

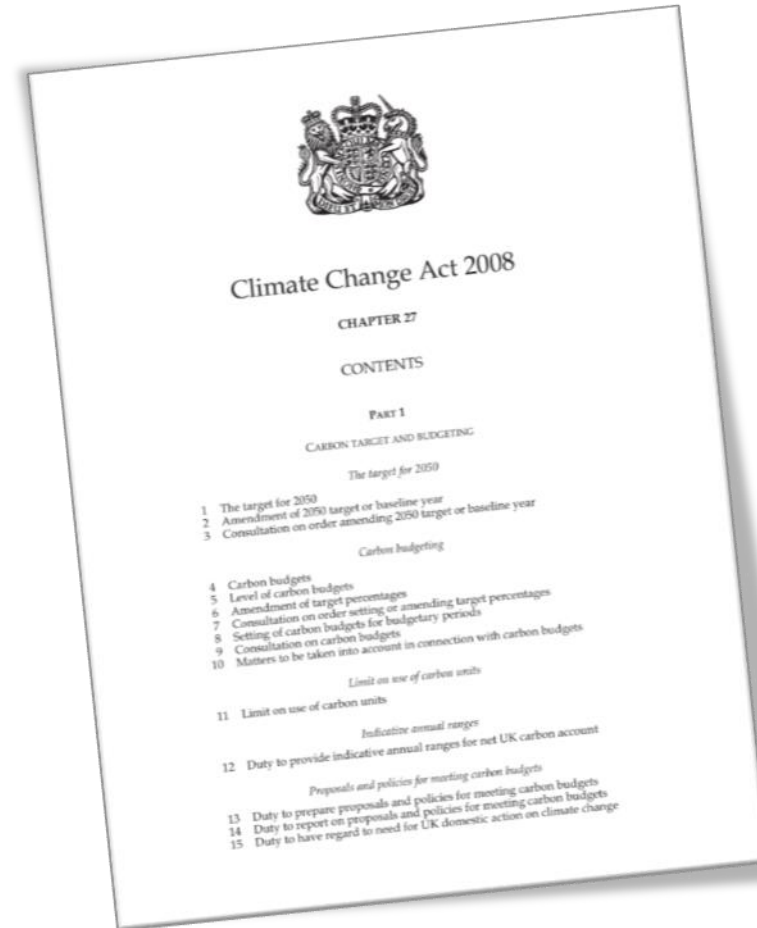
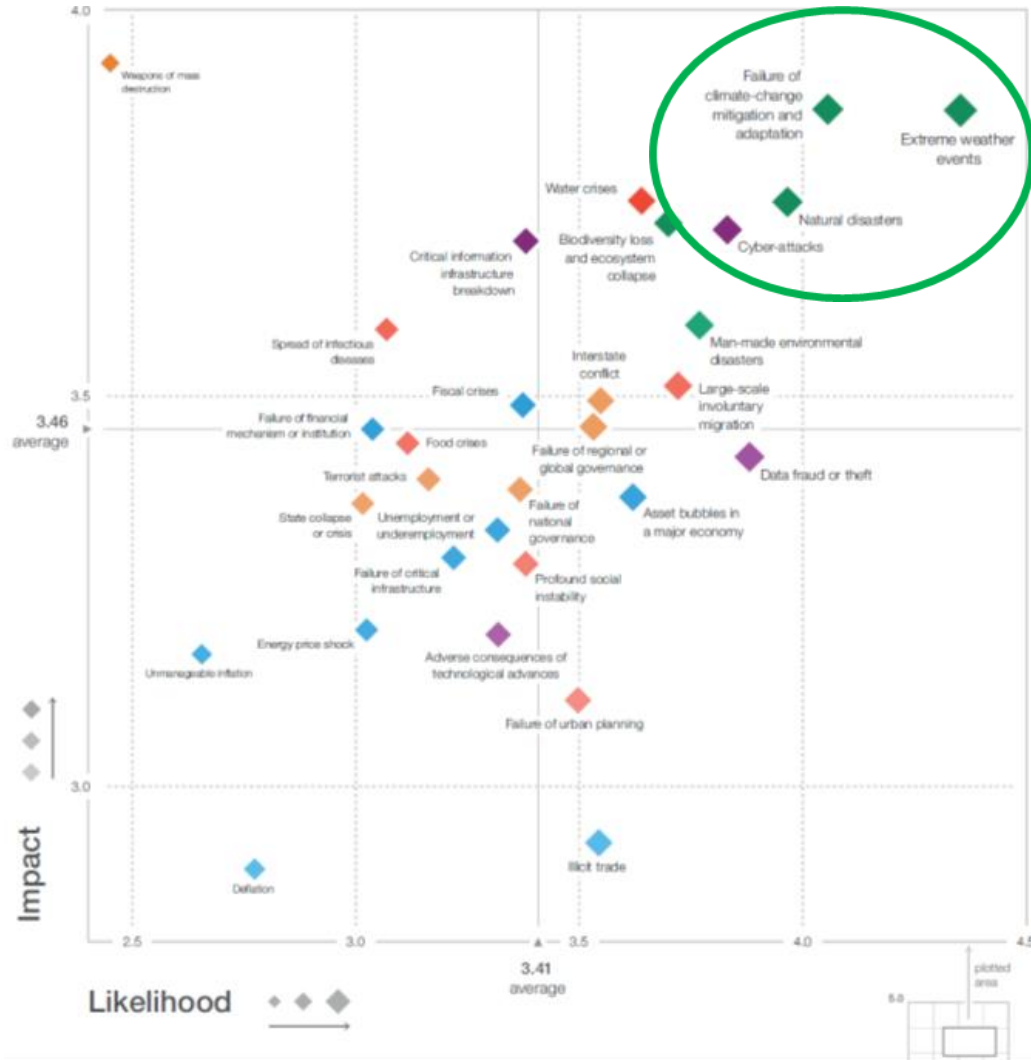
7th July 2020

Adapting to climate change

Kathryn Brown, Head of Adaptation, Committee on Climate
Change

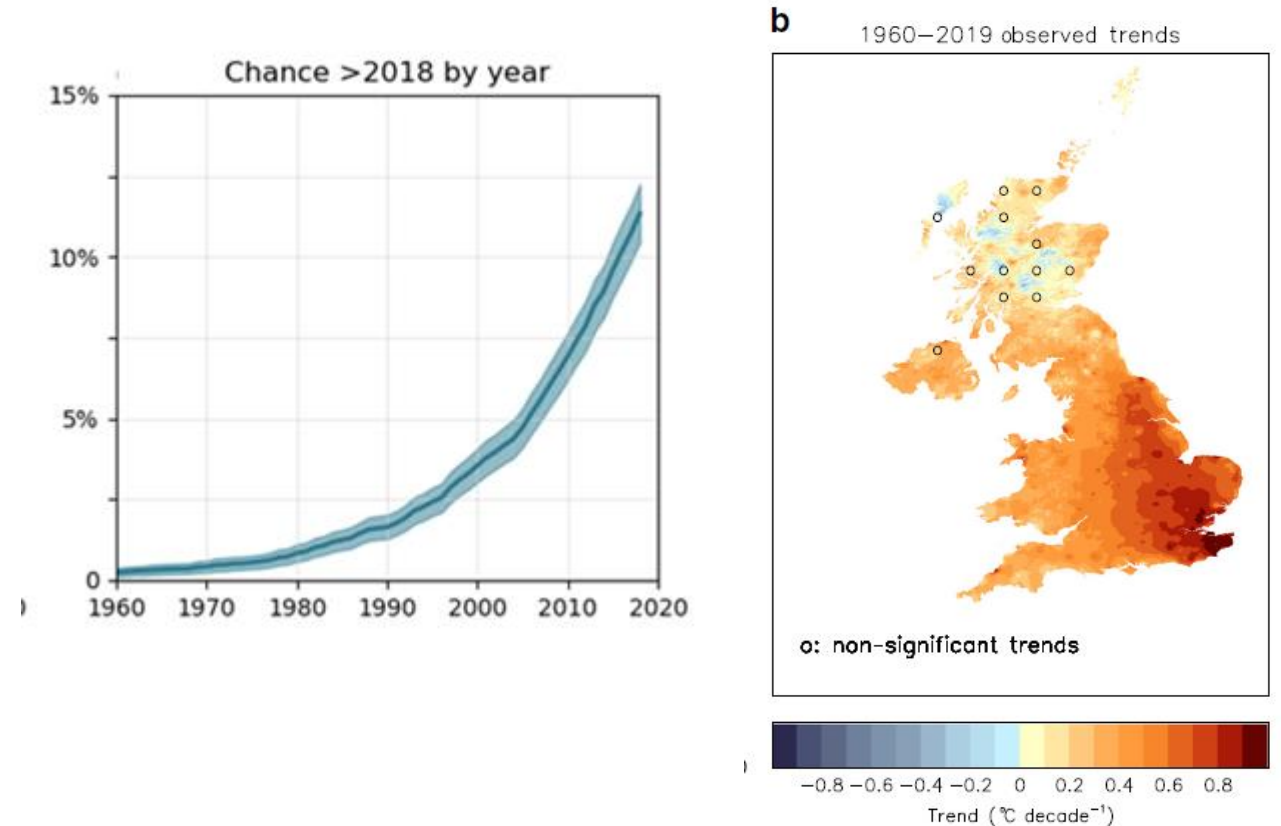
- The UK's climate is changing, and further change by 2050 is inevitable
- The long-term extent of future UK climate change depends on global GHG emissions
- Adaptation actions to build resilience are needed alongside actions to reduce emissions in order to tackle climate change
- Essex is and will experience a range of impacts
- Most local authorities have not grasped adaptation as fully as mitigation – scope to be a leader in this area
- What will the Commission's advice be? (for discussion)

Global risk from climate change is higher than infectious diseases or fiscal crises



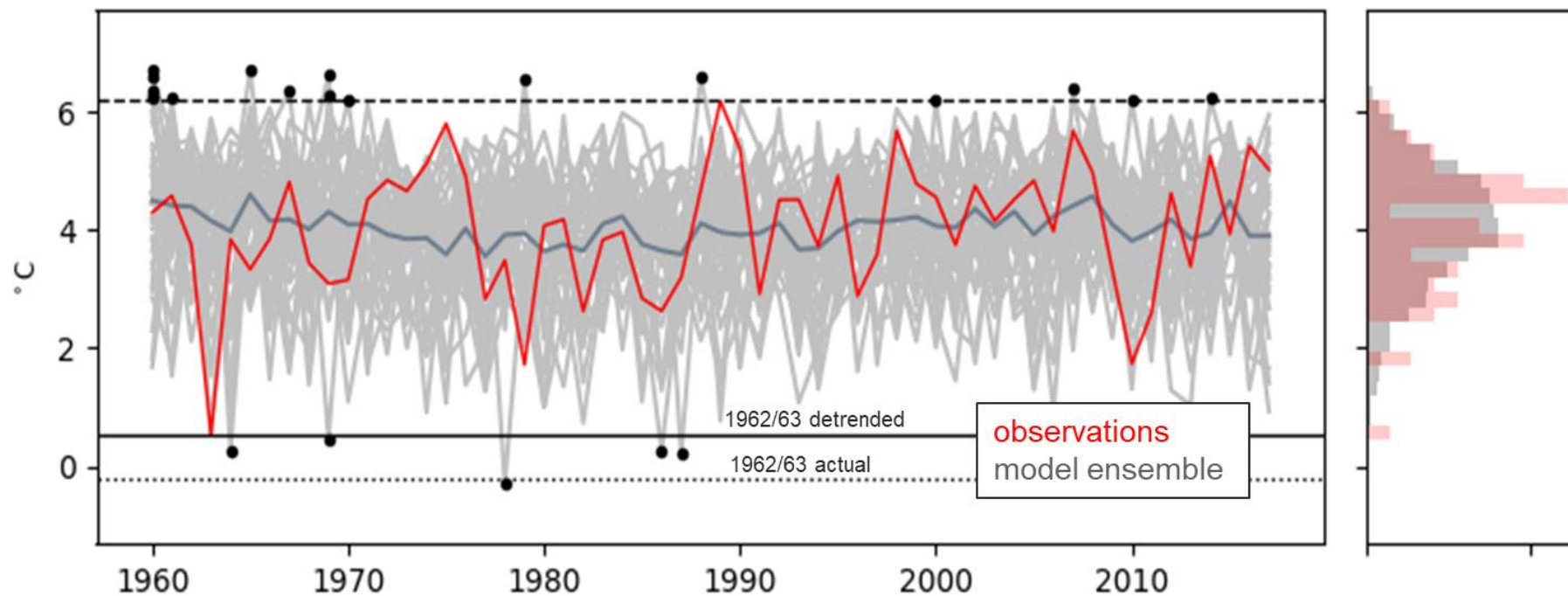
The climate has already changed – temperature, sea level are rising

| Variable | What has happened so far? |
|---|--|
| Global average surface temperature | Over 1°C above pre-industrial levels. |
| UK annual average temperature | About +1.2°C above pre-industrial levels. We have experienced a +0.8°C increase since 1961-1990. |
| Global mean sea level rise | ~21 cm increase from 1900. |
| UK mean sea level rise | ~16cm since 1900. |
| UK heavy rainfall | Some indications of increasing heavy rain but difficult to quantify. |
| UK heatwaves – ‘like 2018 summer’ | Now a 10 – 25% chance each year, compared to <10% chance each year a few decades ago. |



Results from the Met Office ‘UNSEEN’ project (left) calculating how much more likely a 2018 summer has become since 1960, and Christidis et al. (2020) showing trend in the warmest day since 1960

Chance of very cold winters has dropped dramatically



- UNSEEN UK winter temperature variability using >2000 years of simulations.
- Probability of experiencing a 1962/63 cold winter is essentially zero.
- Chance of another 2009/10 cold winter is also very low (<3%).

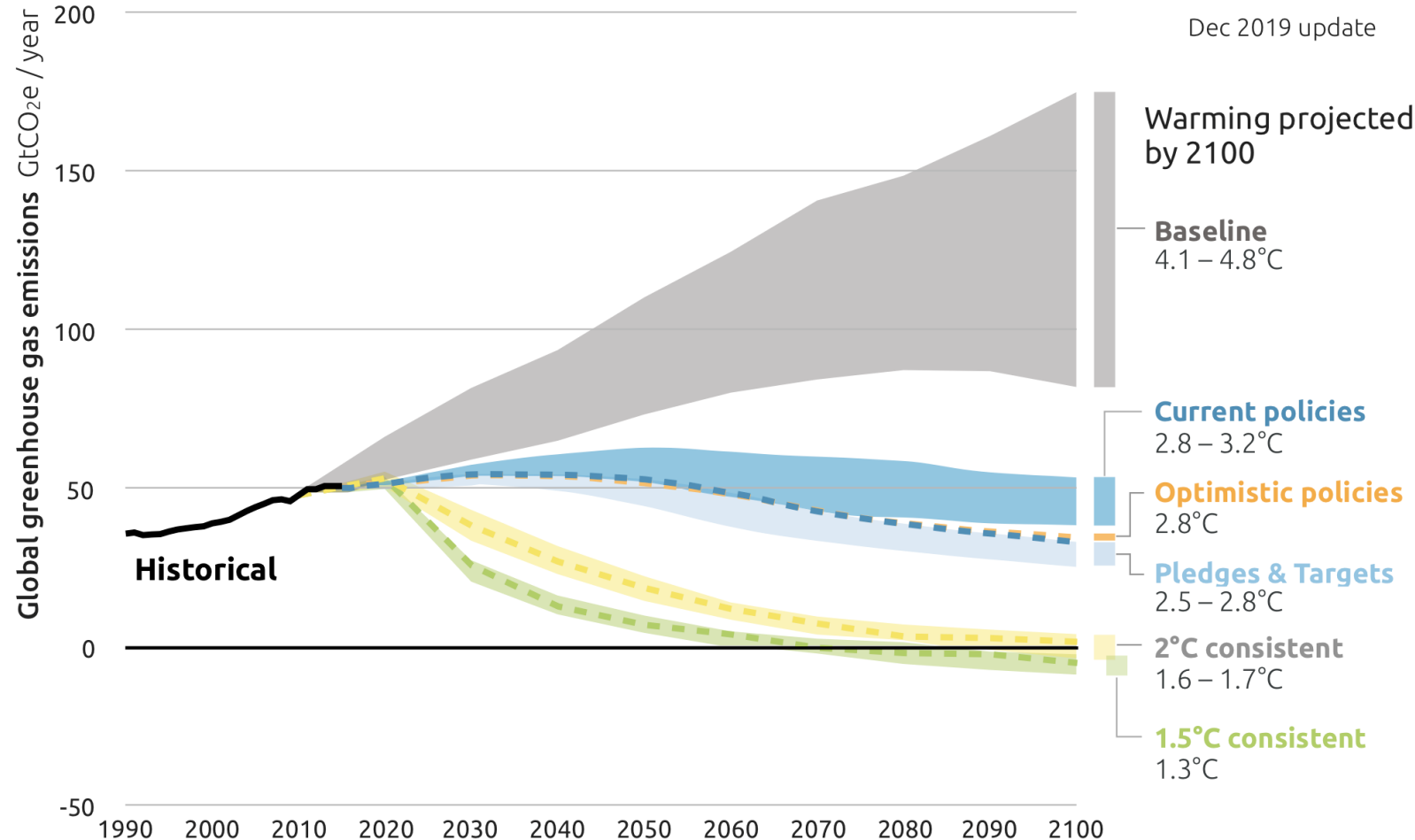
Looking ahead - global emissions and policy pledges are heading the world for $\sim +3^{\circ}\text{C}$ currently

2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies



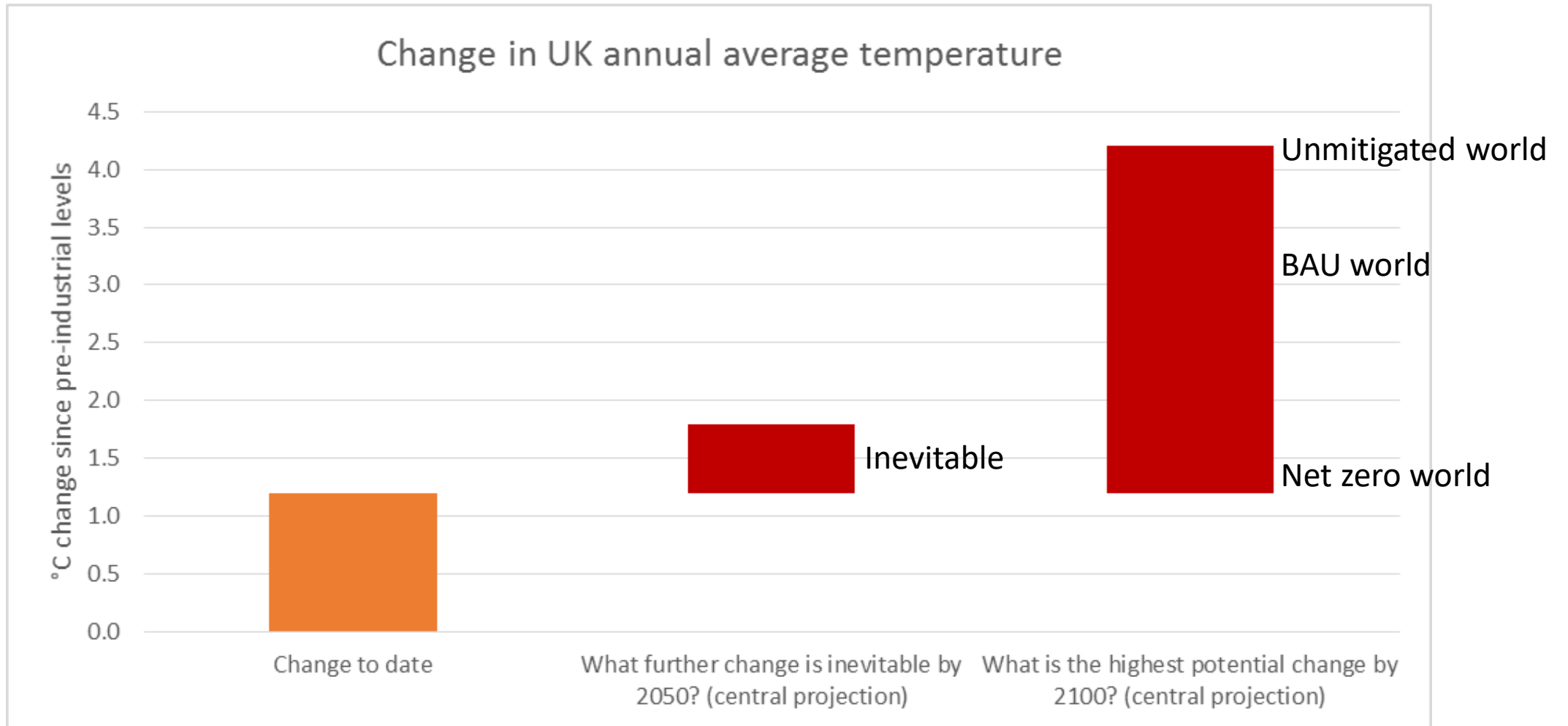
Dec 2019 update



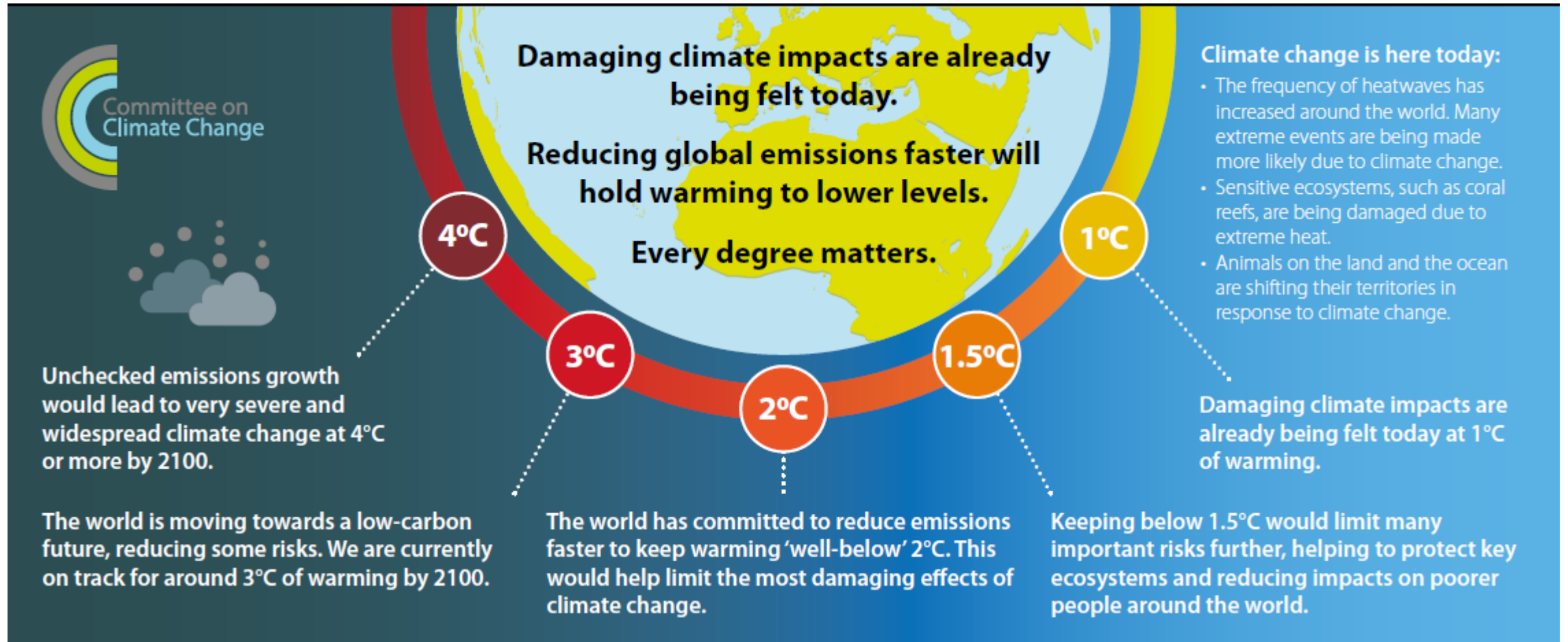
Greenhouse gas emissions need to reach net zero globally to stop global warming:

- Emissions will have declined in 2020 due to Covid, but these will still contribute to further climate change
- The future UK climate will be determined by global (not UK) emissions

In the UK, further change is inevitable – at least another 0.5°C by 2050

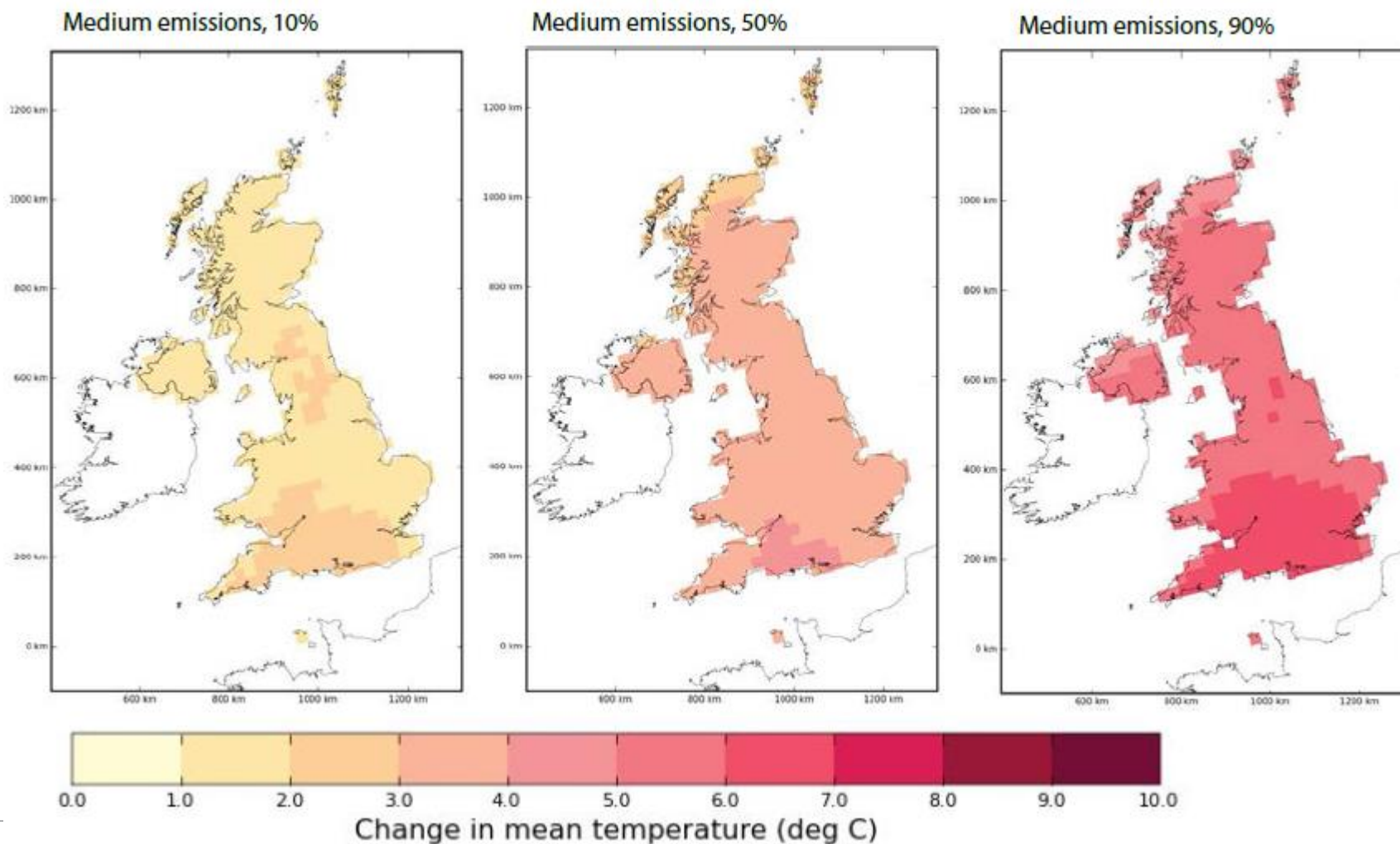


This means we need to mitigate (reduce emissions) and adapt (build resilience to climate change impacts)

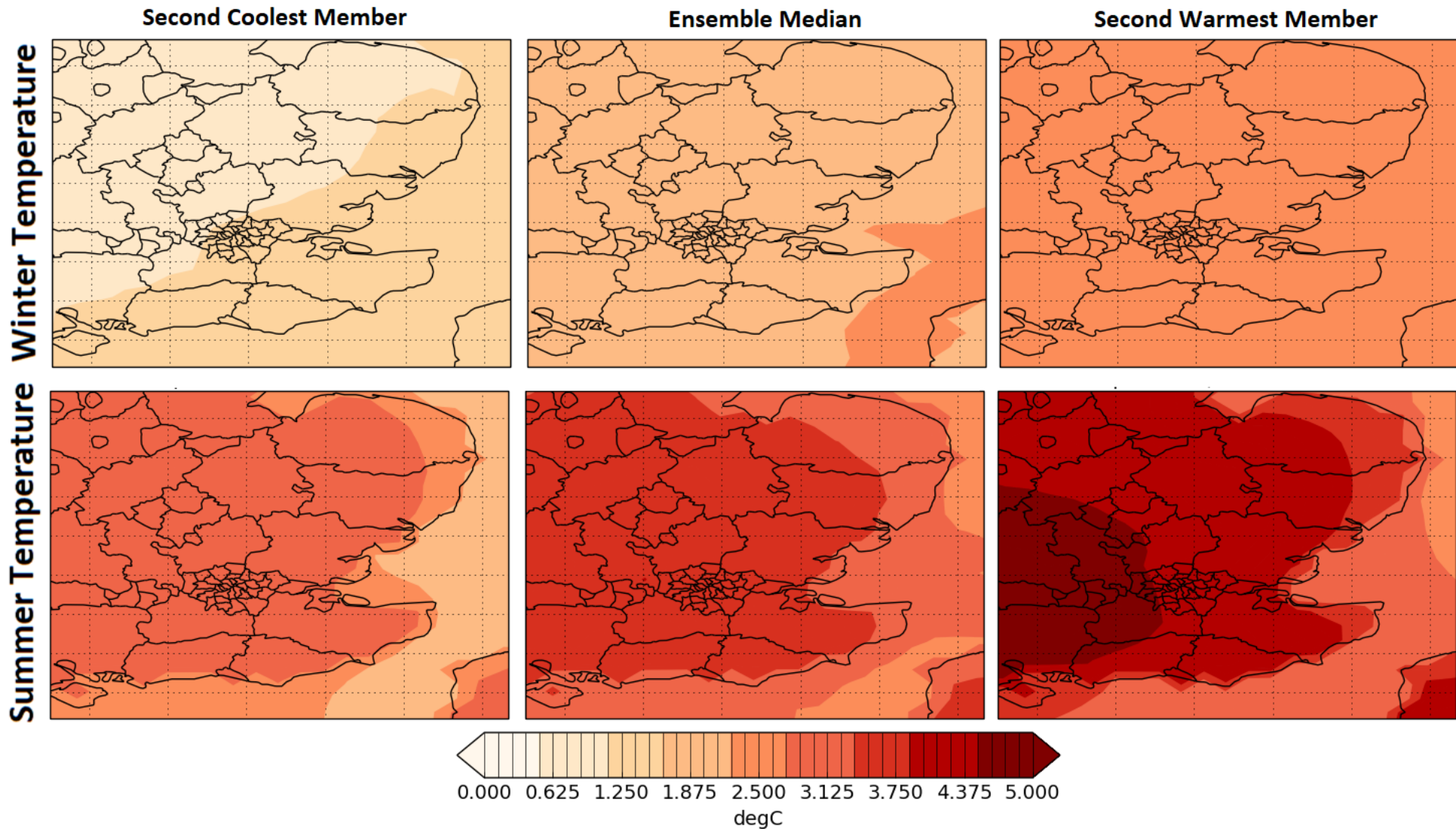


Along with inevitability is uncertainty

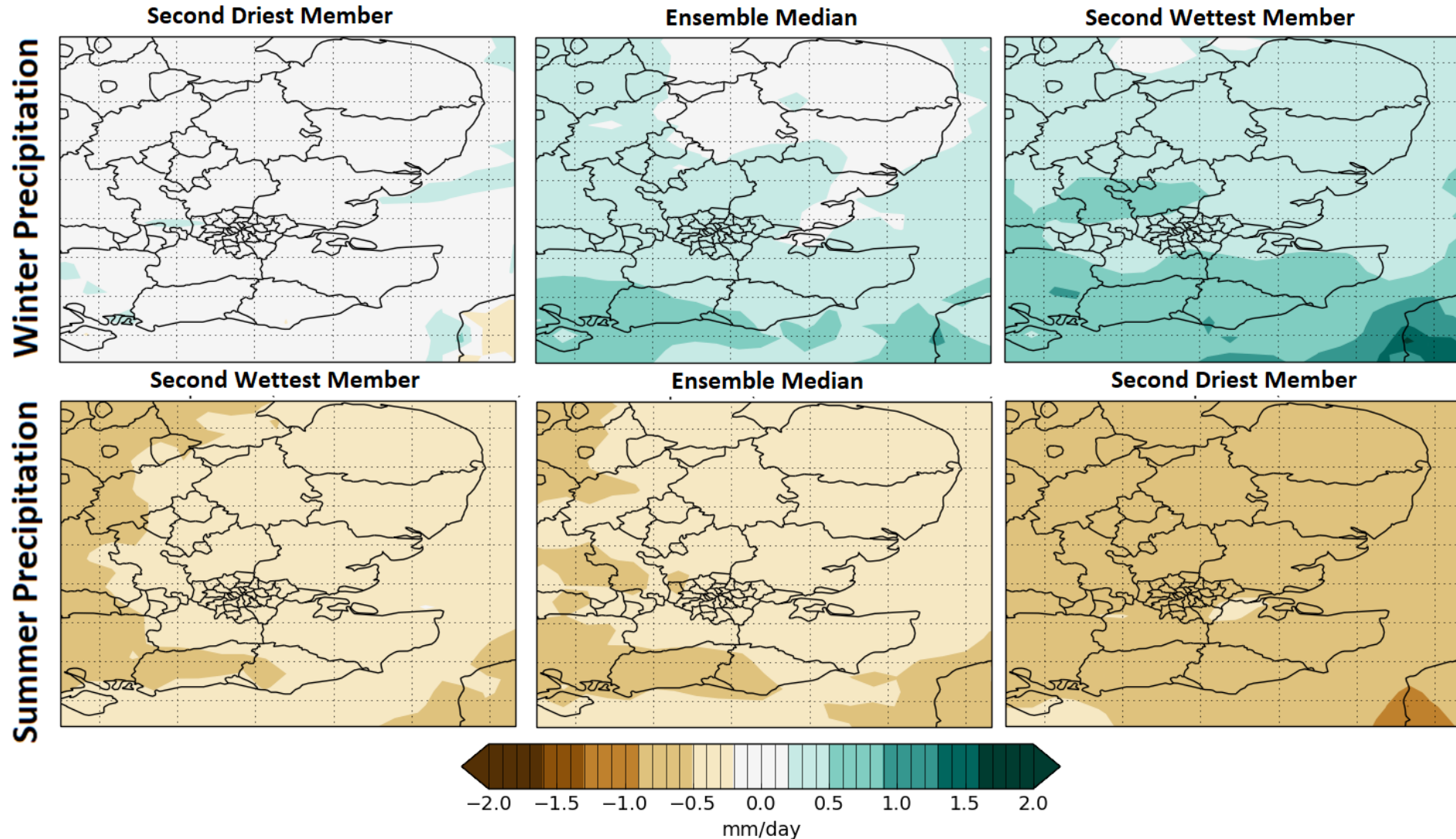
Three scenarios for summer mean temperature for the period 2040 – 2069 are all under a medium (A1B) emissions scenario



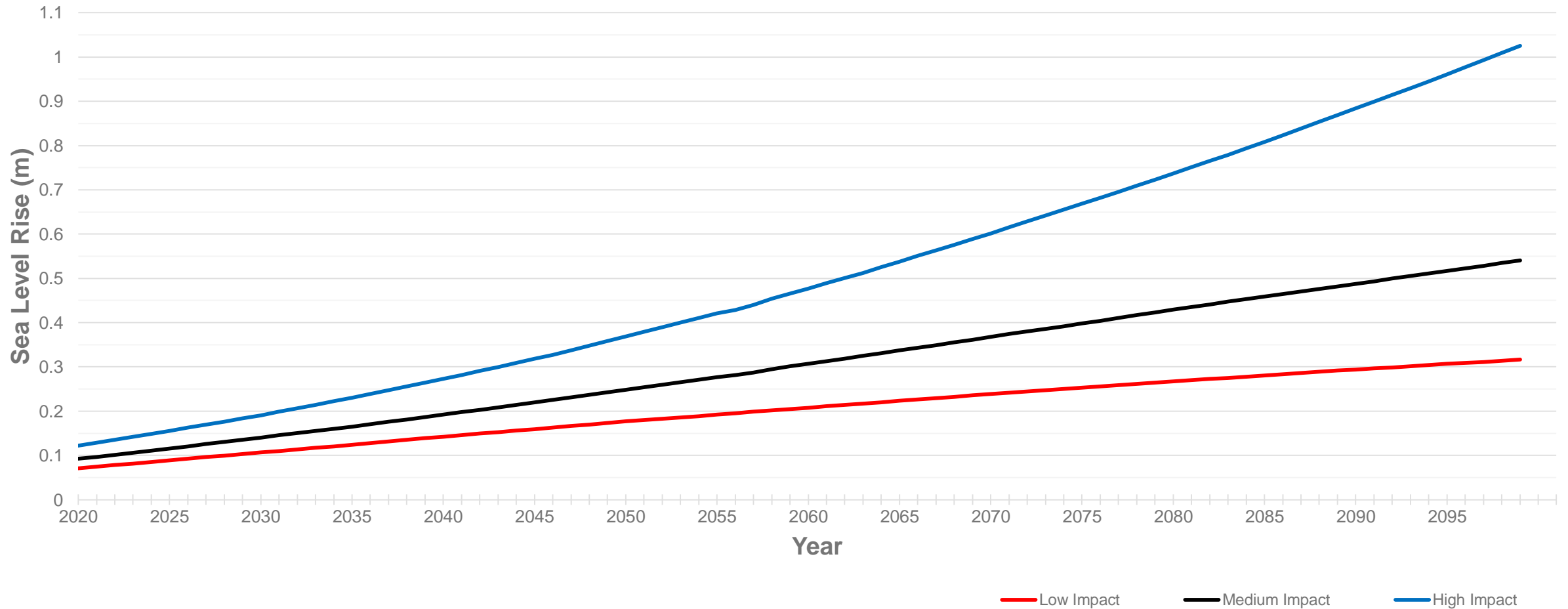
Change in mean seasonal temperature for the 2050s compared to 1981-2000 from UKCP Regional (12 km)



Change in mean seasonal precipitation for the 2050s compared to 1981-2000 from UKCP Regional (12 km)



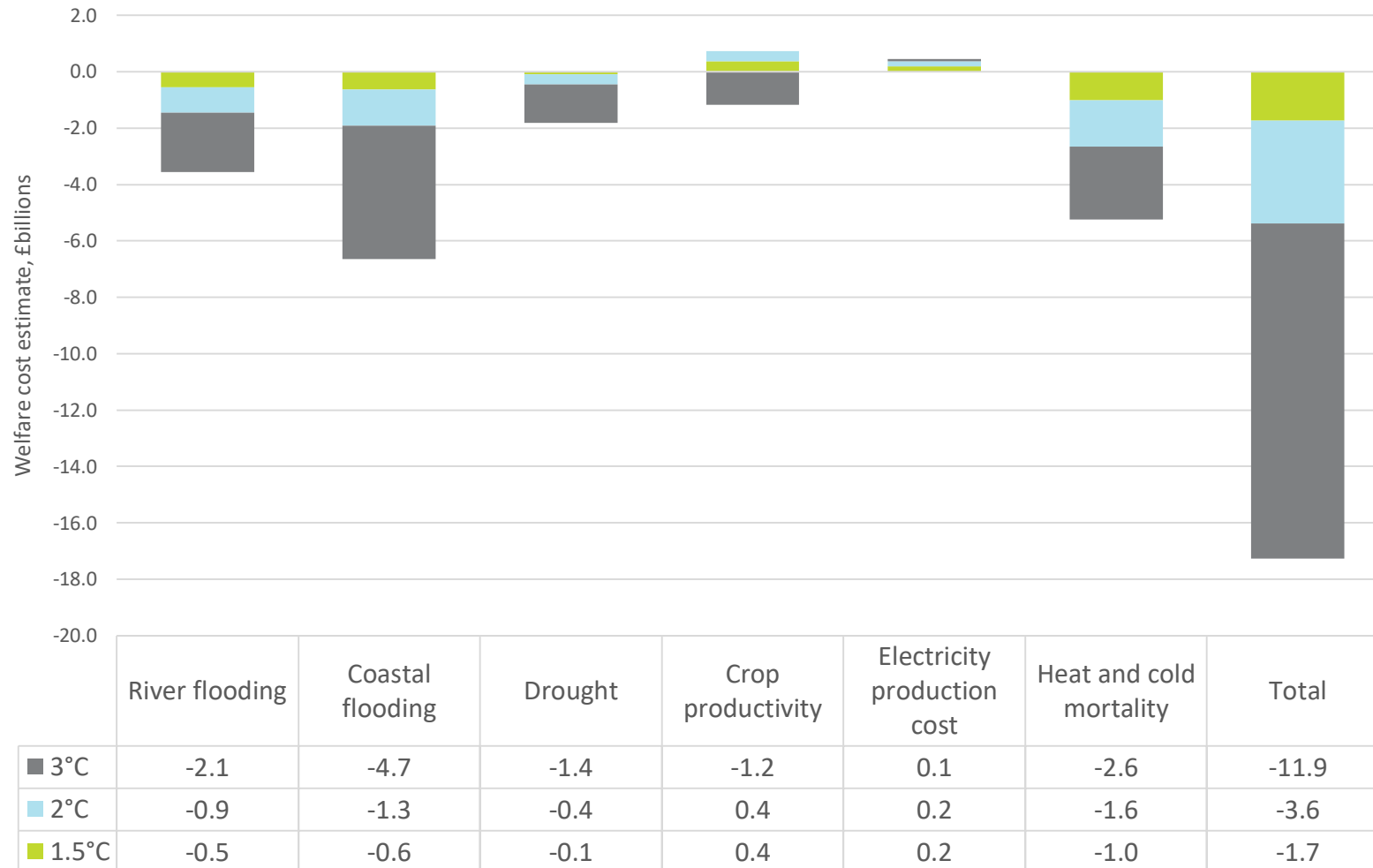
Change in Sea Level at the Sheerness Tide Gauge in 2020-2099 compared to 1981-2000 from UKCP Marine
(closest tidal gauge, results will be similar across Essex)



2099 Sea Level Rise Values: 0.54 m (0.32 m to 1.03 m)

Costs of inaction are high (but hard to estimate in full)

Welfare losses per year from climate impacts in £billions, UK and Ireland

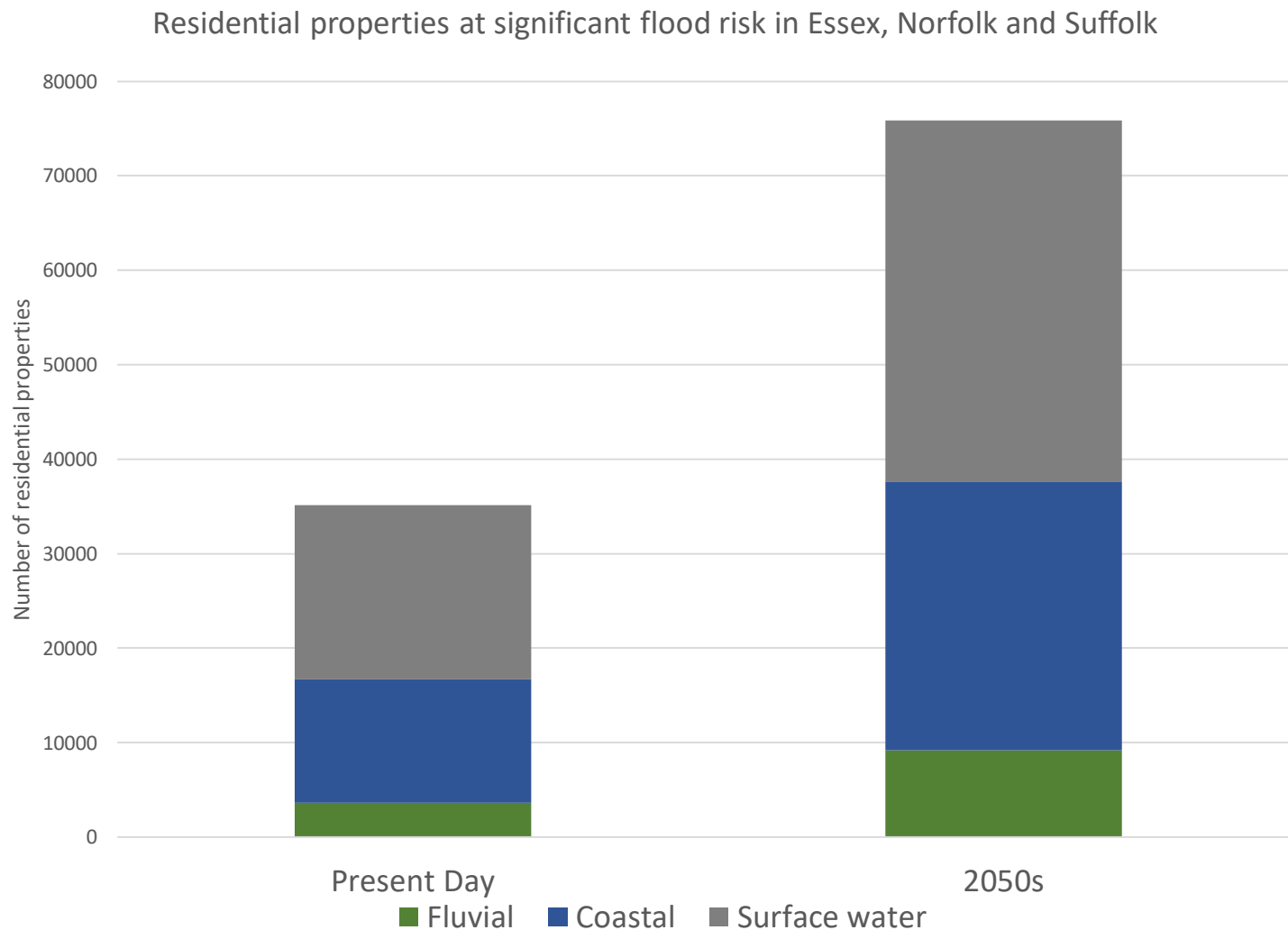


Note:

-These estimates only include a selection of impacts (e.g. does not include surface water flooding, windstorms, impacts on the natural environment), so are not a national total loss estimate of climate change

- Analysis assumes that the economy is the same size and shape as today

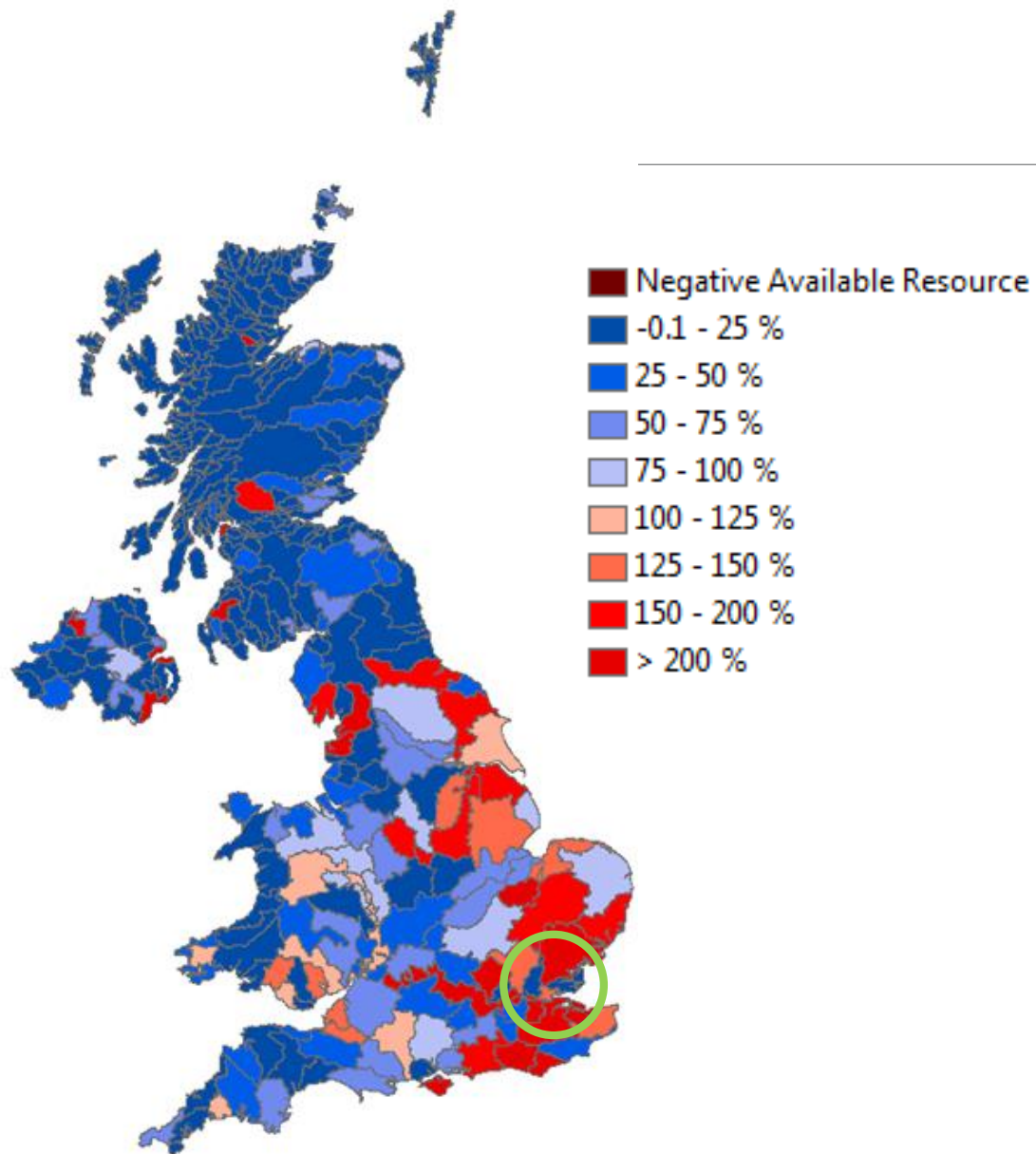
Future impacts – flood risk



Essex has substantial issues with coastal and surface water flooding (blue and grey boxes)

Even over the next 30 years, the risk is projected to double without additional adaptation action

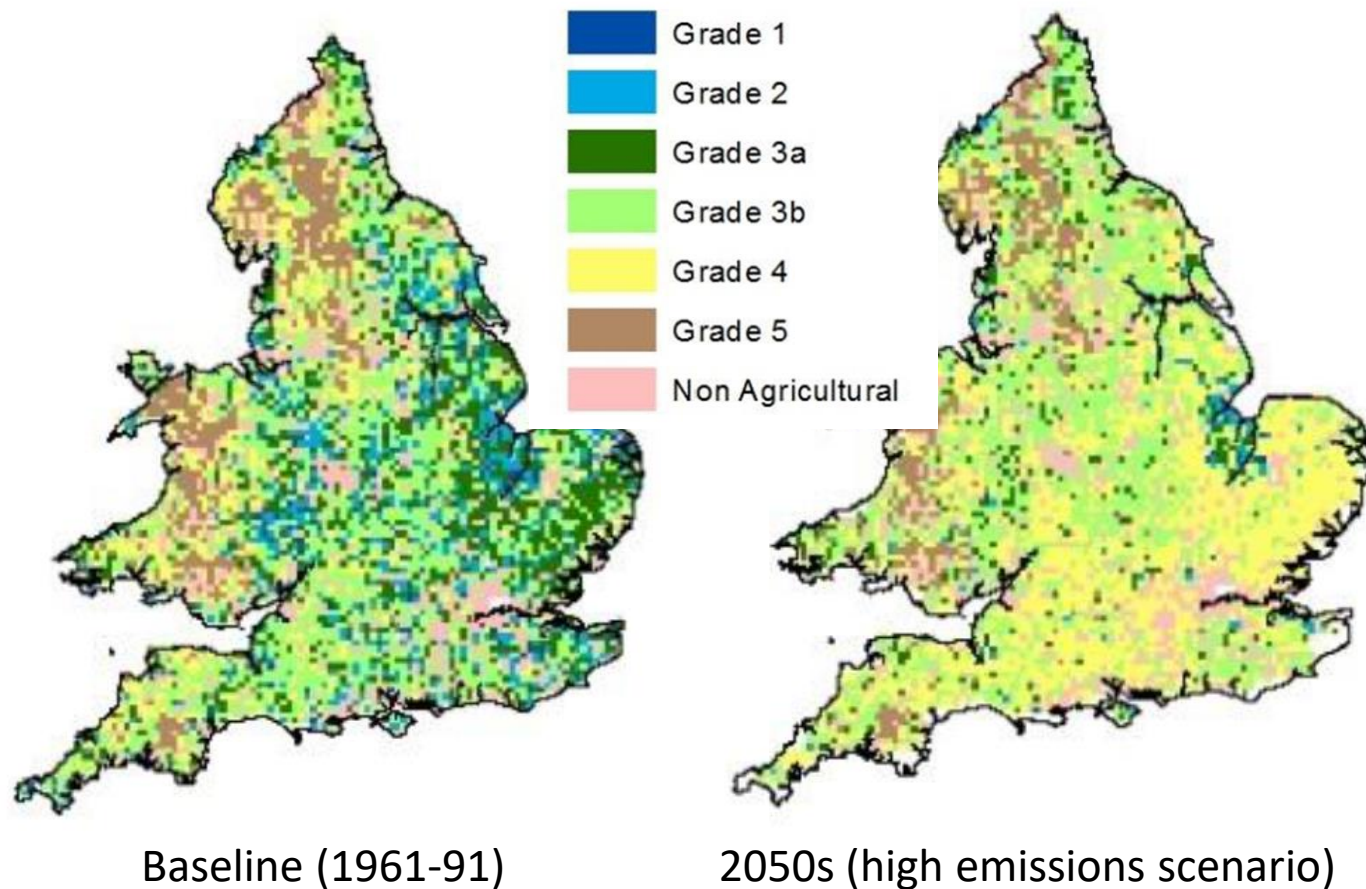
Future impacts – water scarcity



UK map showing water demand as a % of water available for abstraction

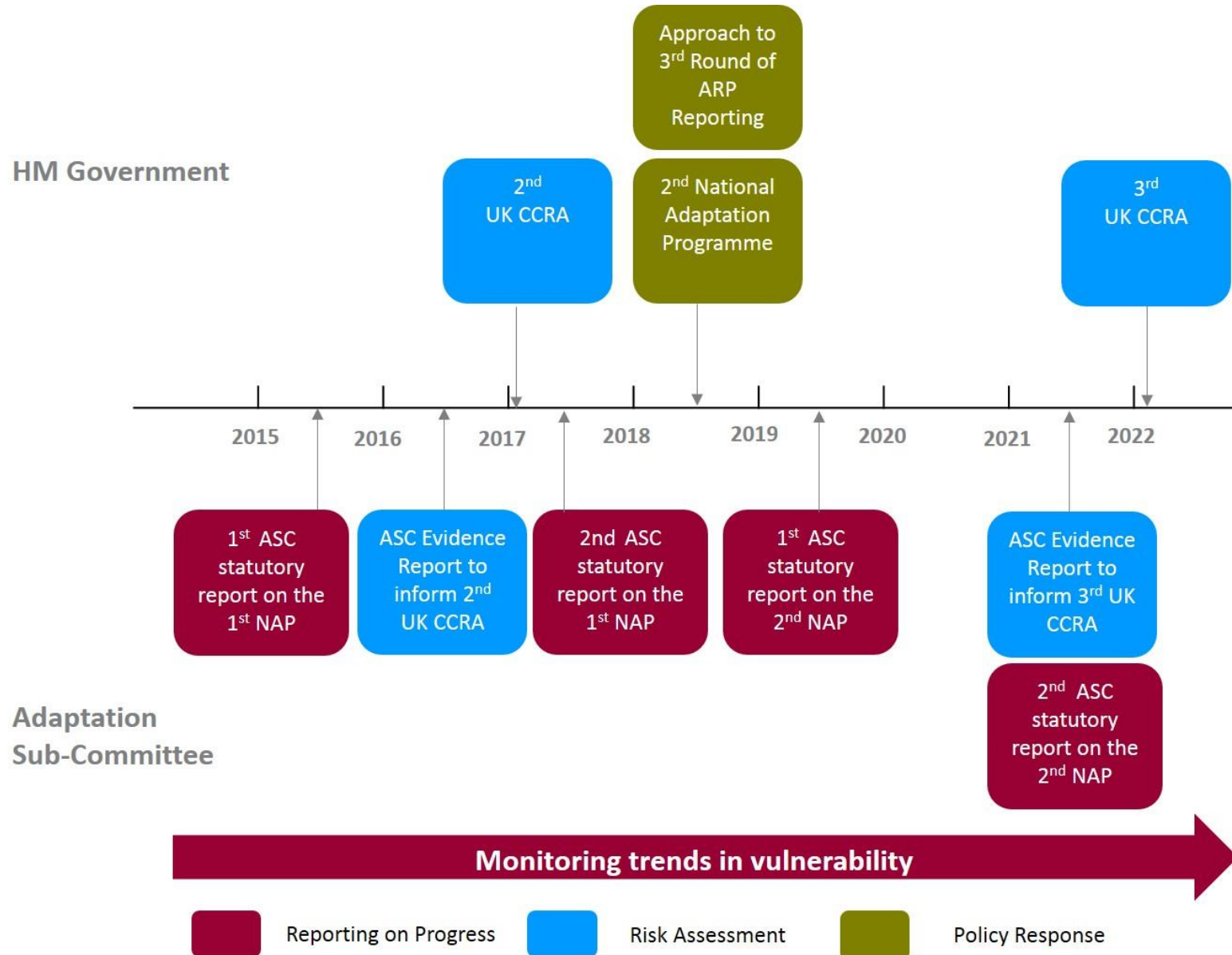
Scenario - 2050s, high climate scenario, no assumed additional adaptation, natural environment requirements are assumed to be the same proportion of total water as they are now (i.e. proportional, not fixed demand)

Agricultural land classification in England and Wales



Holme post – showing where the peat soil top layer used to be..

The UK climate change adaptation policy cycle



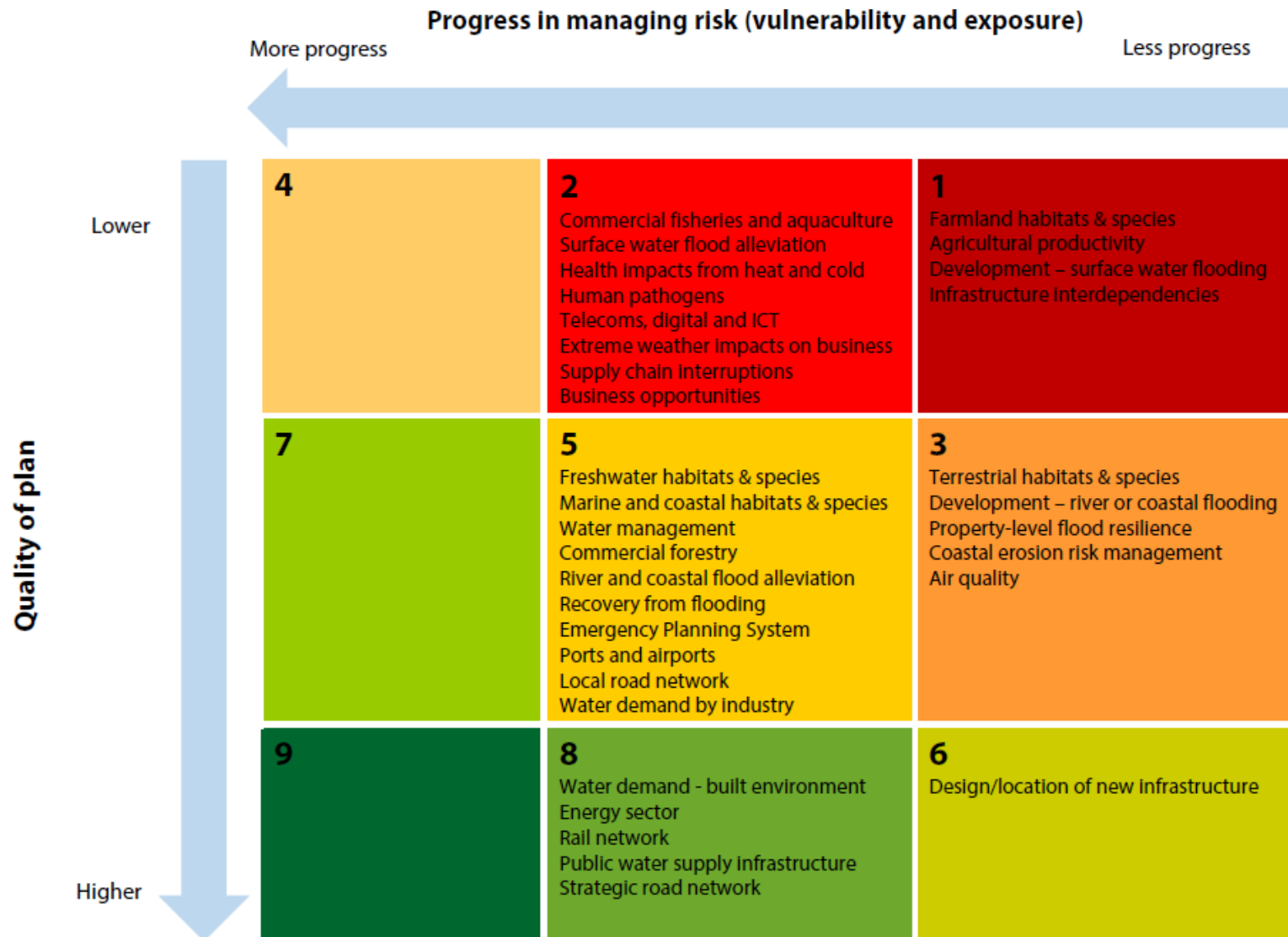
The Climate Change Act puts in place statutory measures:

- UK climate change risk assessment CCRA, every five years
- National Adaptation Programme NAP, every five years

The Adaptation Committee:

- Provides advice on the risk assessment (every five years)
- Scrutinises the National Adaptation Programme (every two years)

Latest Adaptation Progress Assessment (England)

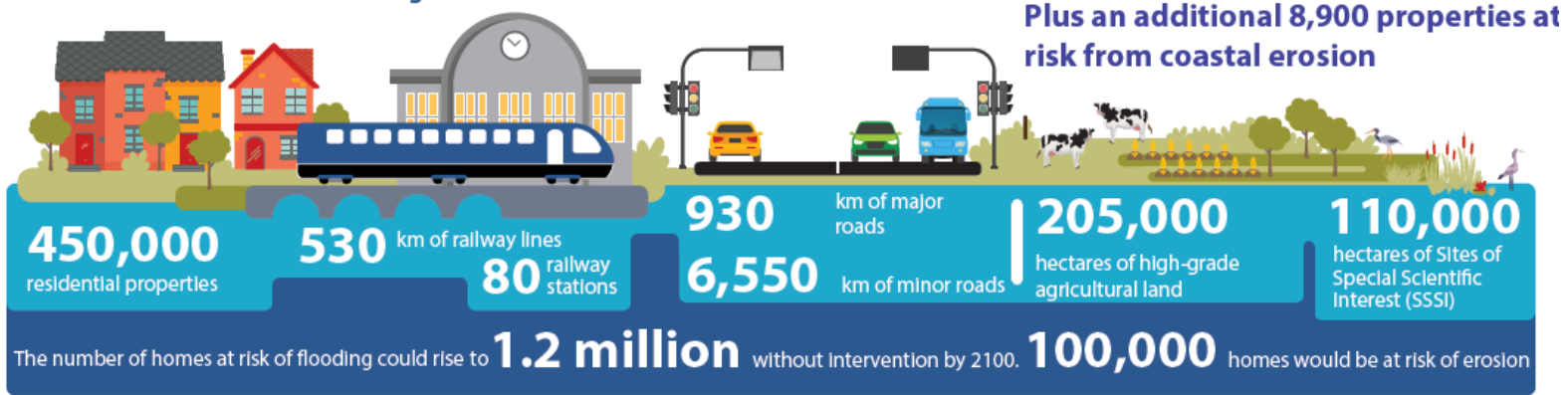


CCC – Managing the coast in a changing climate (2018)

What are the risks and impacts of coastal change in England?

An assessment of the risks and impacts of coastal flooding and erosion in England has been completed, focusing on advisory plans to manage these risks known as **Shoreline Management Plans (SMPs)**.

What is at risk of coastal flooding now?



How much do we need to invest to manage these risks up to 2105 in present value terms?

£18 - 30 billion
The cost of investments to implement Shoreline Management Plans to manage the risks of flooding and erosion.

£49 billion
The benefits of these investments in terms of avoided damages to properties.

150km
The length of the 5,000 km coastline within SMPs where intervention will not be cost-effective. **The benefits of hard defences are marginal for a third of the coast and are therefore unlikely to be funded.**



For some investments, such as retreating or realigning the coast, this assessment excludes potential long-term environmental benefits of new habitats, which would strengthen the case for action.

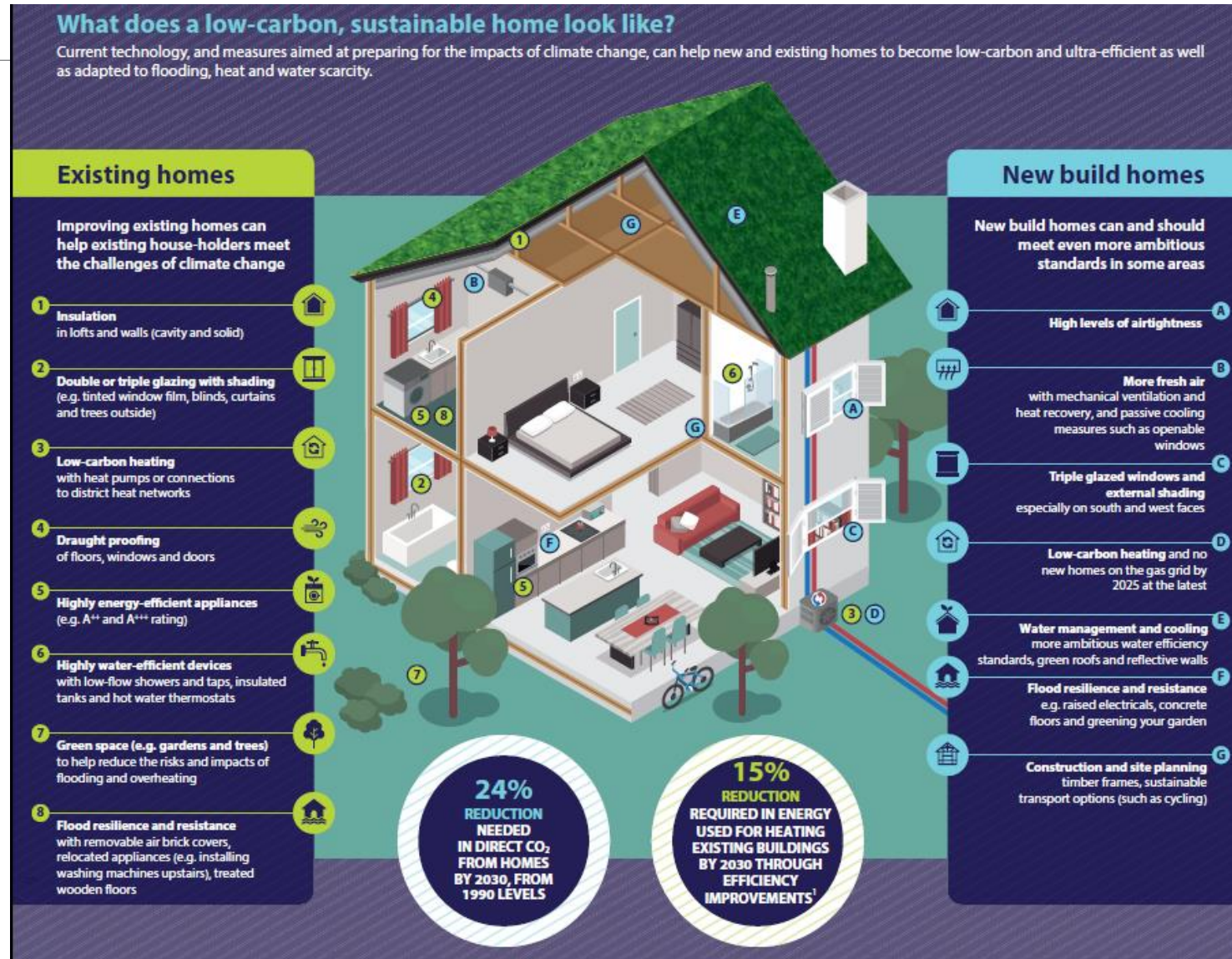
What could we be doing now to improve our resilience against coastal change?



CCC recommendations – coastal change

- Scale and implications of future coastal change should be acknowledged by those with responsibility for the coast and communicated to people who live on the coast
- Local government and the Environment Agency need to be enabled by national government to deliver a long-term and appropriately resourced approach to engaging affected communities and stakeholders
- Policy on the management of coastal flooding and erosion risk should specify long-term, evidence-based, quantified outcomes that have the buy-in of the affected communities and stakeholders
- Plans to manage and adapt specific shorelines over the coming century should be realistic and sustainable in economic, social and environmental terms.

CCC – UK Housing – Fit for the Future? (2019)

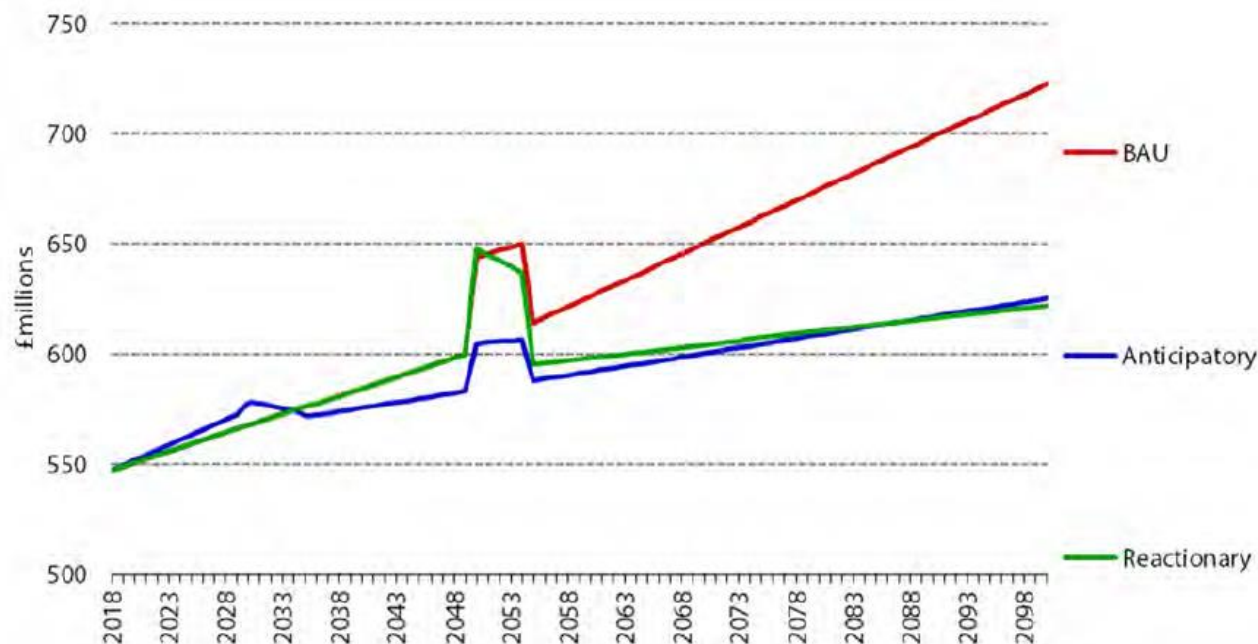


CCC recommendations – housing and urban areas

- Set goals for reversing the national decline in urban greenspace
 - Greenspace 'retrofit' programmes should be included in local plans.
 - Incorporate national green infrastructure from the 25 Year Environment Plan into local planning
- Include water efficiency measures in energy efficiency retrofit programmes
- Overheating risk needs integrating into local plans (we have already made extensive recommendations to MHCLG on the need to amend building regulations). Plans are also needed for care homes, hospitals, schools, prisons.
- Stronger policy on sustainable urban drainage to ensure it is included as the default for new developments
 - Make green SuDS the default in all new developments (buildings and infrastructure) – this is set out in the NPPF but needs implementation
 - Automatic right to connect new developments to the sewer system should be made conditional on national SuDS standard being met
 - Clarify arrangements for who is adopting and maintaining SuDS

CCC – Land use; reducing emissions and preparing for climate change (2019)

Figure 3.7. Norfolk and Suffolk broads case study: Long-term pattern of costs (£m) under different adaptation scenarios



Source: JBA Consulting (2018) for the CCC

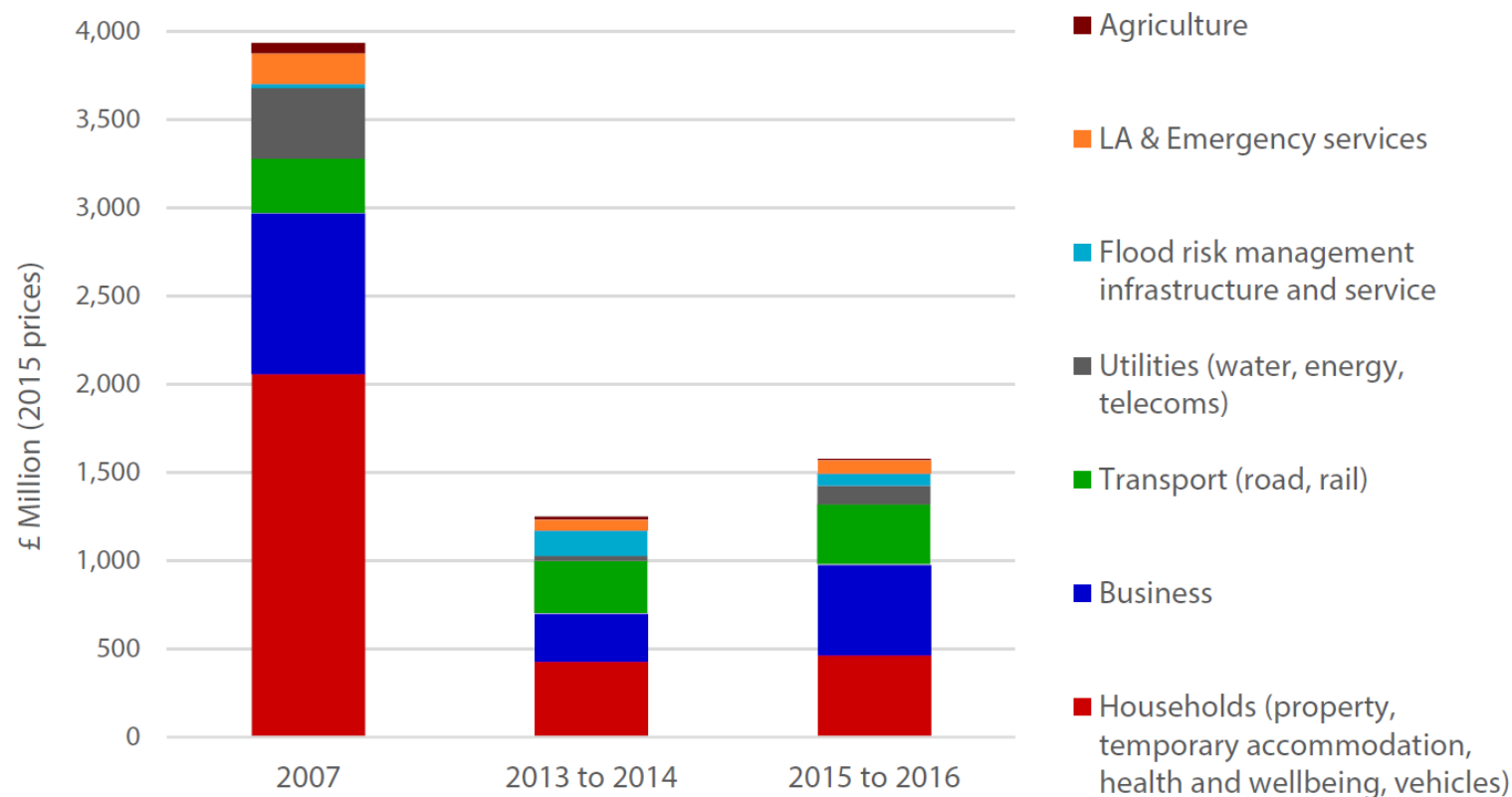
Notes: The jump in costs seen in 2050 relates to the recovery costs after the flooding event, plus an increase in short-term maintenance costs and expenditure to maintain production. Due to some degree of switching to more resilient land uses (arable to pastoral and saltmarsh), the costs during this period are lower under the anticipatory scenario than for the reactionary or BAU scenarios, but some impacts still occur due to negative impacts on the remaining arable land in particular. See the supporting research for more details. Values are quoted in nominal terms.

- Anticipatory adaptation to change land use has much lower long-term damage costs
- CCC land use report (2019) considered this for four case study areas, including switching arable to saltmarsh/ pastoral in the Norfolk Broads. Not quite Essex, but the general pattern of costs and benefits likely to be the same!

- Ensure that adaptation (and mitigation) are integrated into the Environmental Land Management system (letter to Defra from the CCC [here](#)).
- Diversifying land use is likely to build in resilience. Diversifying agricultural land, afforestation, peatland restoration and catchment management have positive impacts on the condition of natural habitats, and habitat creation.
- Resources are needed that explain local climate impacts and risks to land managers – e.g. regional risk assessments
- Support should be provided to help land managers transition to alternative land uses. This includes help with skills, training and information to implement new uses of land, and support with high up-front costs and long-term pay-backs of investing in alternative uses.

Assessing risks (and opportunities) to businesses

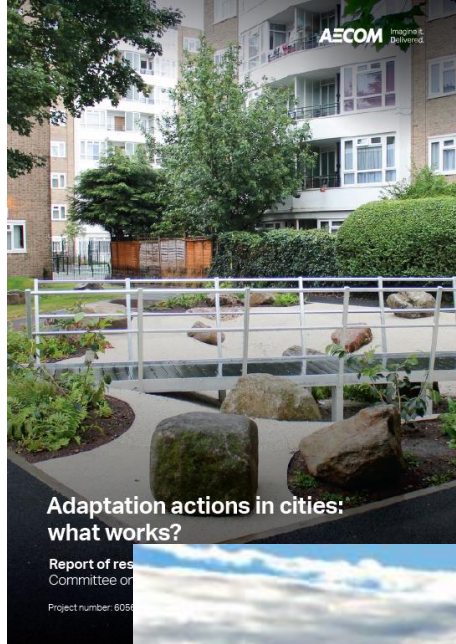
Figure 5.1. Estimates of the economic impact of major floods



Source: Environment Agency (2018) *Estimating the economic costs of the 2015 to 2016 winter floods.*

- Government should re-establish a support service on adaptation for businesses (could Essex do something here too? There is no sign of this happening at national level)
- Encourage large businesses to disclose physical risks, using frameworks such as the Taskforce on Climate-related Financial Disclosure, or the Adaptation Reporting Power

Good adaptation leads to better places to live for people and wildlife



Adaptation in Essex – great examples that need scaling up



Kingsmoor Flood Alleviation Scheme (Leaky Dams)



Abbotts Hall Farm Saltmarsh



Basildon Hospital Rain Gardens

