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Tyndall Centre for Climate Change Research 21 years

Coastal adaptation and resilience in the UK

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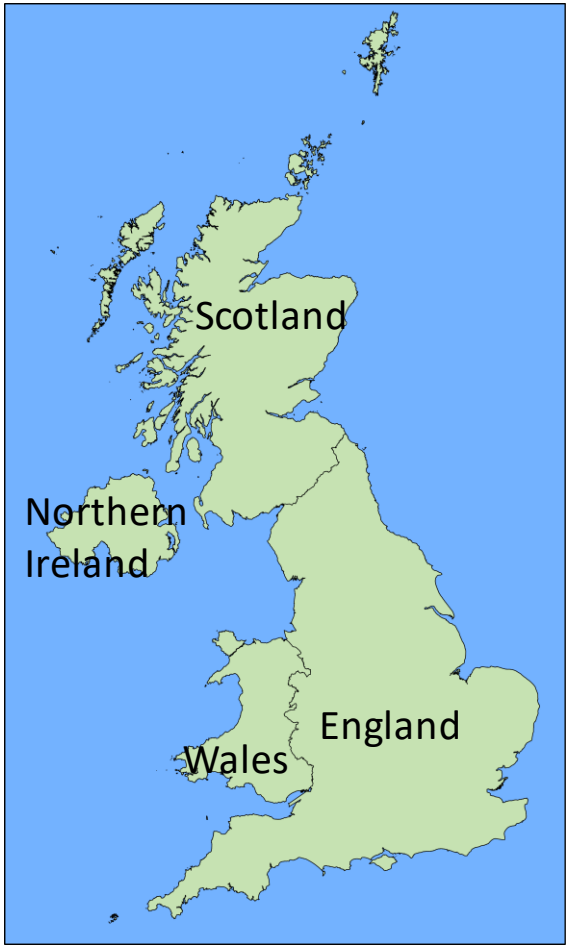
The United Kingdom

The two major coastal hazards

- Erosion (episodic and chronic)
- Floods (high tides, surges and waves)

Particularly prevalent on south and east coasts – soft geology and low elevation

Erosion and flooding traditionally treated separately, but strongly coupled



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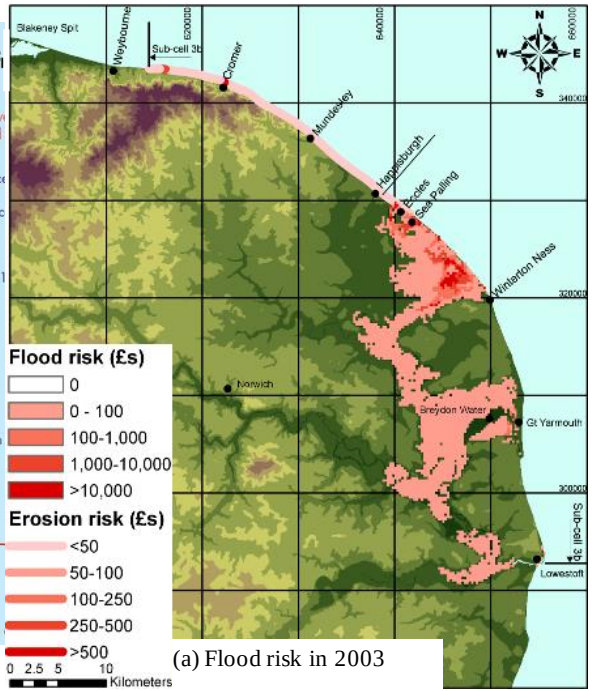
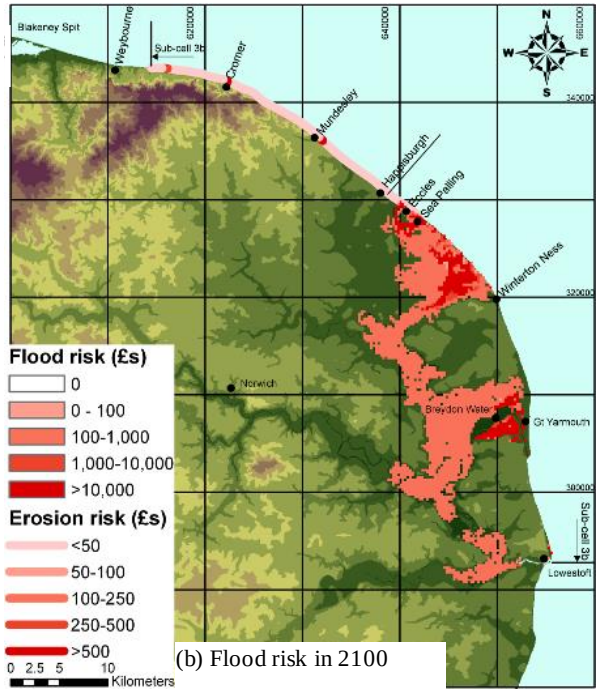
CHANGING FLOOD AND EROSION RISK: 2003 to 2100



(a) Flood risk in 2003



(b) Flood risk in 2100

Historical Coastal Change

Managing coastal floods

Changes over the last 30 years (1)

Forecast and warning services (since the 1953 flood disaster)

A move from “defence” to “management”

A move from a hazard (source) perspective to a systemic risk perspective

- Change in hazard (e.g., sea-level rise)
- Change in pathway (e.g., defence upgrade)
- Change in receptor (e.g. urban expansion in the flood plain)

Recognition of multiple adaptation approaches (not just defence)

Managing coastal floods

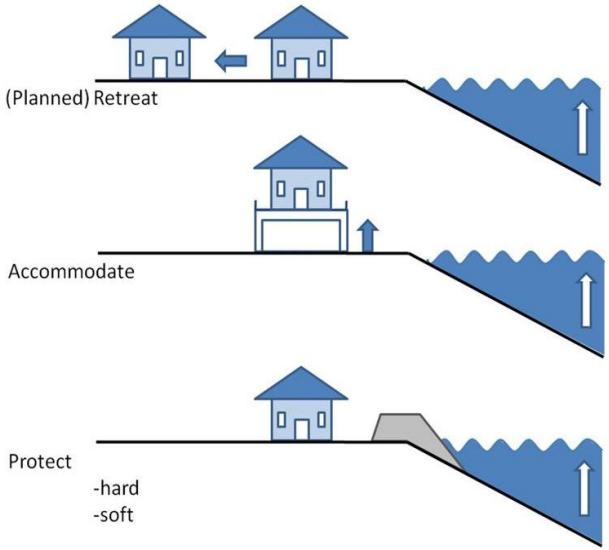
Changes over the last 30 years (2)

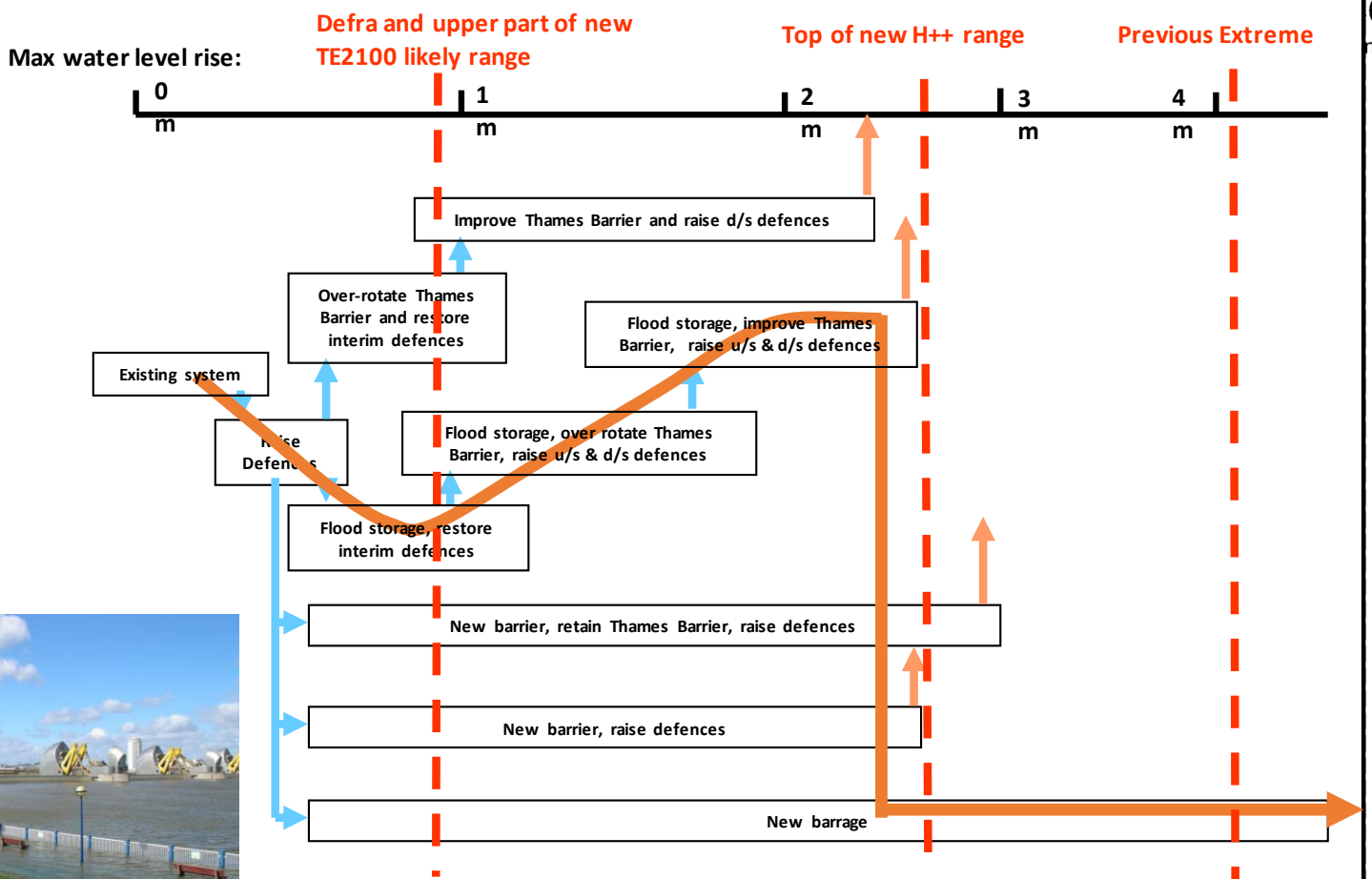
Structured national management approaches

- Framing decisions around assessing economic risk and benefit-cost approaches (since the 1970s)
- Shoreline management plans, strategy studies, projects
- National coastal monitoring in England (Channel Coastal Observatory)
- Thames Estuary 2100 project – an adaptive management approach
- National climate change scenarios (e.g., UKCP18)
- Climate Change Act (2008) – five yearly Climate Change Risk Assessments and National Adaptation Plans
- Increasing interest in resilience to flooding (all types) and coastal change (i.e. erosion)

Technical Issues

Classic IPCC approach to coastal adaptation



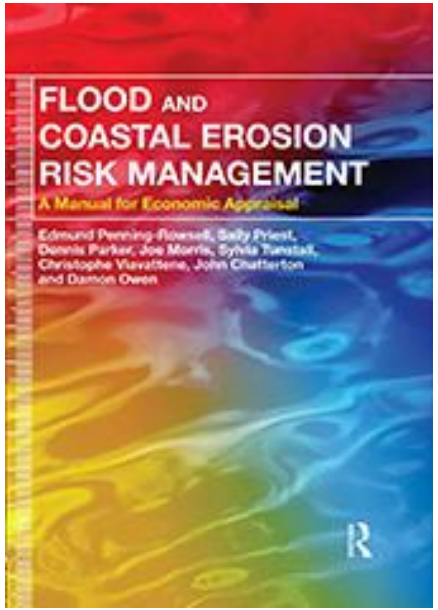


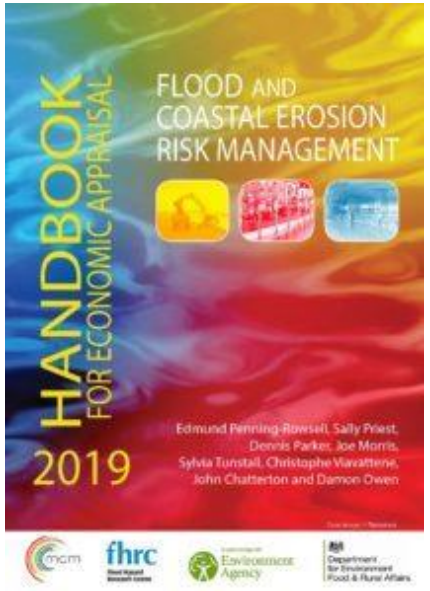
Thames Estuary 2100 developed options

Source: Tim Reeder, Environment Agency

Economic/Financial Issues

1. Effective and agreed approaches to assess costs and benefits of flood alleviation
2. Cost-Benefit needs to >> 1 to be funded by Grant in Aid



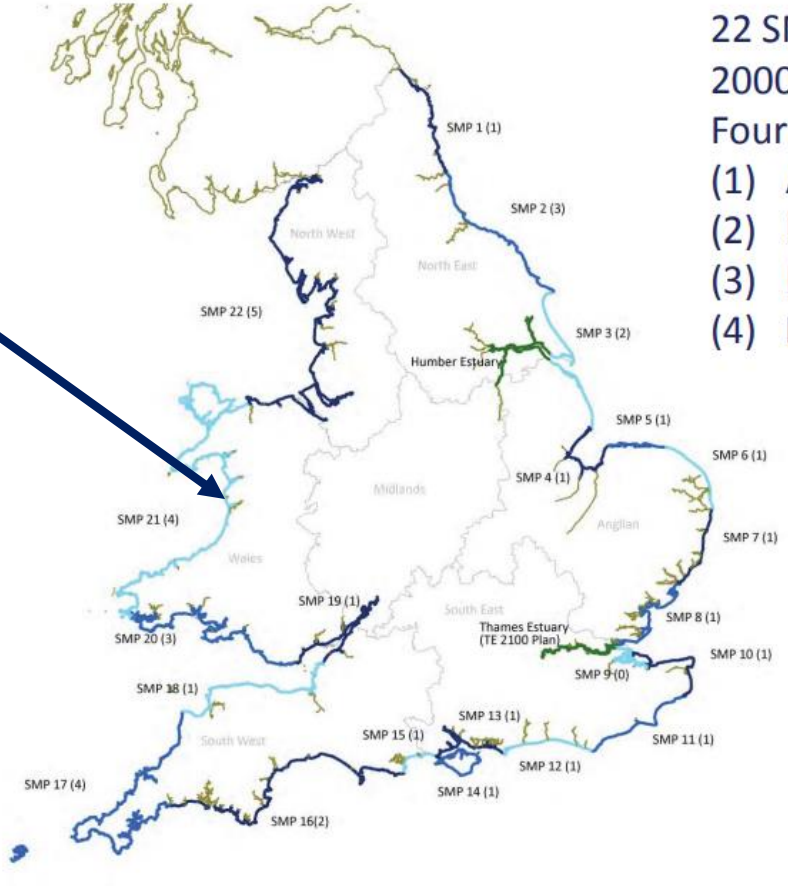


Shoreline Management Plans (SMPs)

Fairbourne, North Wales

Guardian, 18 May 2019

'This is a wake-up call': the villagers who could be Britain's first climate refugees



22 SMPs

2000 management units

Four policy choices per Epoch

(1) Advance the line

(2) Hold the line

(3) Managed Realignment

(4) Limited Intervention

Recognise three mesoscale epochs

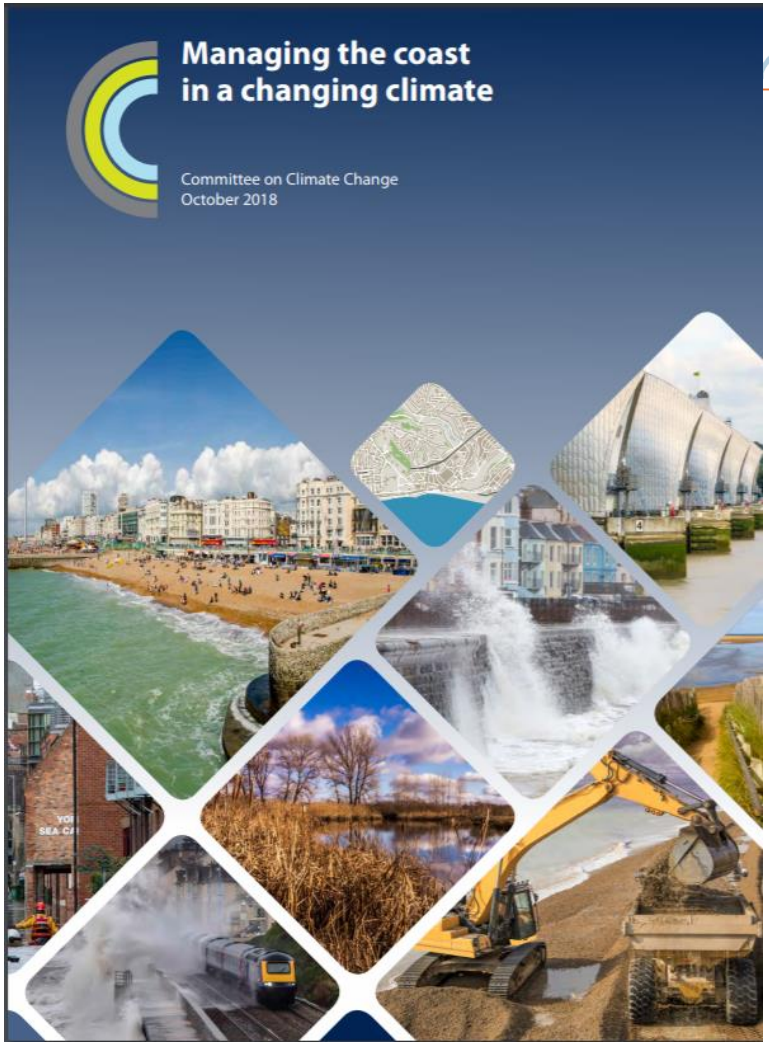
Epoch 1: 0 to 20 yrs

Epoch 2: 20 to 50 yrs

Epoch 3: 50 to 100 yrs

Limits to Protection

- “for 149 - 185 km of England's coastline it will not be cost beneficial to protect or adapt as currently planned by England's coastal authorities”
- A further 1,460 km of the coastline designated as 'hold the line' to the end of the century (29% of the total English coastline) has benefit-cost-ratios below current thresholds.
- Raises the question of how we deal with areas that are not protected – currently retreat is not funded by government
- A reframing from coastal ‘risk’ to ‘resilience’ is causing a reconsideration of priorities



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