

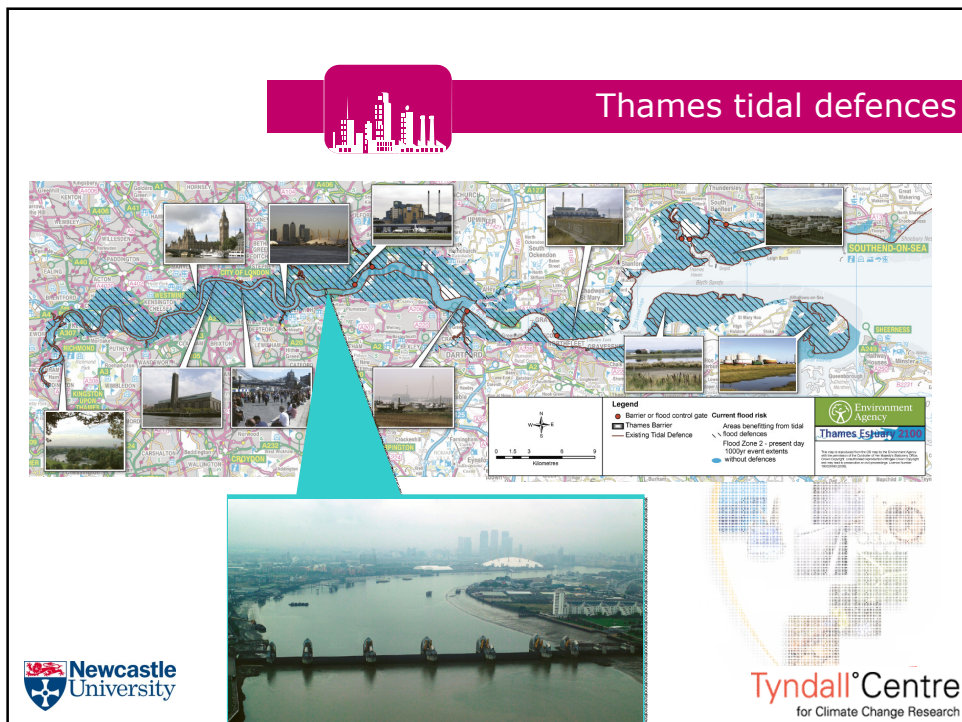
# Impacts of climate change and sea level rise

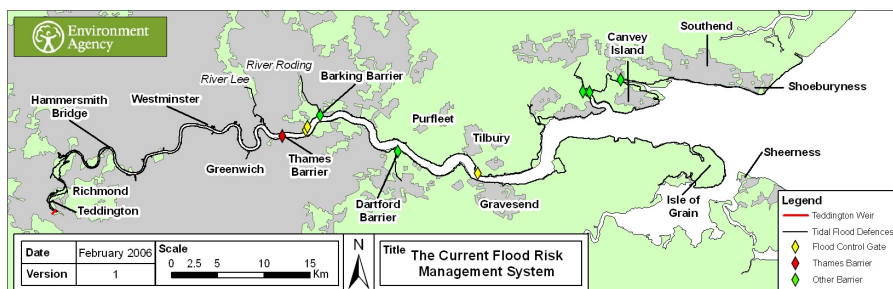
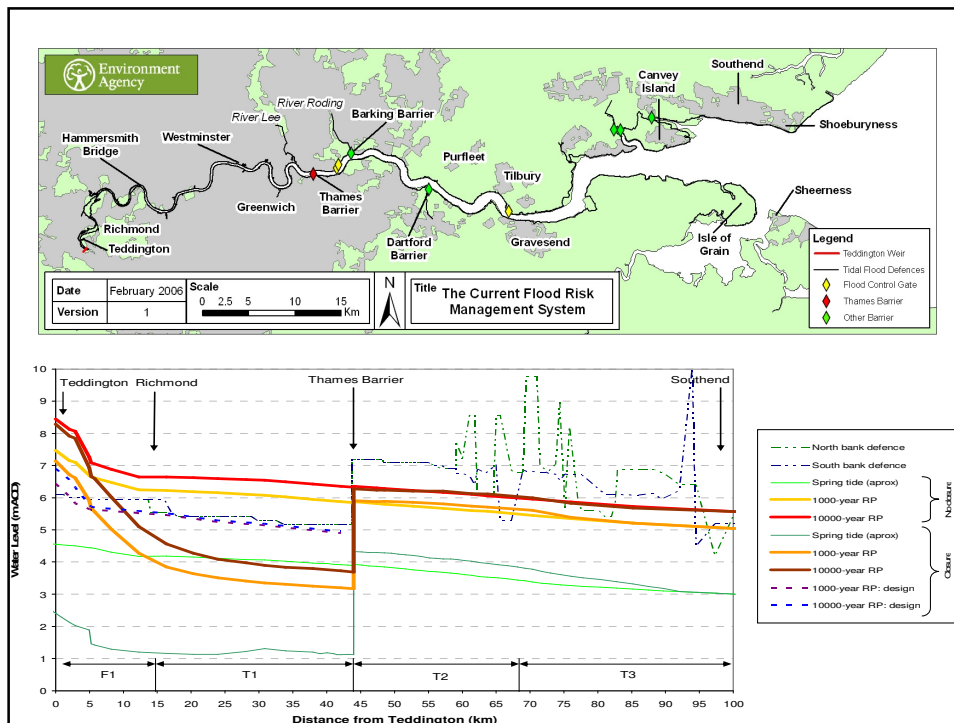
Thames Estuary deltas session

Jim Hall

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School of Civil Engineering and Geosciences  
Newcastle University

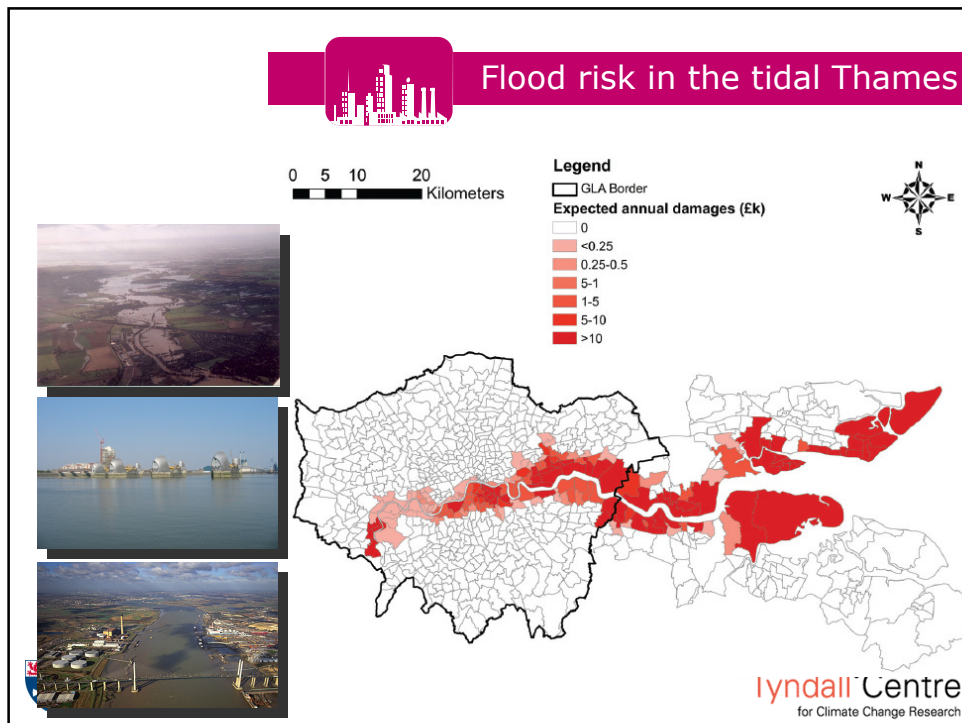






## The flood risk calculation in the Thames Estuary

1. Joint probability distribution of boundary conditions at Southend (water level) and Teddington (flow at weir)
2. 1D hydraulic model of water levels in the estuary with the Thames Barrier open and closed
3. Reliability analysis of each of the dike sections
4. Inundation models in the floodplain
5. Depth-damage functions for flooded locations

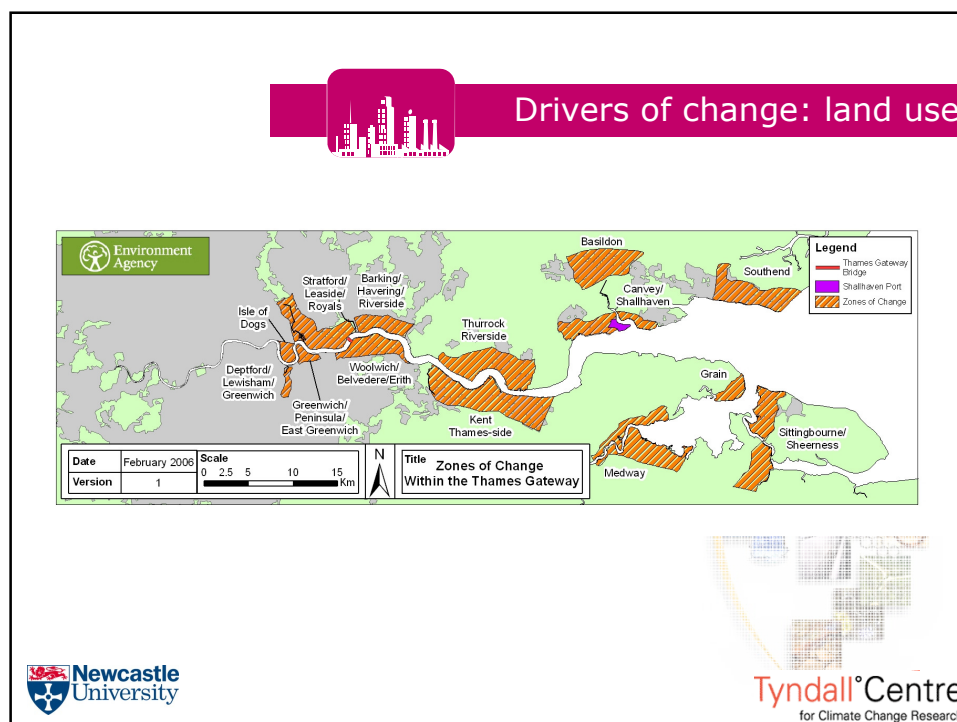
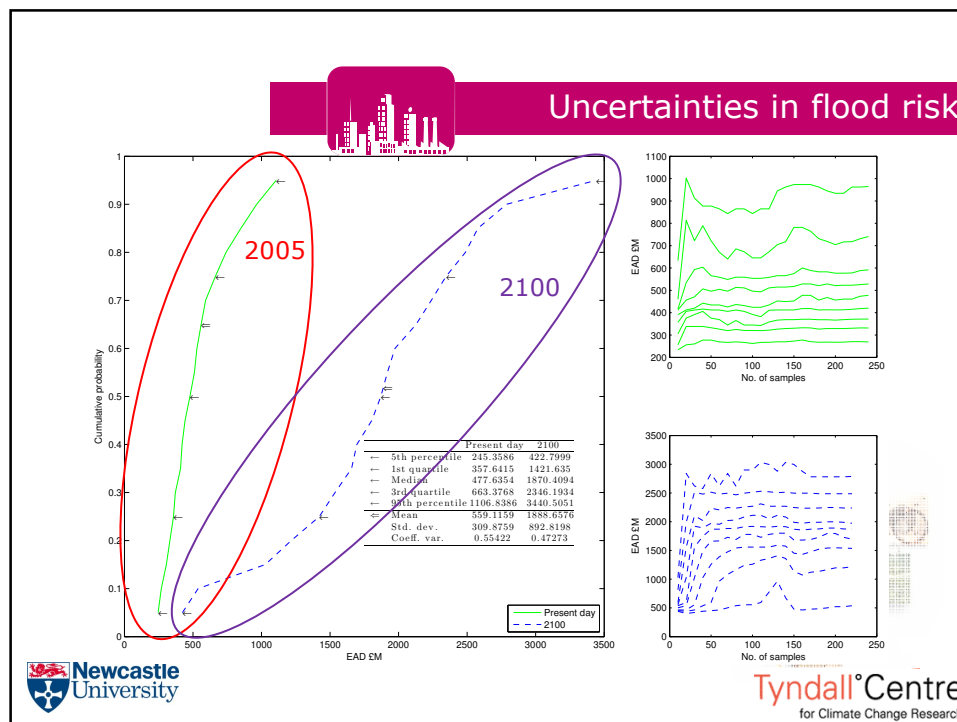


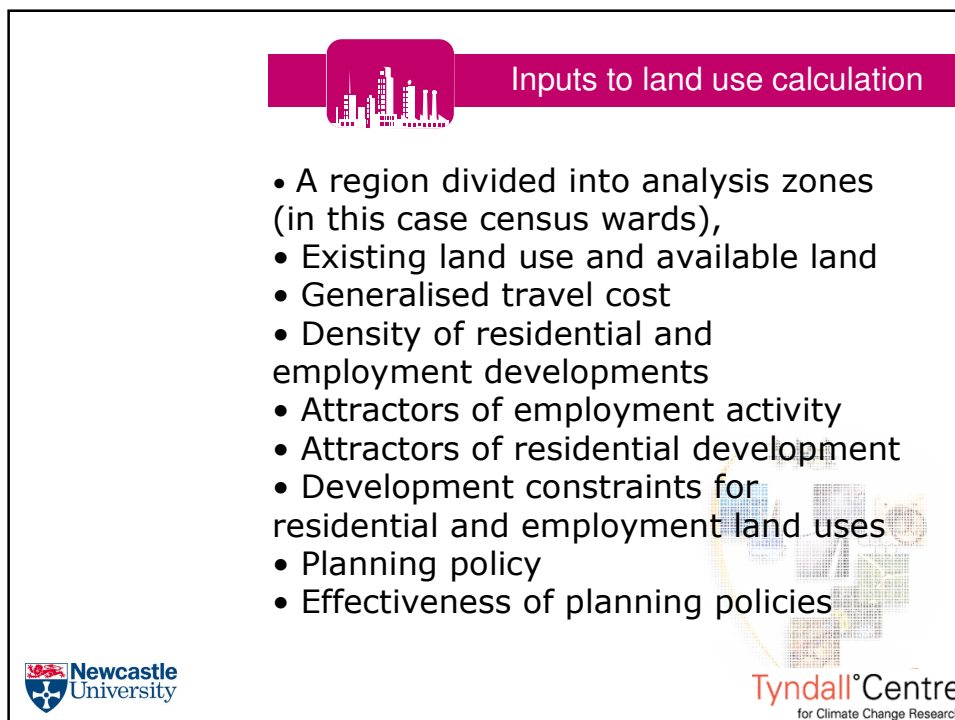
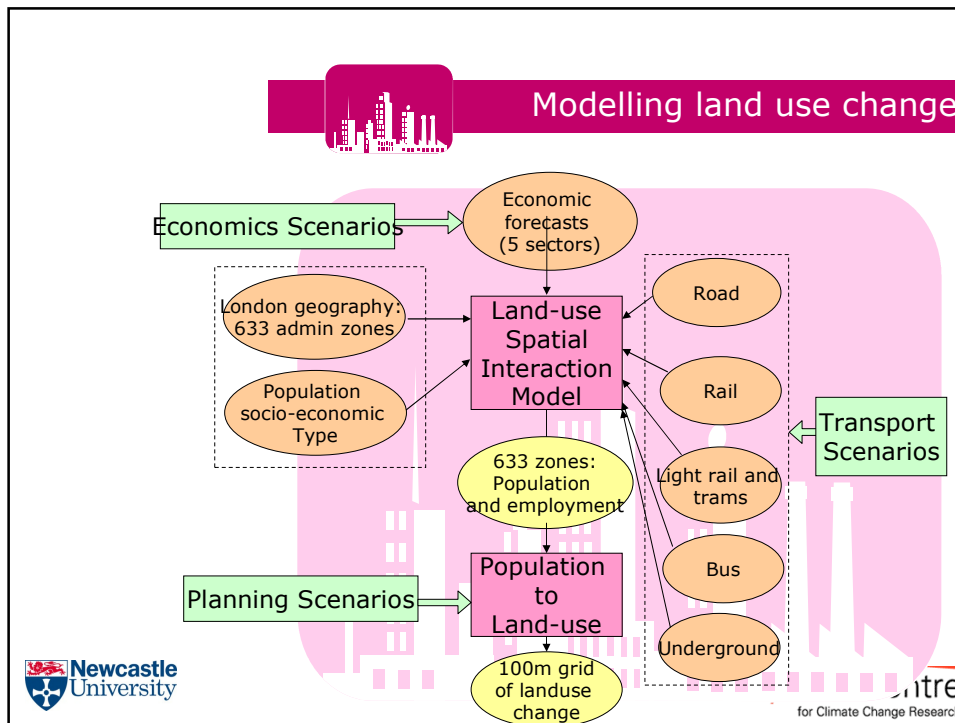
## Sources of uncertainty

- Tide levels (sea level rise and surges)
- River flows (and future changes)
- Hydraulic model uncertainties
- Dike crest level (and subsidence)
- Dike reliability
- Flood inundation models (and sampling)
- Property location databases (and future changes)
- Depth-damage criteria (and future changes)
- Indirect impacts

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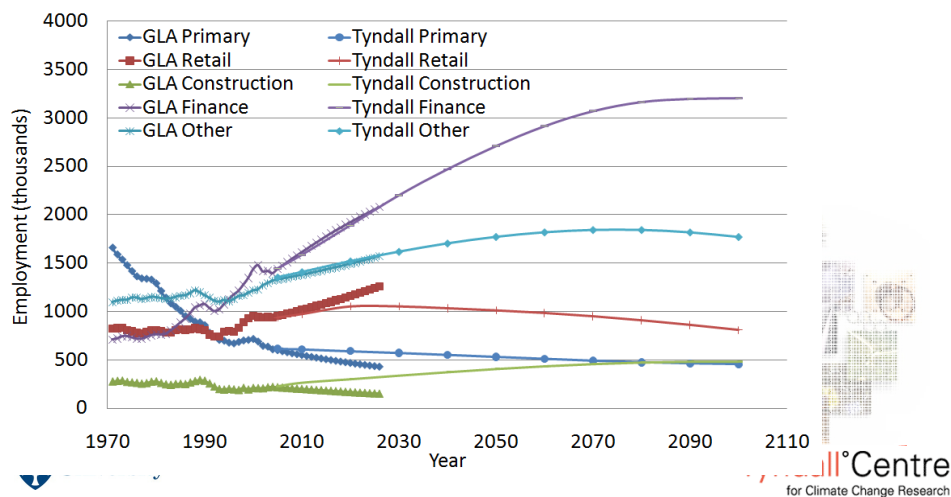






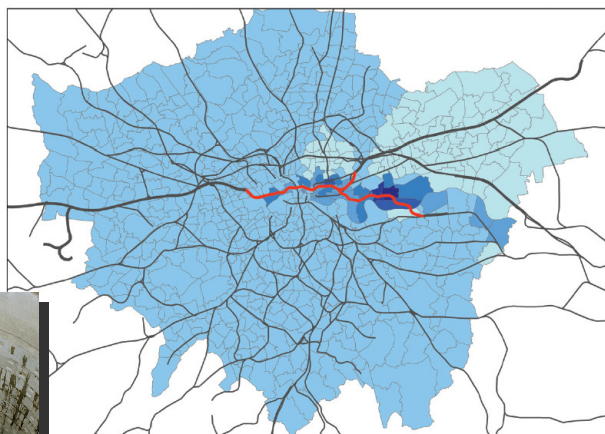


## Economic drivers



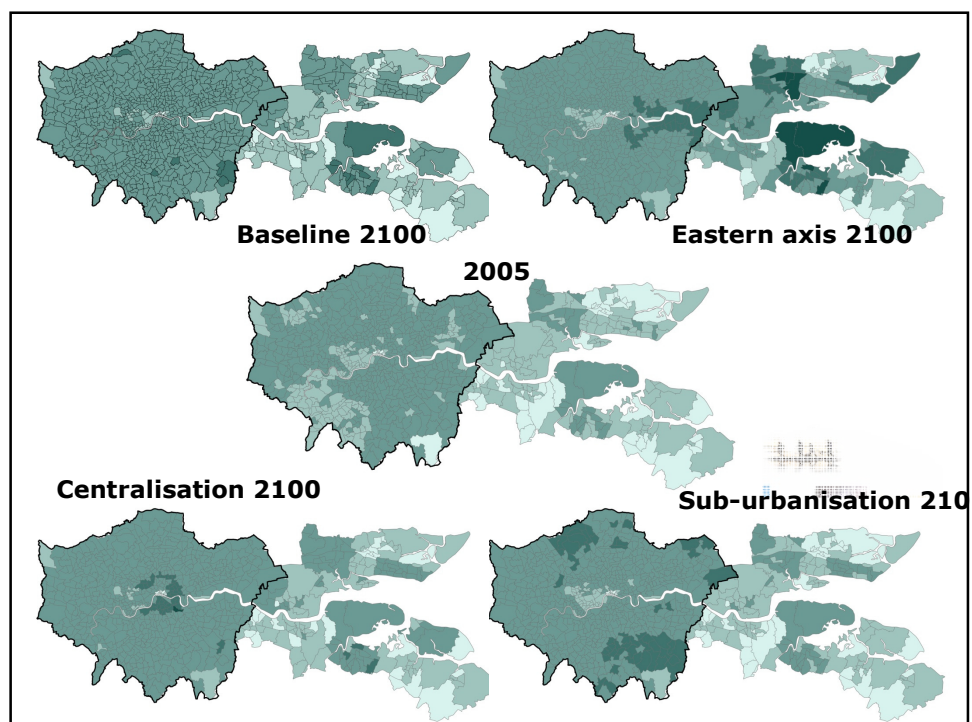
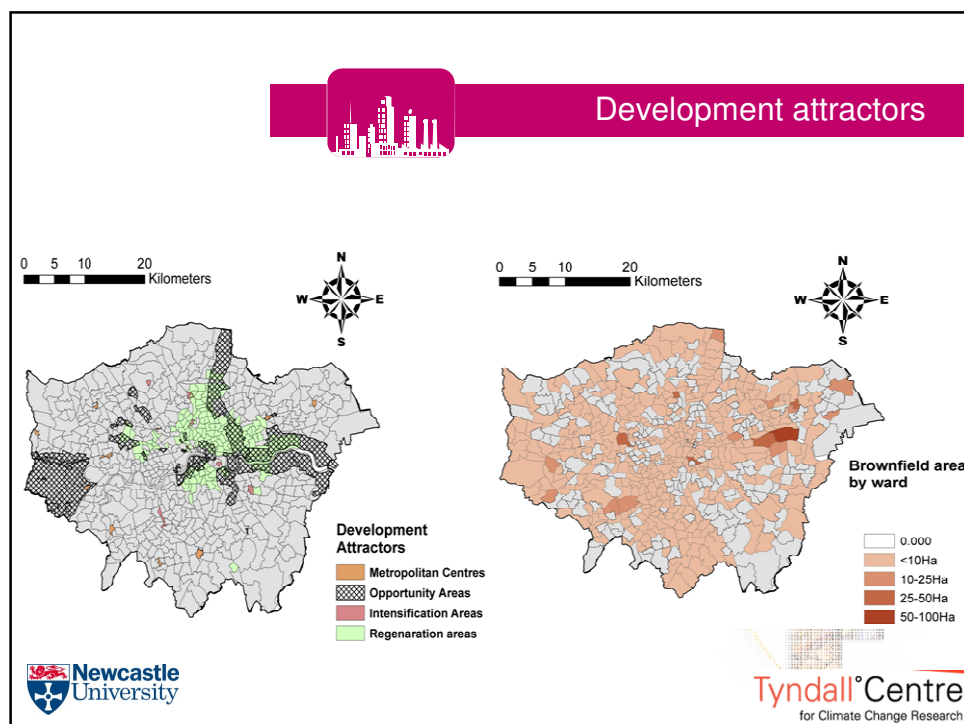
## Transport infrastructure investment

0 2.5 5 10 15 20 25 Kilometres



Reduction in travel times from Heathrow to all other census wards within the GLA boundary by rail after the construction of Crossrail.

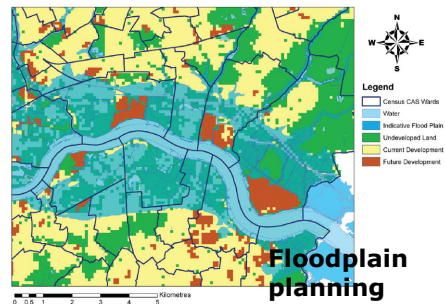
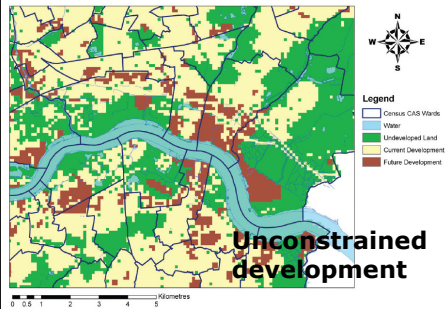
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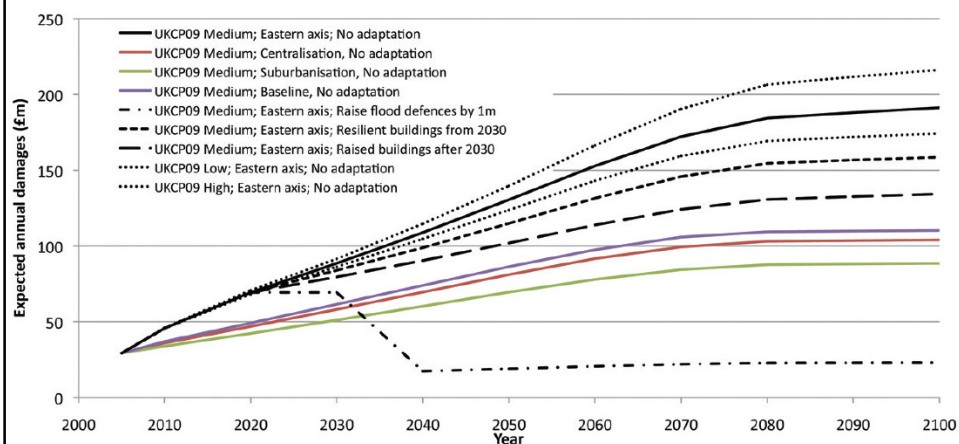




## Adaptation to reduce risk



## Flood risk in the tidal Thames



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