spring

Exacerbating flood risk – floodplain development



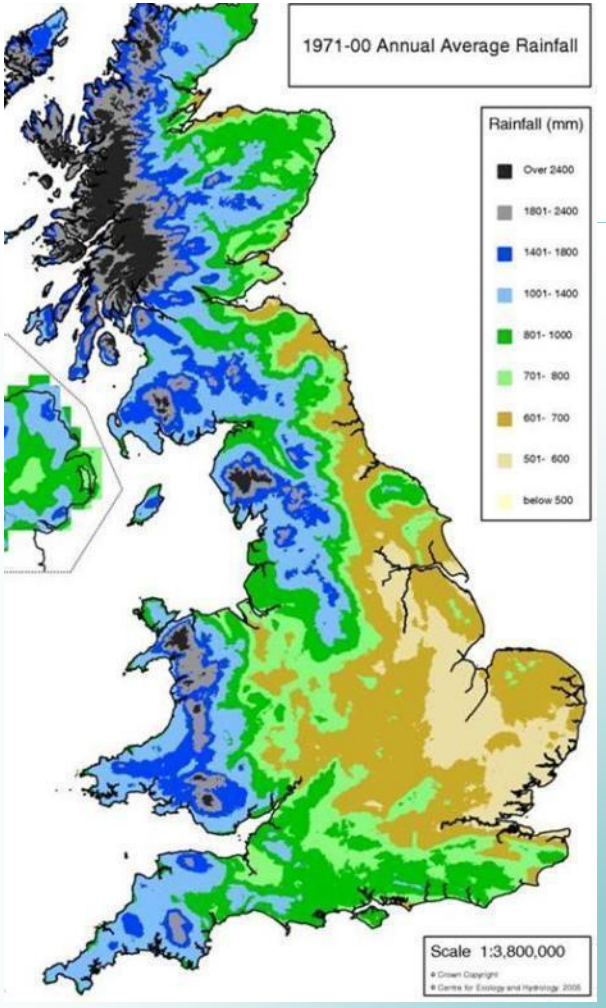


Underlines the importance of planning controls and Sustainable Urban Drainage

Flooding - weighing up the risks

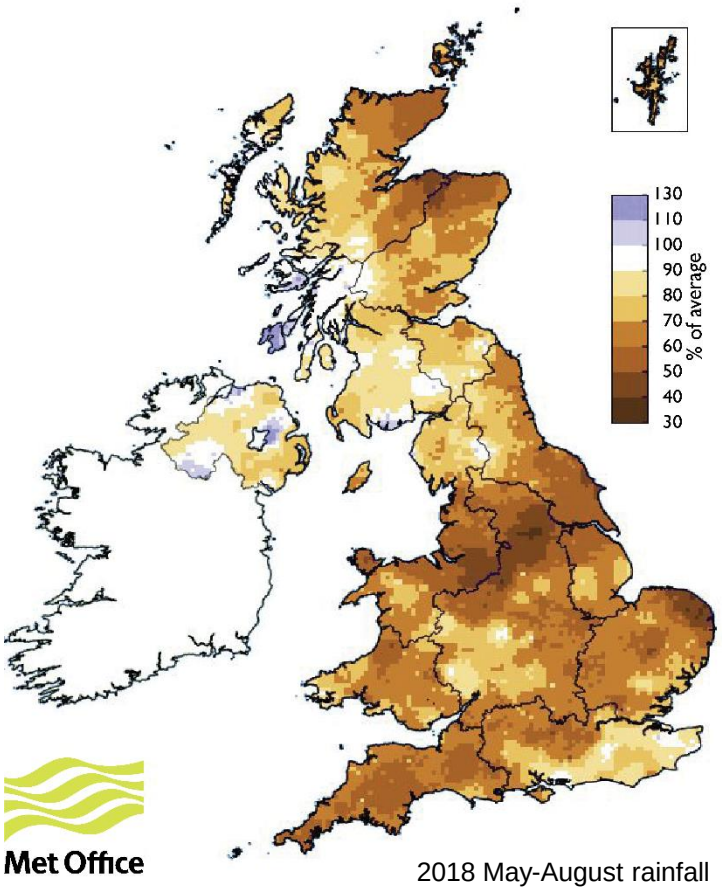
Drought and water resources stress

- 50% of rainfall in the Thames basin is lost to evaporation
- Very high population density
- Thames is the dominant water supply source
- Water resources management is challenging



The 2018 Drought

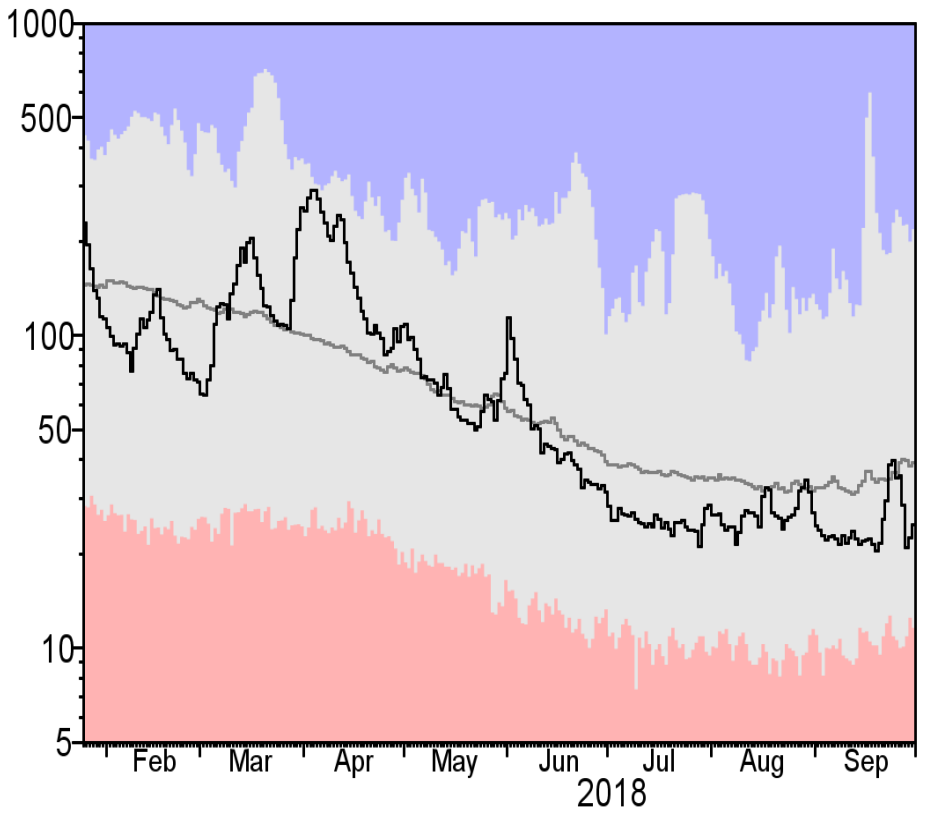
- Mediterranean episode
- Thames basin - hottest April-August on record
- 48 successive dry days
- 3rd lowest June-Sept rainfall
- 4th Driest soils June-Sept



2018 May-August rainfall

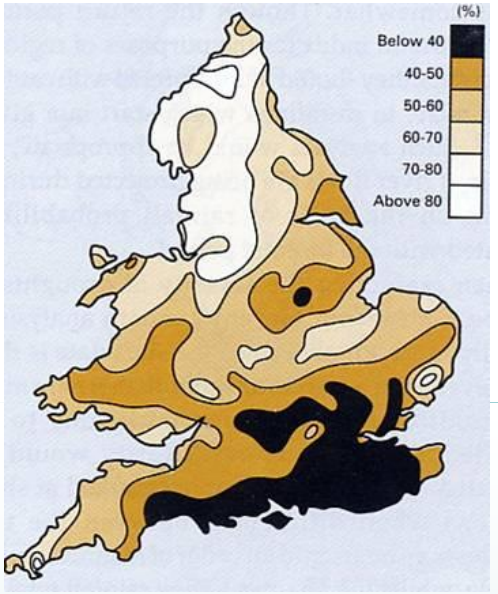
Thames flows in 2018

- Groundwater inflows have been a major moderating factor



1975/76 - The most intense drought of modern times

- Driest 16 months on record (E&W)
- Severe and extensive drought conditions
- Impacts on industry, agriculture and the environment
- Standpipes and other restrictions
- Massive contraction in the stream network
- Rapid termination in autumn 1976



August 1976 - Thames ceases to flow!

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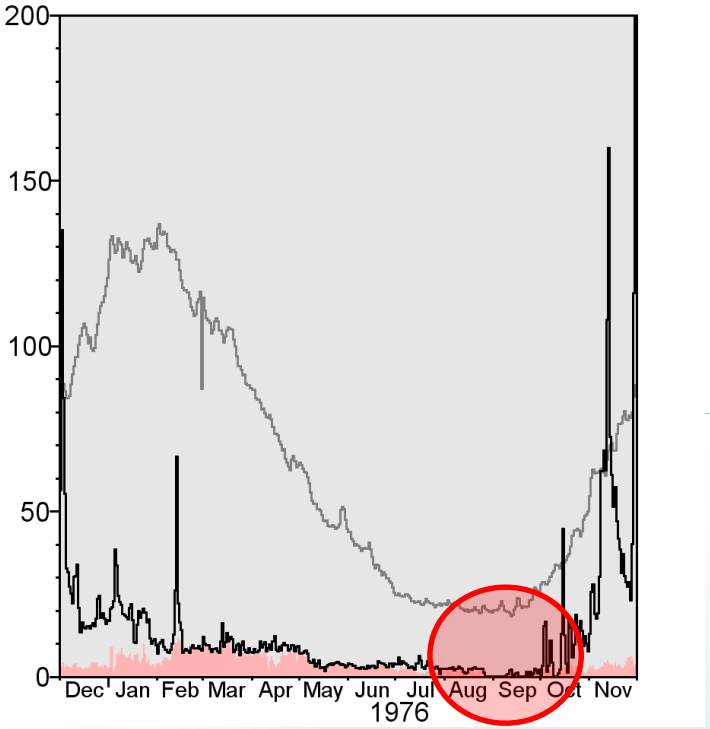
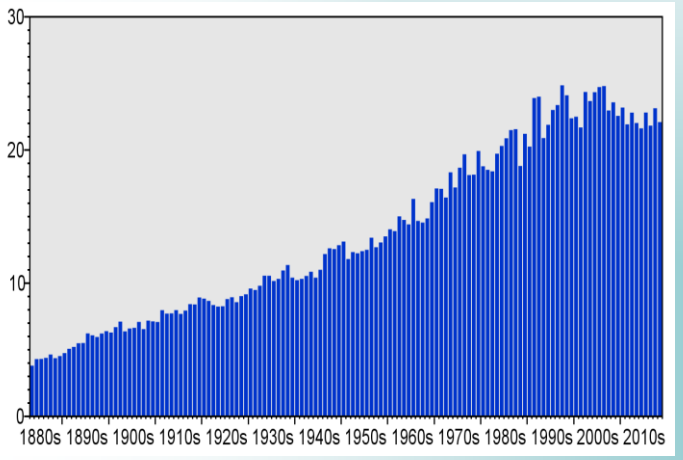


BUT – abstraction for London's water supply needs was a major contributory factor



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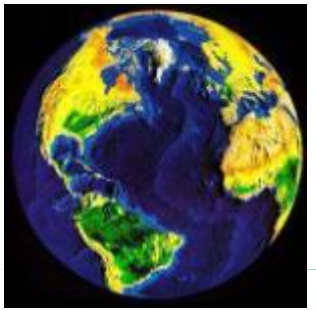
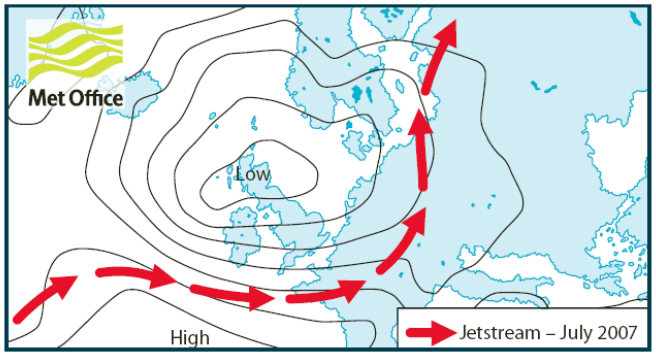
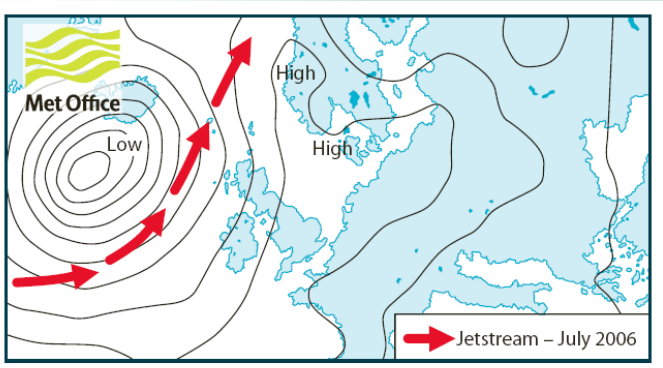
Climate change and long-term trends

Climate change and the Thames basin – a scale problem

- The Thames catchment constitutes <1/50000 of the globe
- Still significant uncertainties in rainfall predictions at the river basin scale
- How will global warming impact on the tracks followed by Atlantic low pressure systems?







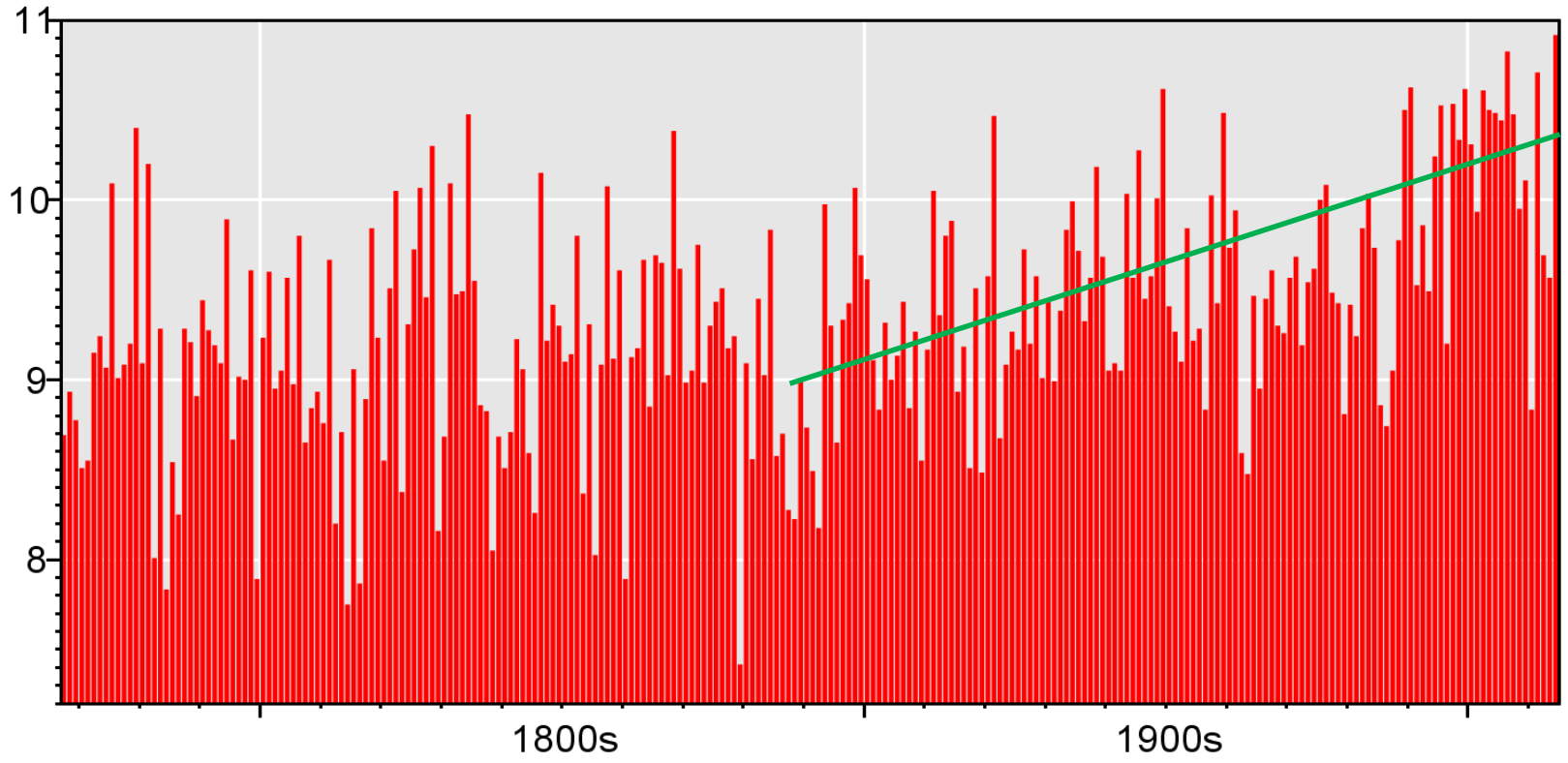
Source: Met Office 2007

Sea Level Rise

- Increasing - but currently around 3-4 mm a year
- Antarctic contribution uncertain
- Isostasy is a complicating factor

Climate trends at Oxford University – Radcliffe Observatory

Annual mean temperature



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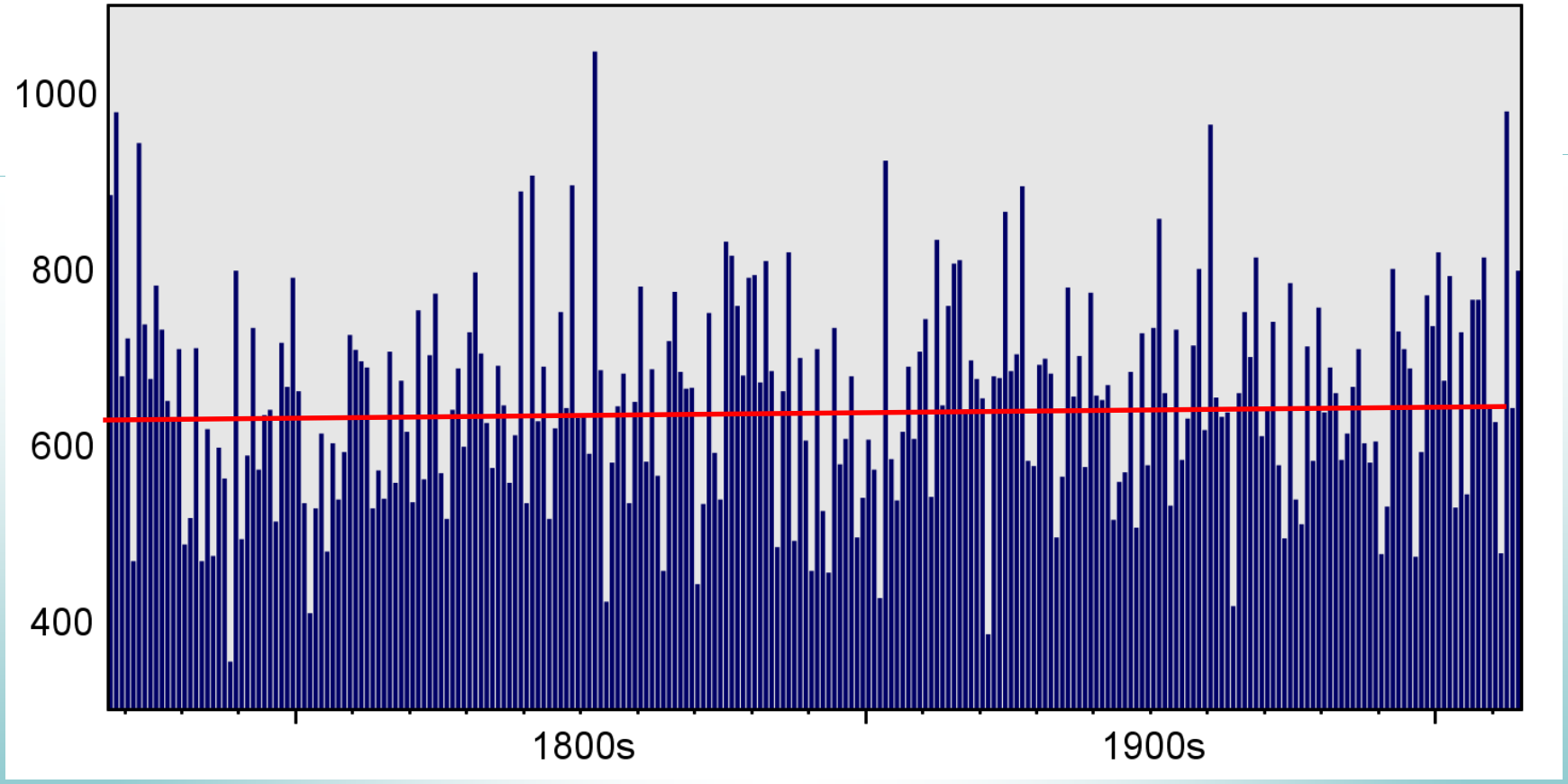
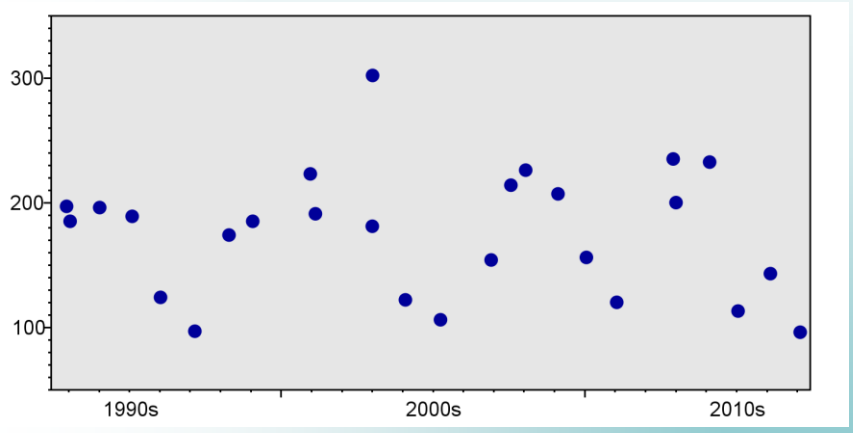
Annual rainfall mm



Flood flows at Caversham

Caversham Gauging Station –
Environment Agency



Annual maximum flows – cubic metres per sec

Teddington/Kingston

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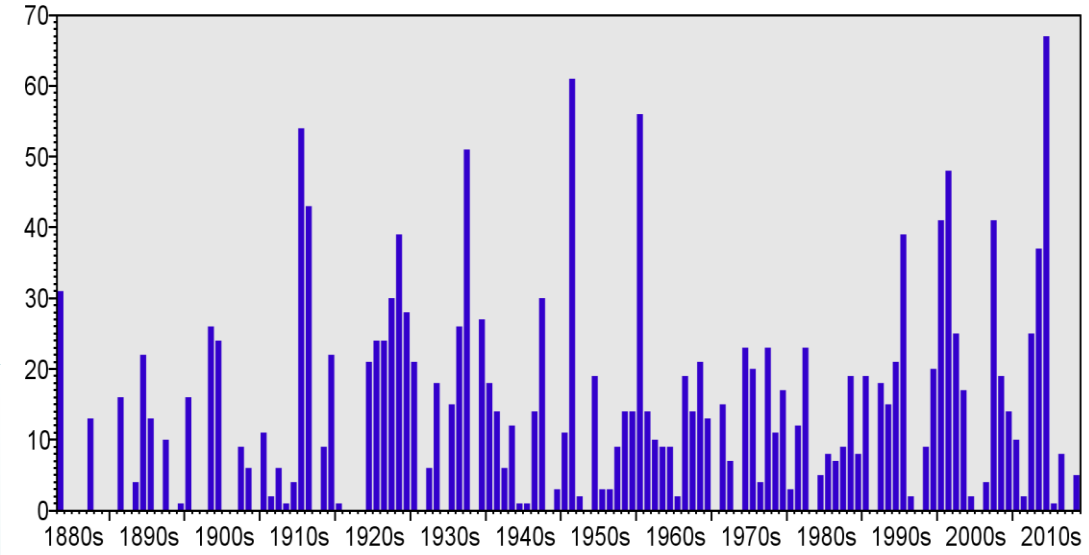
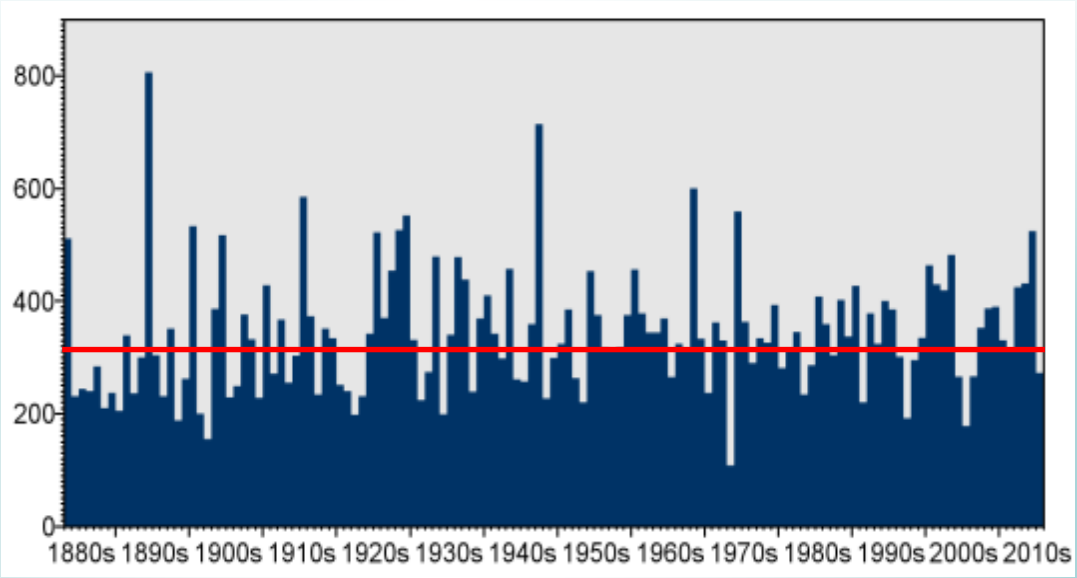
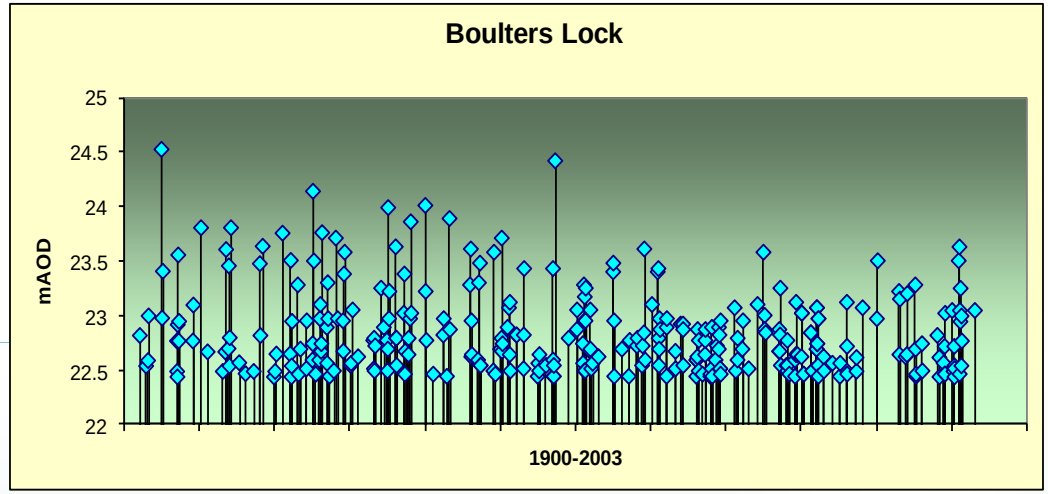
Days with 'high' flows cumecs



Highest flows per year

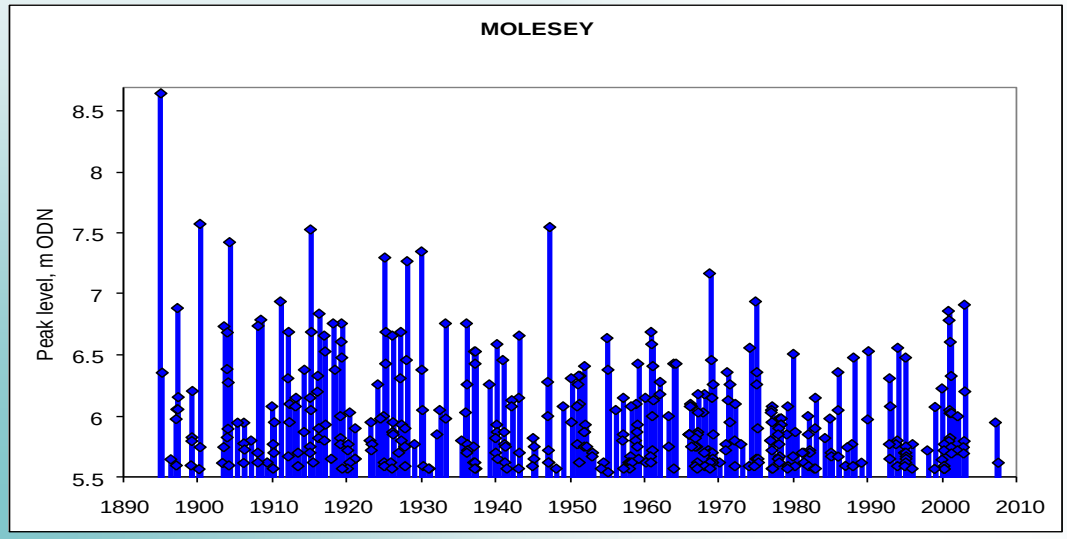


But river levels are more important



Annual maximum Lock Levels

Dredging the Thames



Similar trend for annual maximum water levels at Caversham Lock

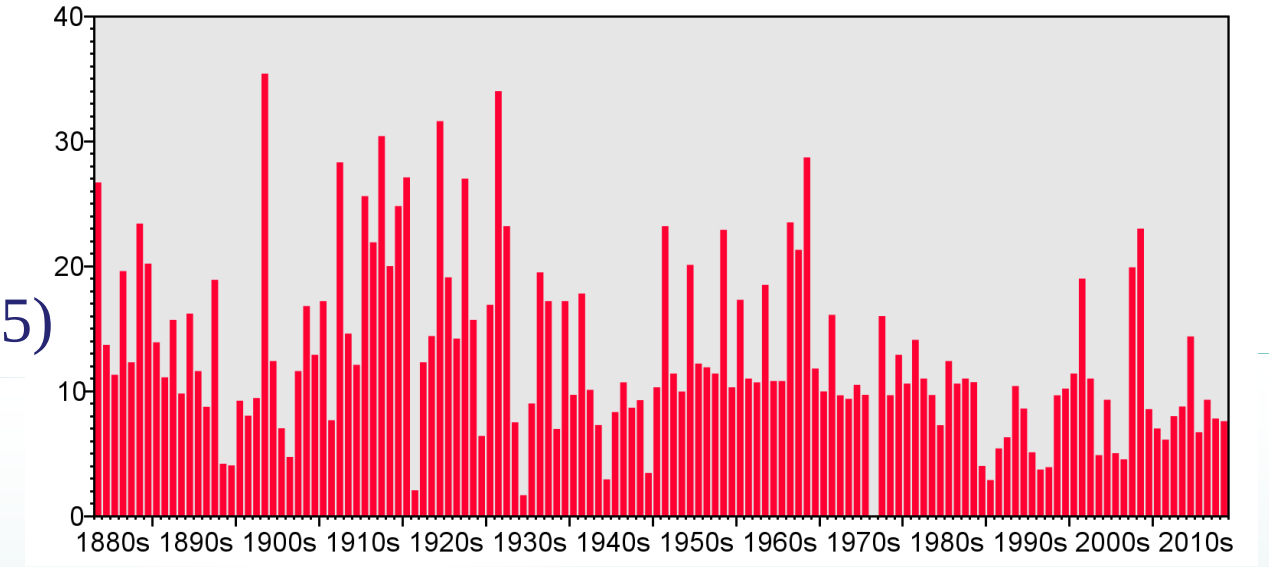
Global warming has benefits...

Reduction in snow/ice aggravated flooding

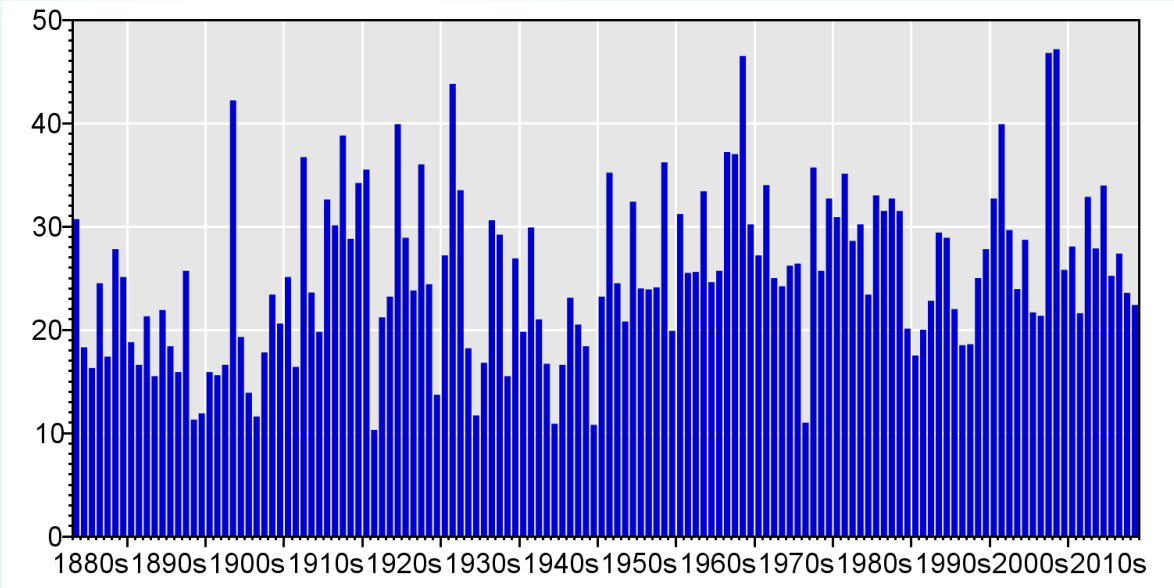
What about droughts and low flows?

Trend in low flows – Teddington/Kingston

- Measured flows (Q95)

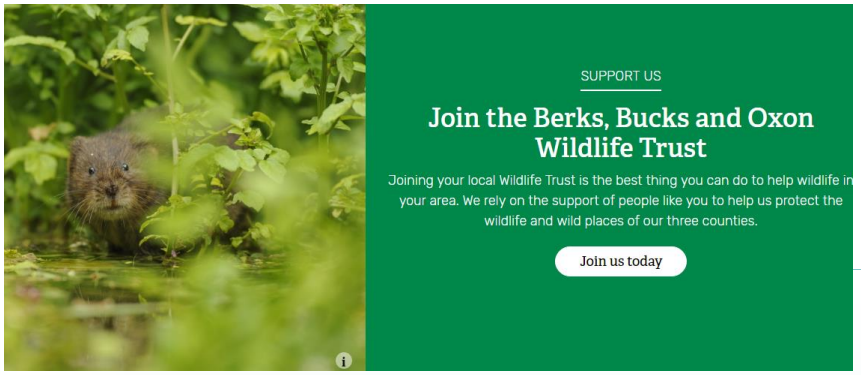


- Adjusted flows



Turning the clock back - ecological recovery

- Environment Agency priority
- Habitat enrichment more effective than restocking
- Conserve and enhance wildlife habitats
- Keep pressure on sources of pollution
- ‘Tidy’ rivers limit wildlife diversity



https://www.ceh.ac.uk/services

Recovery in Action

Welcome to

WITHYMEAD NATURE RESERVE

Withymead Nature Reserve is situated between Goring-on-Thames and South Stoke in Oxfordshire and is a hidden gem that appeals to naturalists, walkers, artists and families.

The Nature Reserve is open by prior arrangement - either email or phone the Wardens:
info@withymead.org
01491 872265
We would appreciate a voluntary donation of £2 per person towards upkeep of the Reserve.

http://www.withymead.co.uk/

Photos: Roger Wyatt

Thank you