



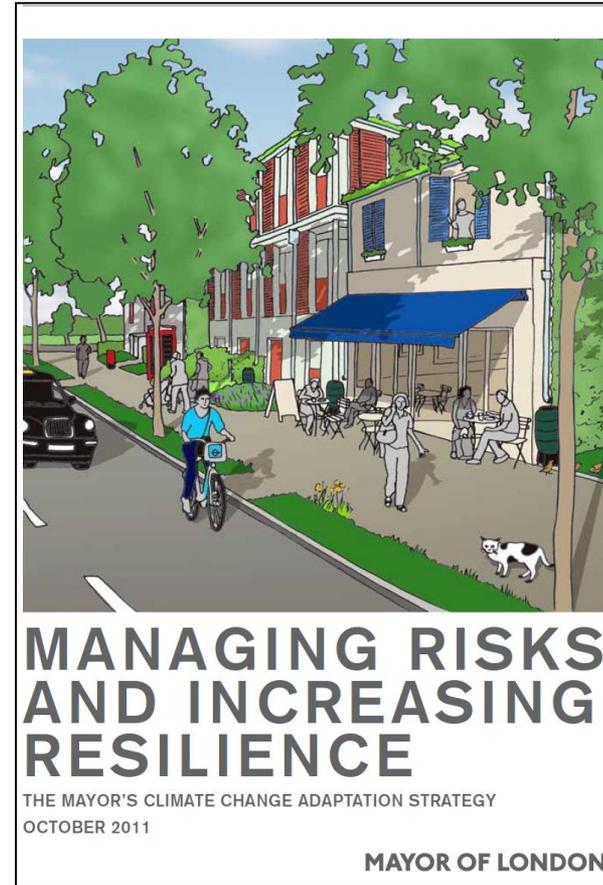
Managing risks and increasing resilience in London

Alex Nickson, Greater London Authority & Dave Wardle,
Environment Agency

Building Cities Resilience to Disasters: Protecting
Cultural Heritage and Adapting to Climate Change.
19-20 March 2012, Venice

How is London vulnerable to climate impacts ?

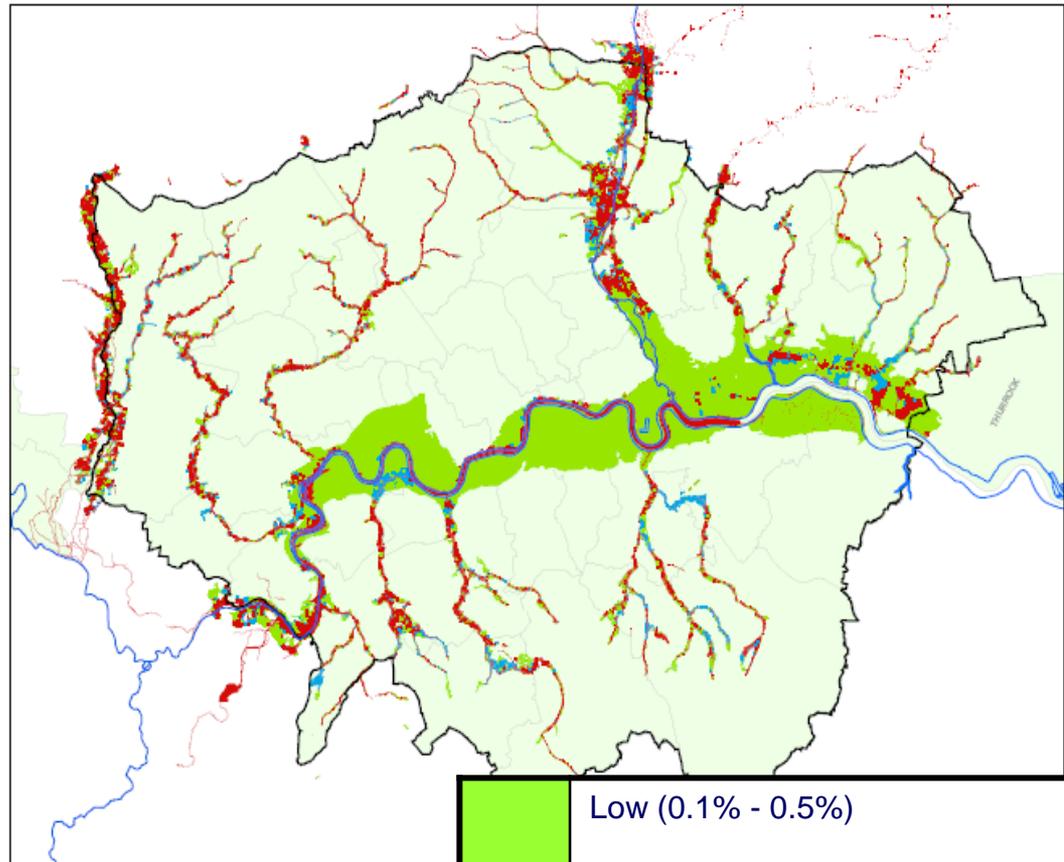
- **Flooding**
- **Overheating**
- **Water resources**
- Wind storms
- Snow and ice
- Air quality
- Subsidence and heave
- Global climate events



The challenges - flooding

5 flood sources

- Tidal
- Fluvial
- Surface
- Sewer
- Groundwater



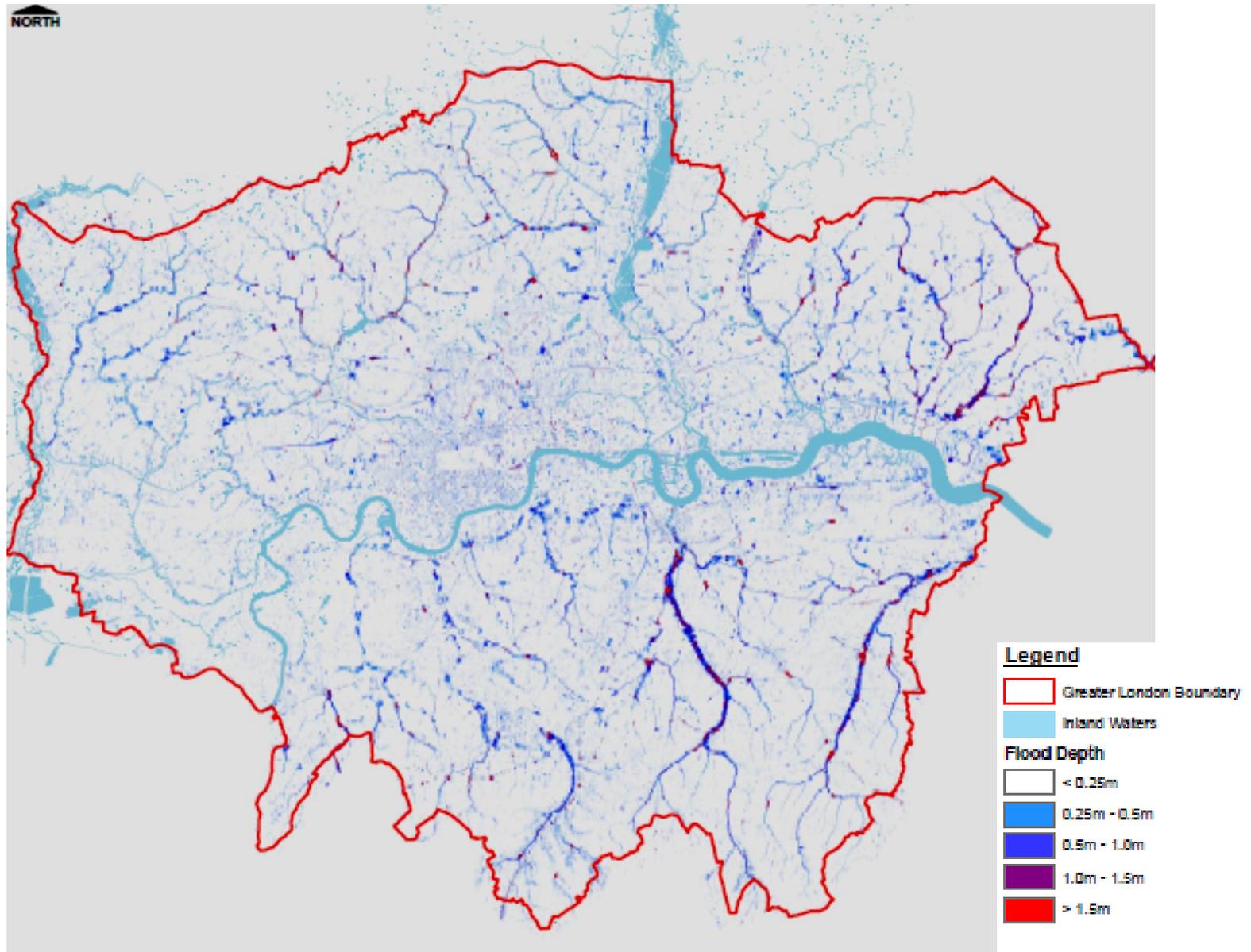
Tidal and fluvial flood risk.
Source: Environment
Agency

Low (0.1% - 0.5%)

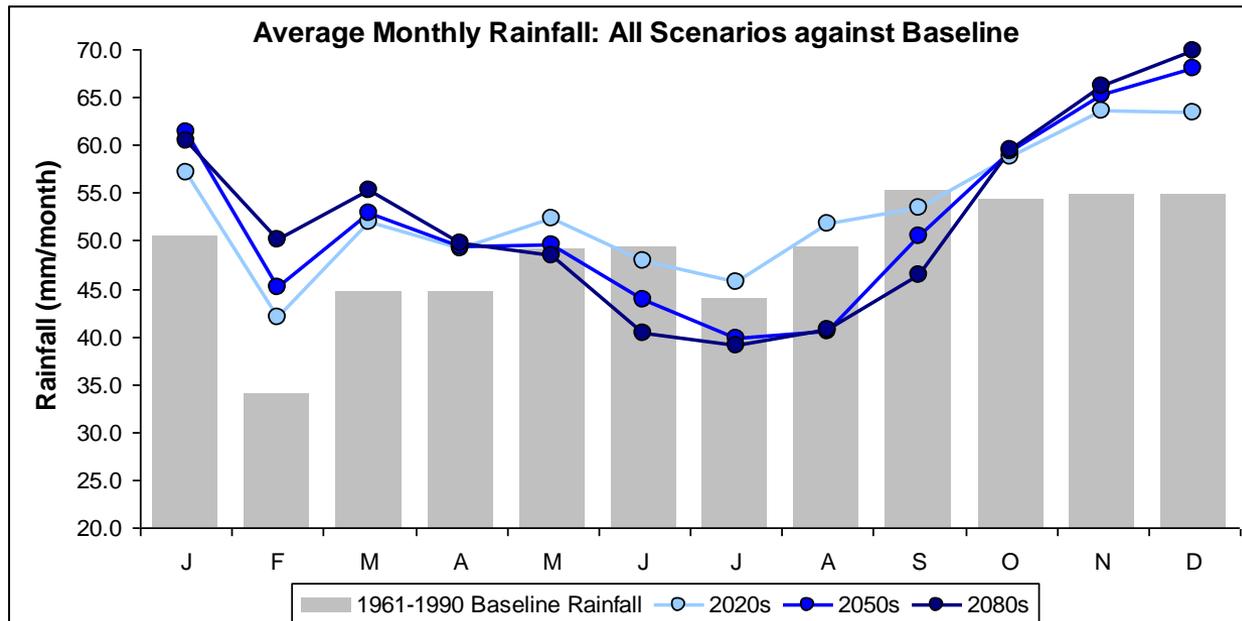
Moderate (0.5% - 1.3%)

Significant (>1.3%)

80,000 properties at significant risk of surface water flooding

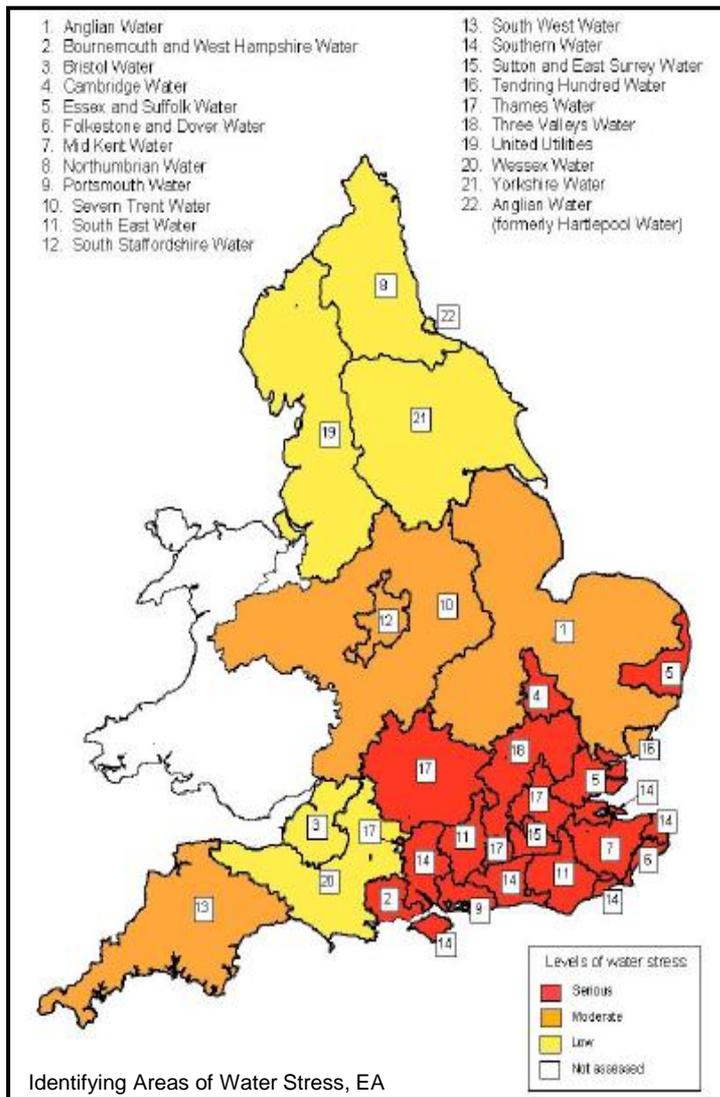


How will climate change increase the risk of floods and droughts ?



- Rising sea levels
- Wetter winters and more heavy rainfall episodes
- Peak river flows could increase by 40% by 2080s

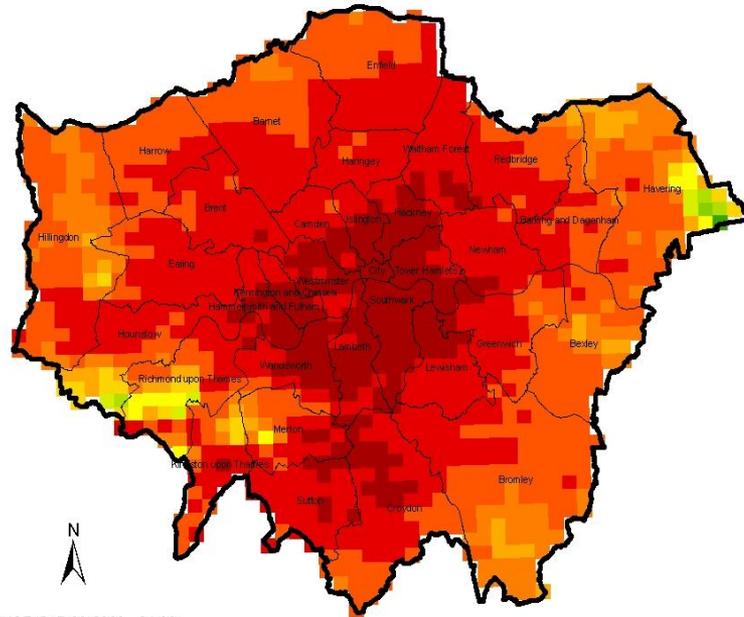
The challenges - drought



- The south east of England is already seriously 'water stressed'.
- 80% of London's water supply from rivers. 20% from groundwater
- London's water resources are already over-abstracted, or over-licensed.
- In a dry year, we can only balance supply and demand through desalination
- Londoners use more water than the national average (167 l/p/d vs 150 l/p/d)
- Only 1 in 4 homes has a water meter
- The Victorian-era water distribution network loses over 1/4 water in leakage

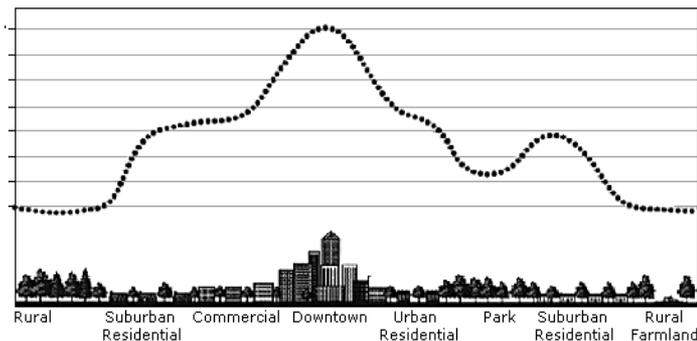
The challenges - overheating

Temperature distribution in London, August 2003



MODIS 7.08.2003 21:30

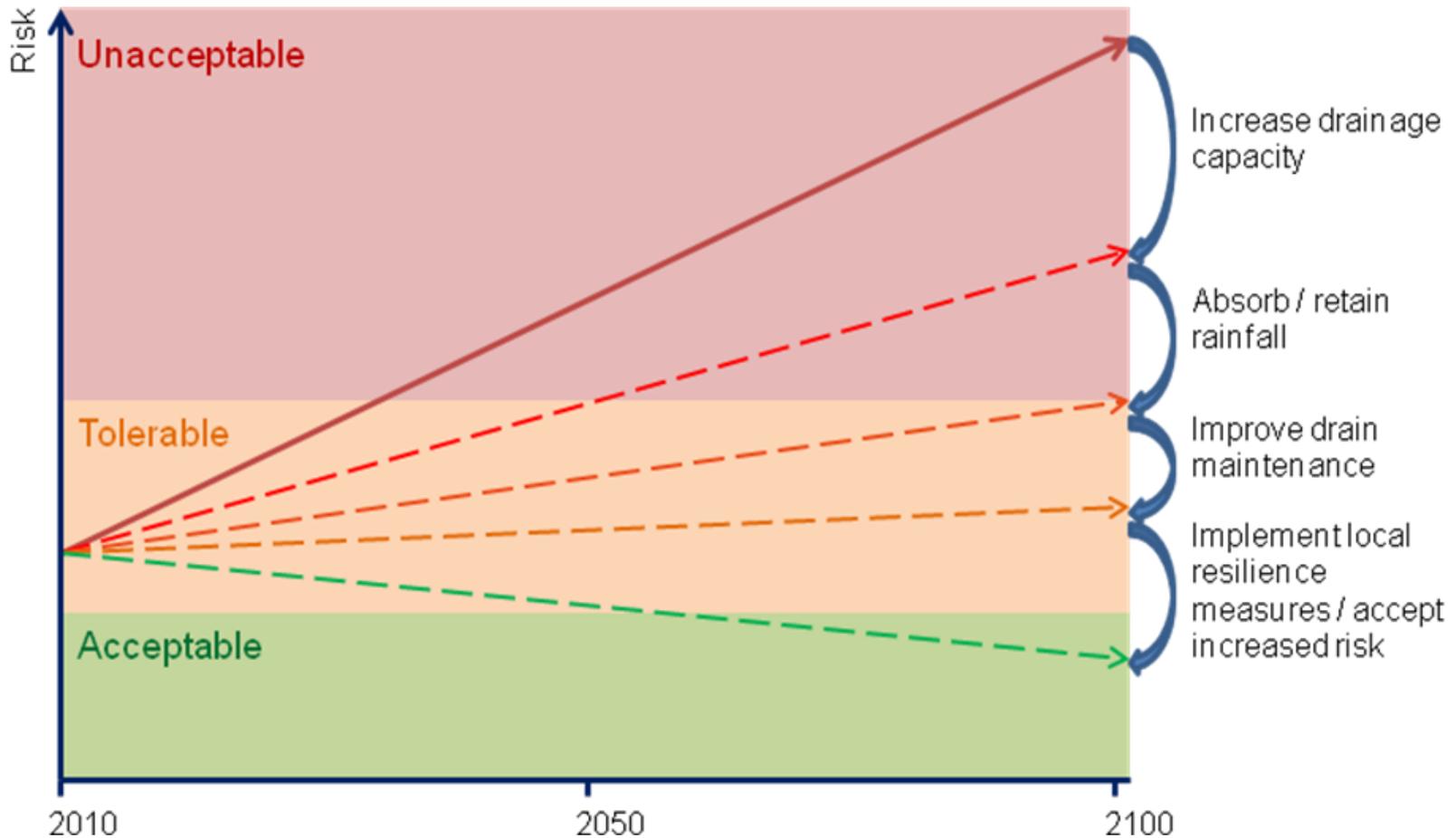
- 600 people died in the 2003 heatwave
- London's microclimate amplifies the impact of hot weather (London is up to 10°C warmer than the greenbelt on summer nights)
- Londoners are more resilient to rising temperatures than other UK regions, but suffer most when temperatures exceed 24°C.



Adaptation actions

- Identifying who and what is at risk, today & tomorrow
- Re-greening the city
 - Increase London-wide tree cover by 5% by 2025
 - Increase greencover in the centre of London by 10% by 2050
- Ensuring new development is fit for the future
- Retrofitting existing development
 - Public and private sector retrofit programmes
- Raise awareness, encourage ownership of risk and build capacity to act
 - Revising emergency plans to be more proactive
 - Community Resilience Plans
- Leading by example
 - Changing corporate approach to climate risks
- Research into 'adaptation gap'

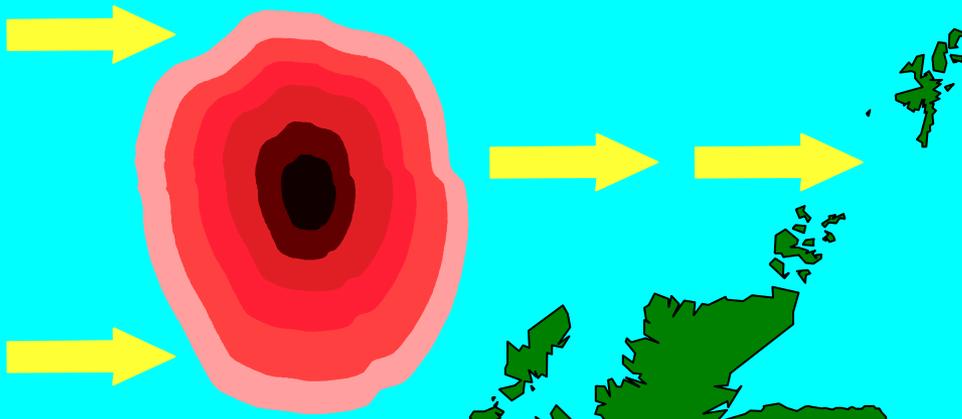
Closing the 'adaptation gap'



Thames Estuary 2100

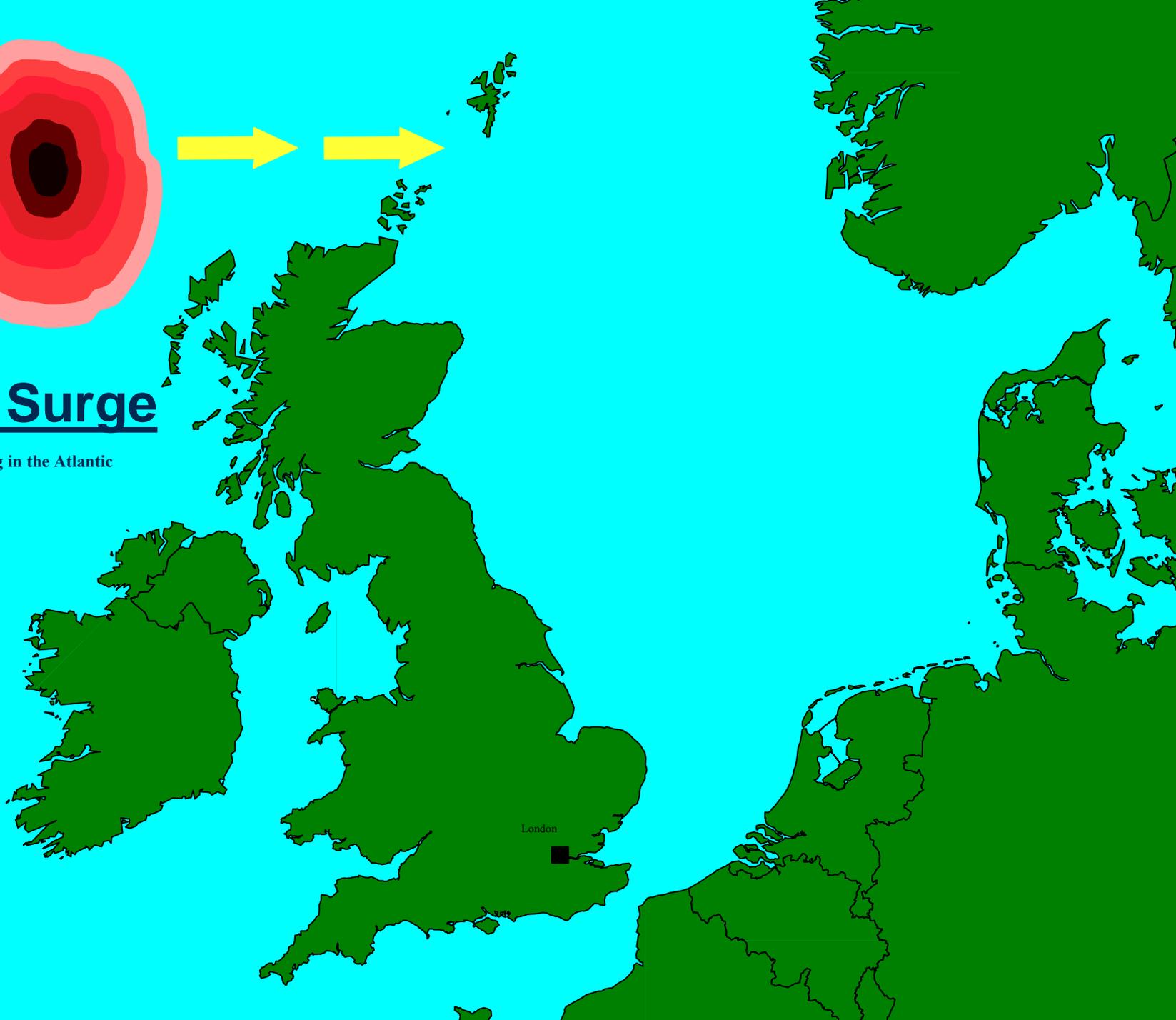


Managing flood risk through London and the Thames Estuary to the end of the Century



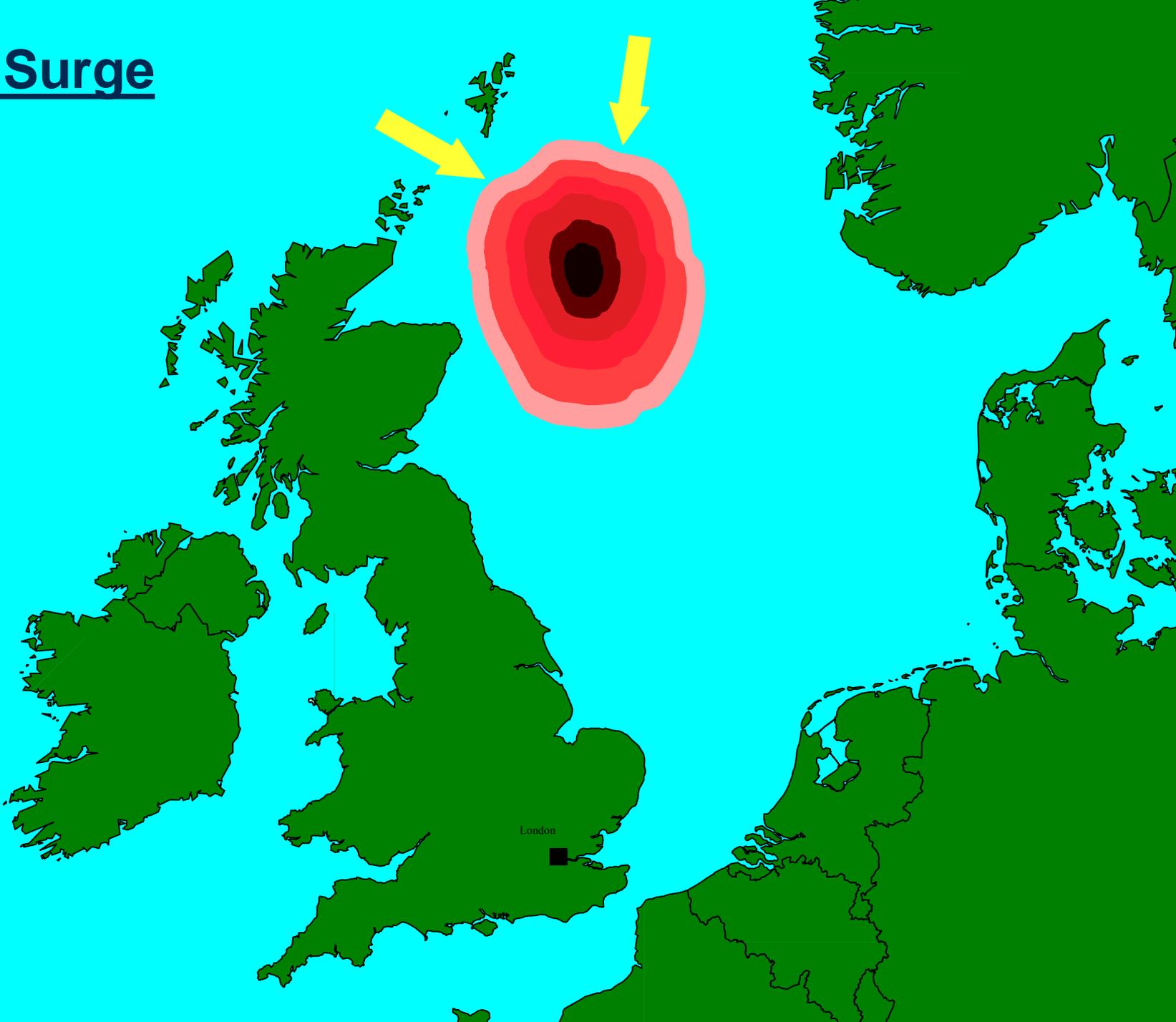
Storm Surge

depression originating in the Atlantic



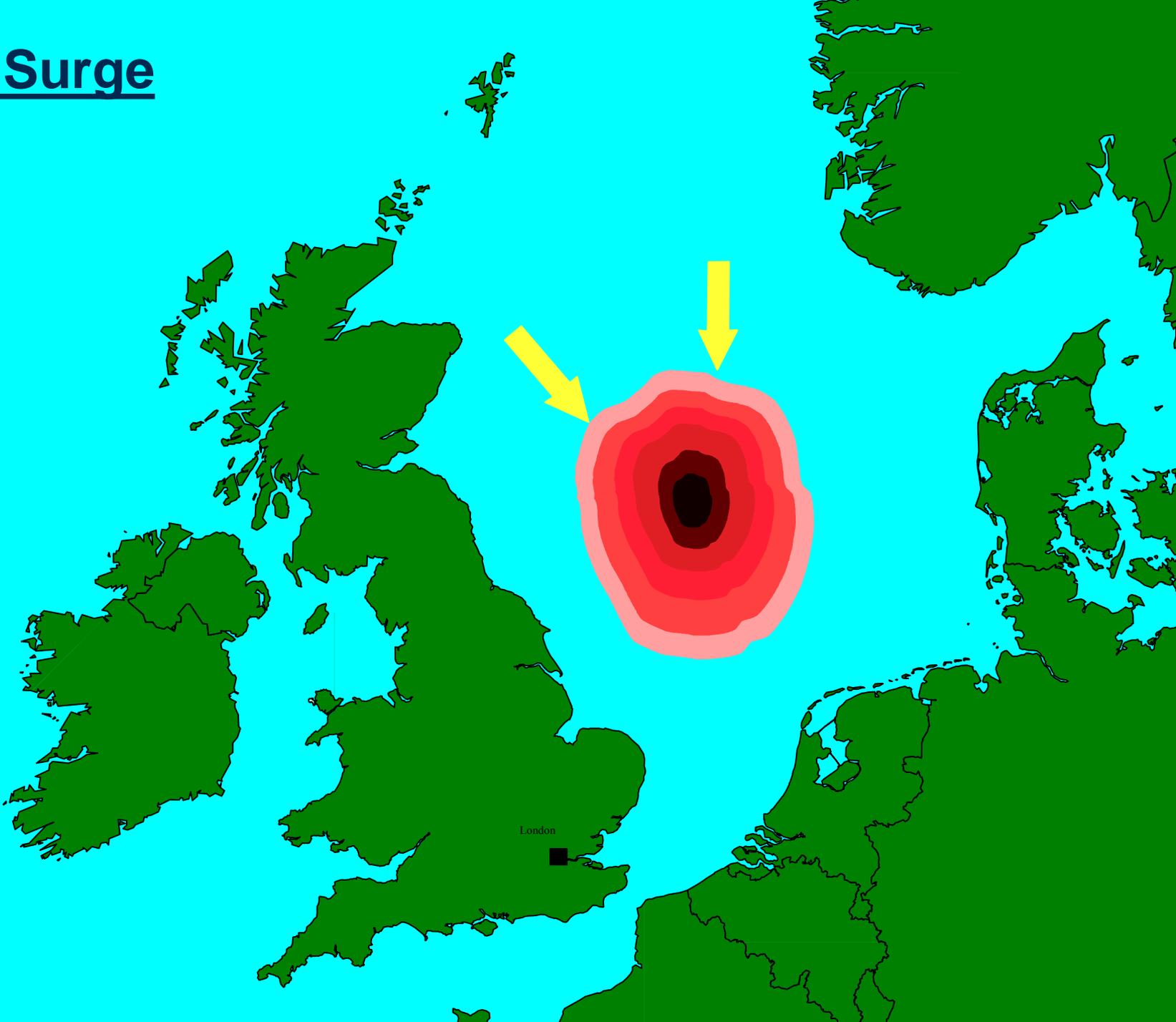
Storm Surge

at Northern Scotland



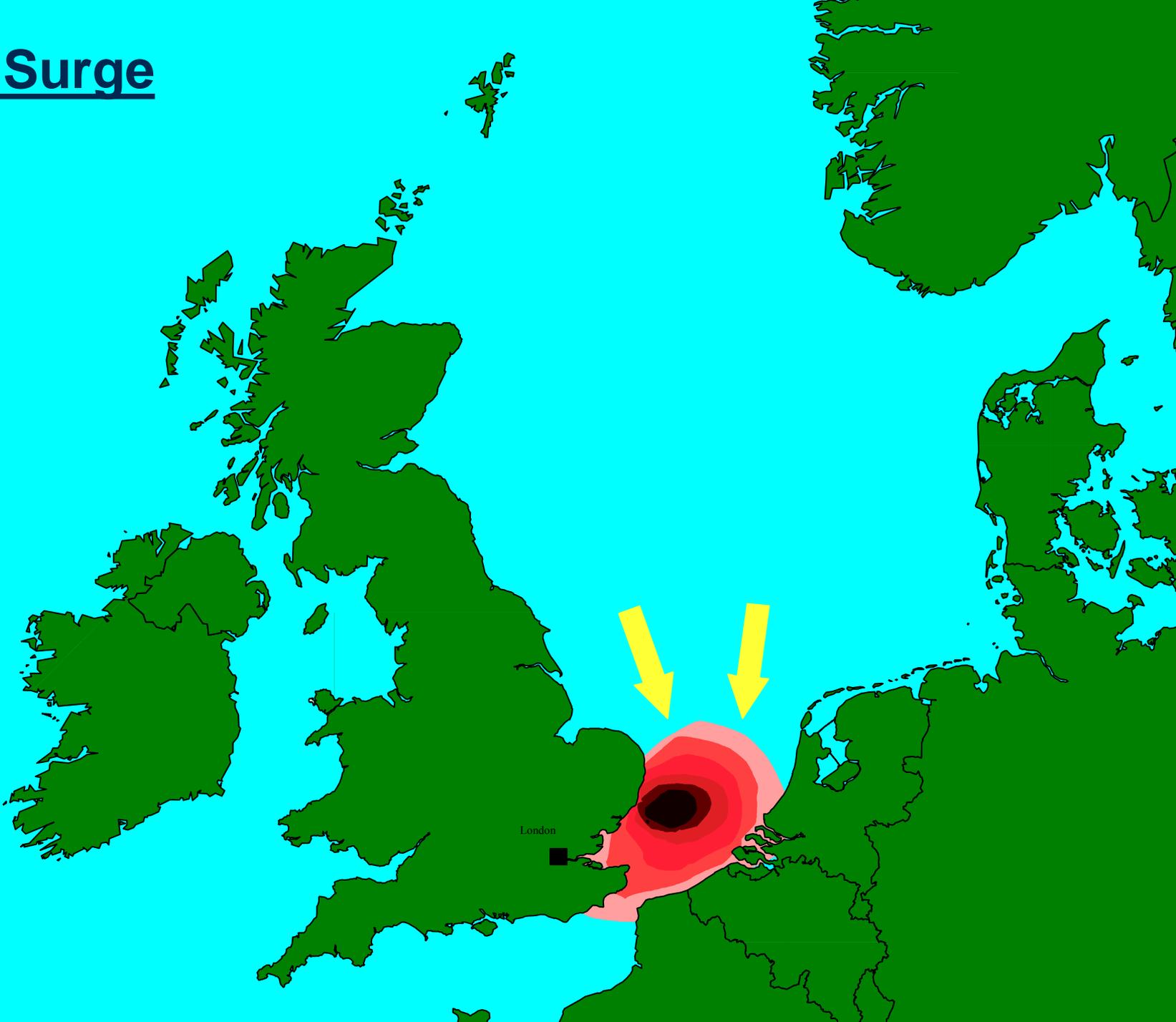
Storm Surge

off East Coast



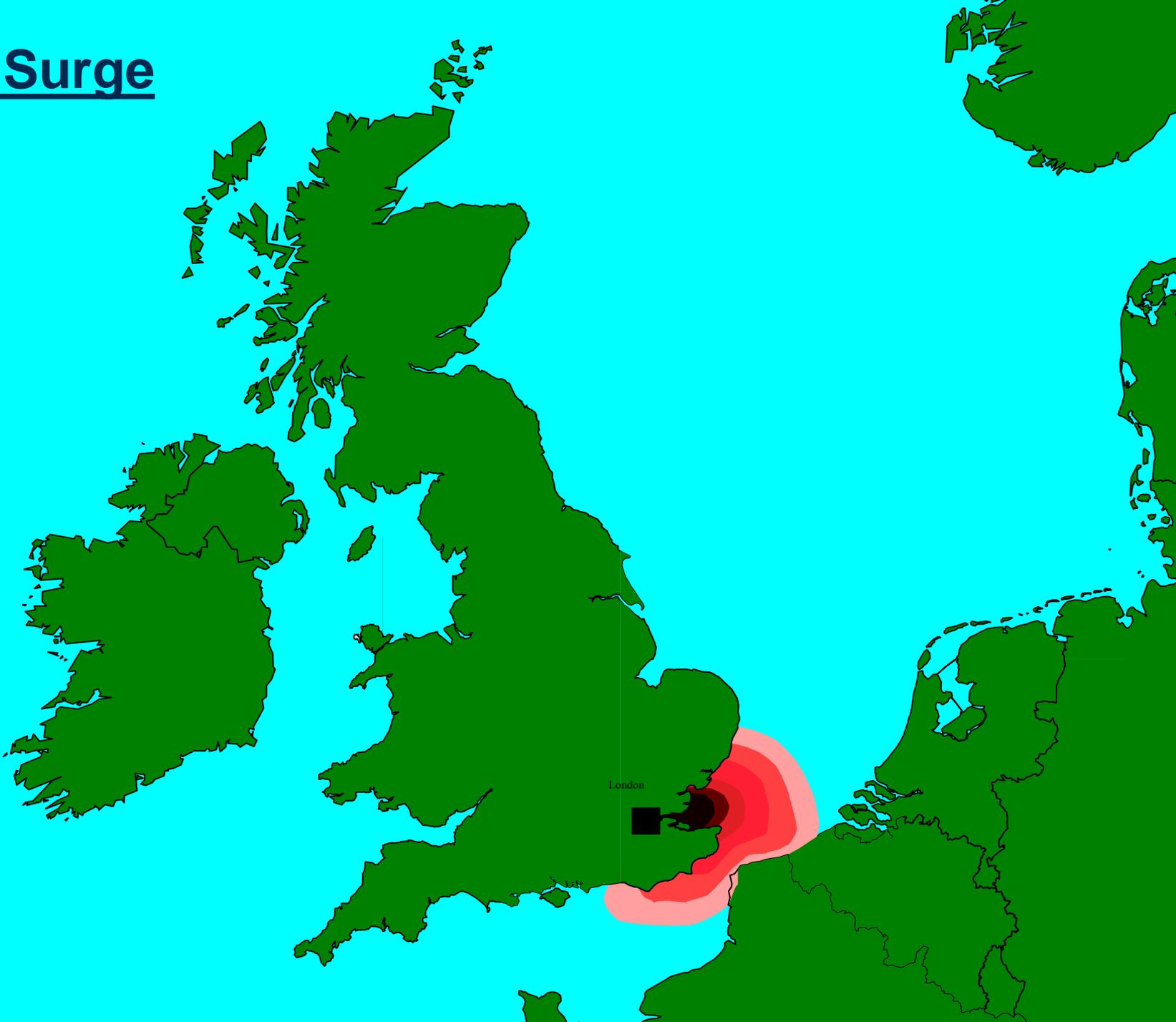
Storm Surge

at Thames Estuary



Storm Surge

at Thames Estuary





Interim Defences during the construction of the Thames Barrier →

1928 Flood & subsequent 1930 Flood Act →

Late C19 update to Flood Act →

1879 Flood Act →



What is the TE2100 Plan?

A plan of options and actions demonstrating how flood risk could be managed in the Thames Estuary over this century in response to:



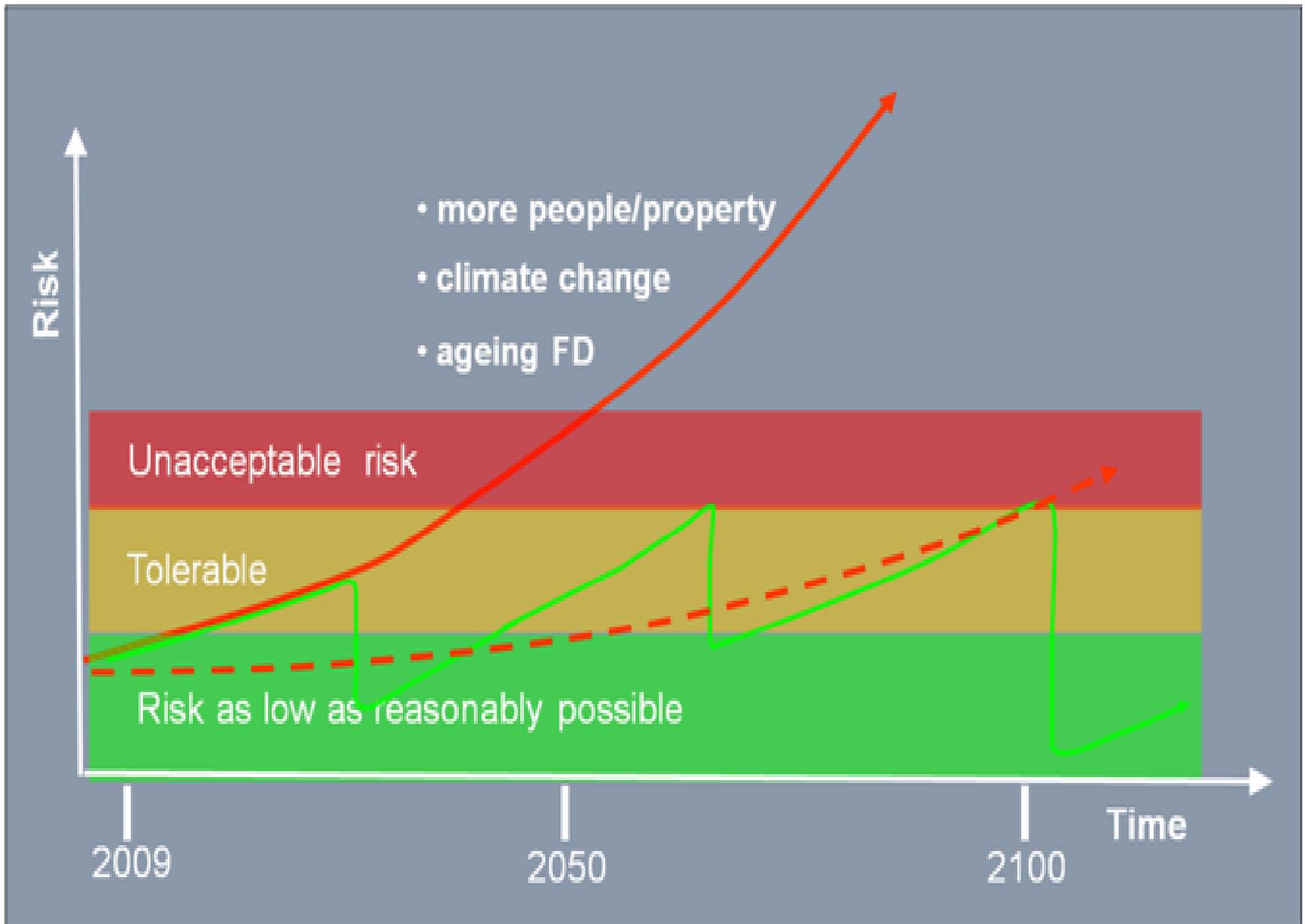
- A changing estuary



- A changing climate



- Ageing flood defences



Managing flood risk over the century

Maximum sea level rise:



All four options suitable in 2100

Improve defences

Old High ++

Improve Thames Barrier and raise d/s defences

HLO 1

Over-rotate Thames Barrier and restore interim defences

Flood storage, improve Thames Barrier, raise u/s & d/s defences

HLO 2

Existing system

Raise Defences

Flood storage, over rotate Thames Barrier, raise u/s & d/s defences

Maximise storage

Flood storage, restore interim defences

Estuary-wide options

New Barrier

HLO 3a

New barrier, retain Thames Barrier, raise defences

HLO 3b

New barrier, raise defences

HLO 4

New barrier with locks

Current Defra

High ++

New Barrier with locks

A plan adaptable to climate change