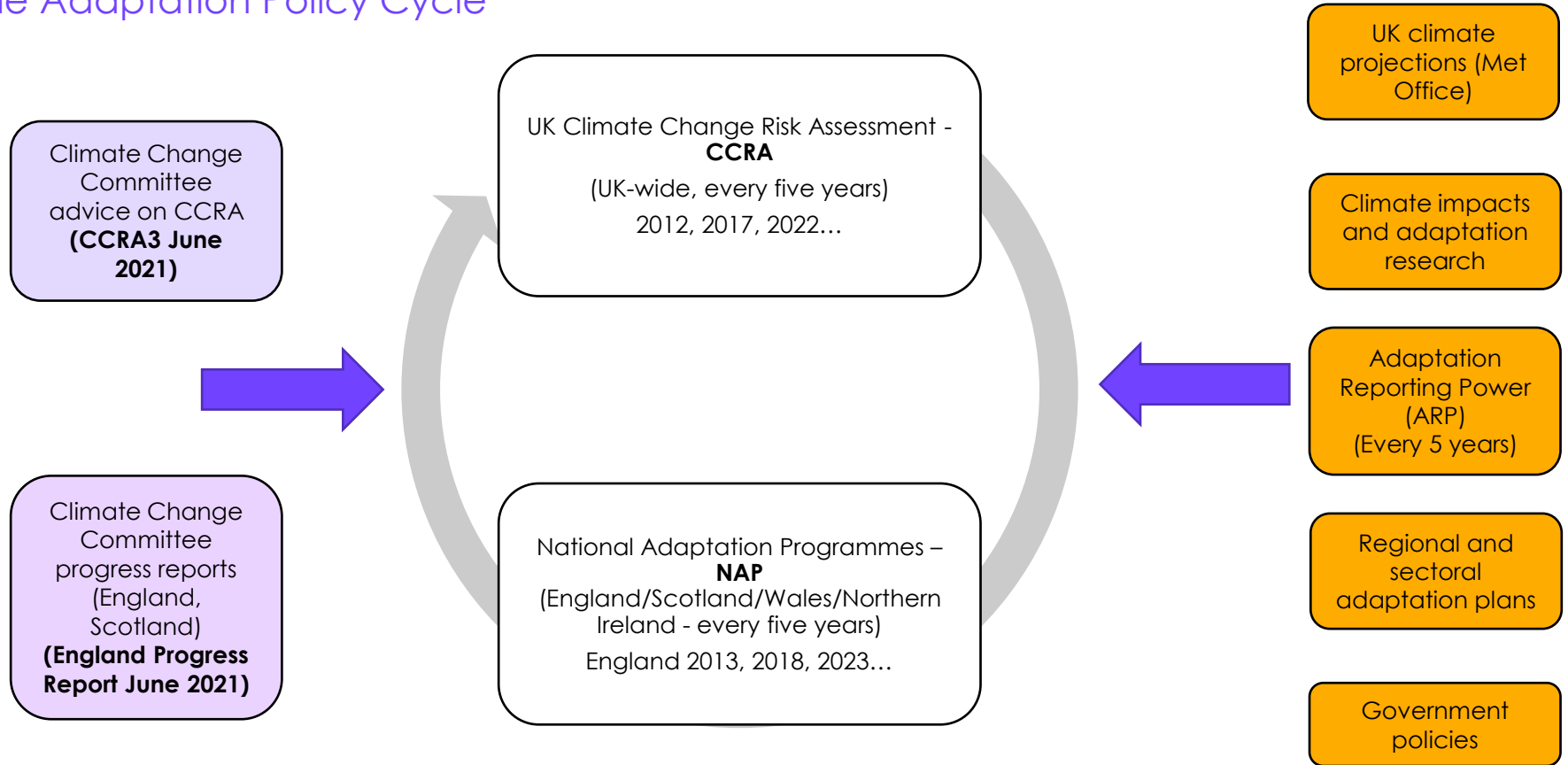


# Independent assessment of UK climate risk

Richard Millar, Head of Adaptation and Climate Science

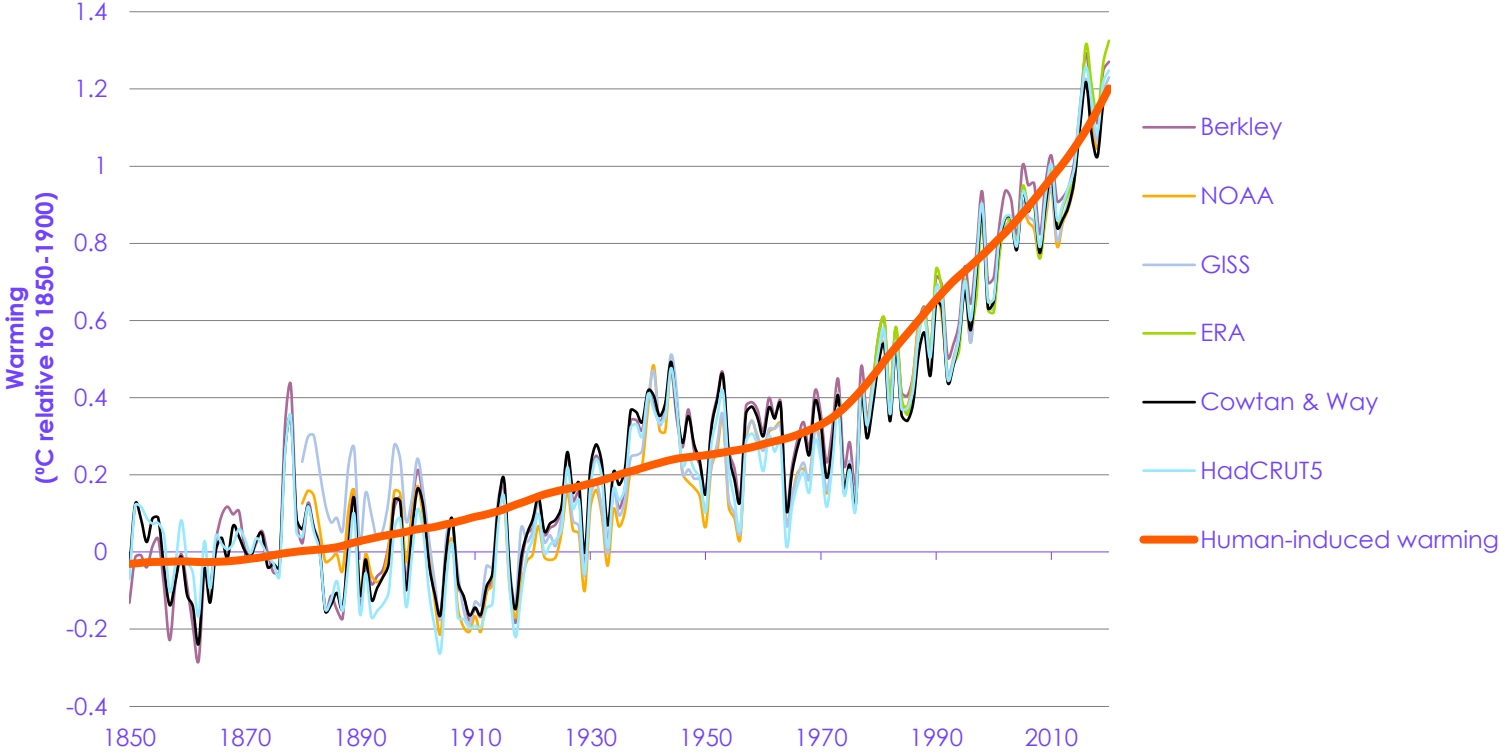
Climate Change Committee

# The Adaptation Policy Cycle



# Our changing climate

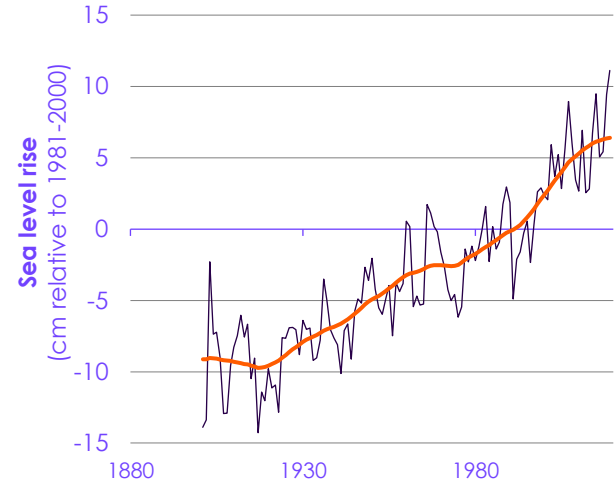
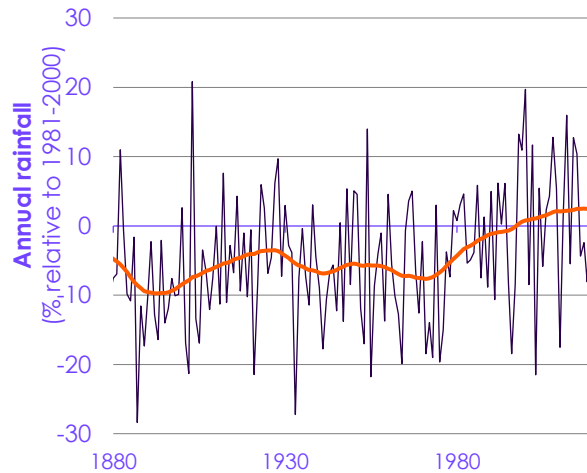
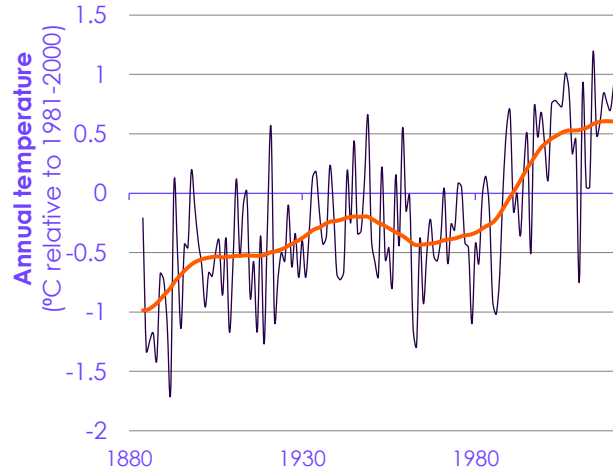
Observed changes in global and UK climate are becoming clearer



Source  
UK Met Office, IPCC

# Our changing climate

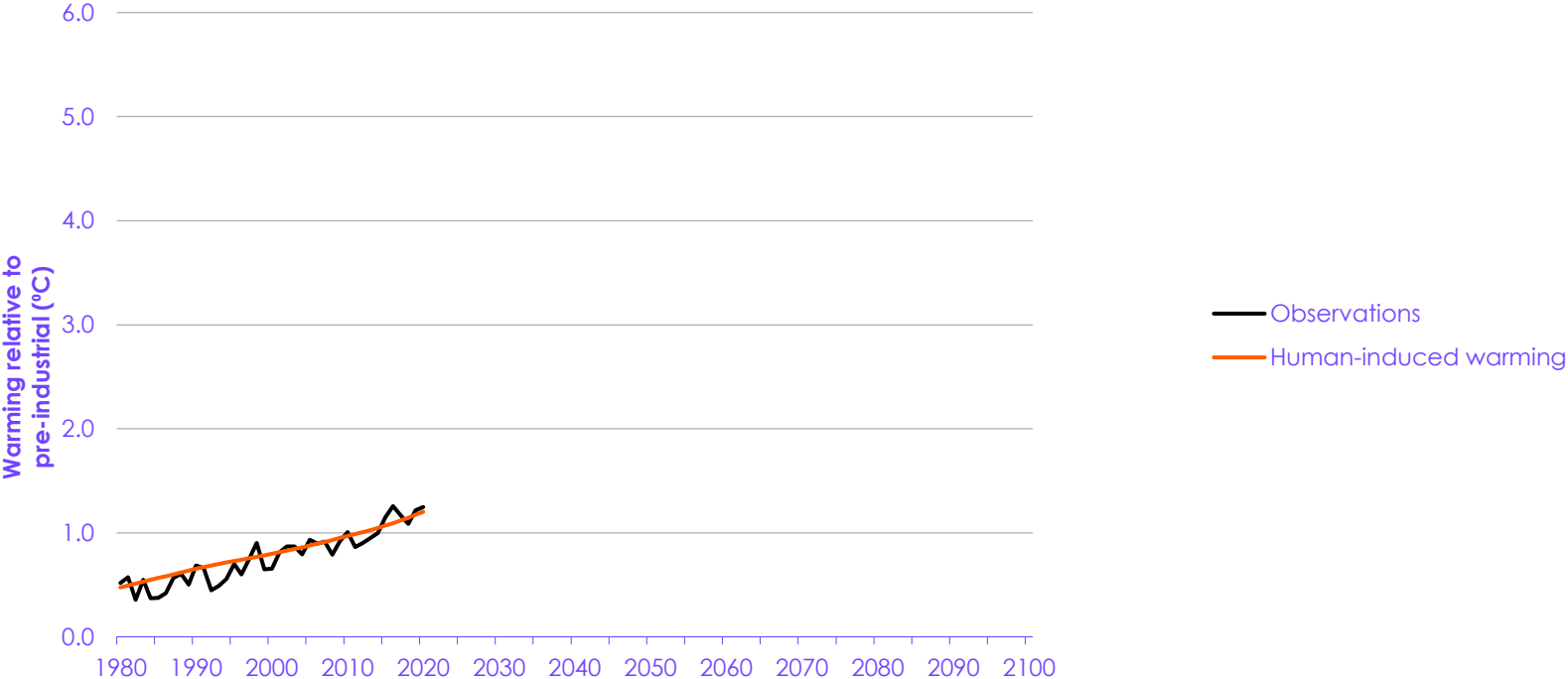
Observed changes in global and UK climate are becoming clearer



Source  
UK Met Office, IPCC

# Our changing climate

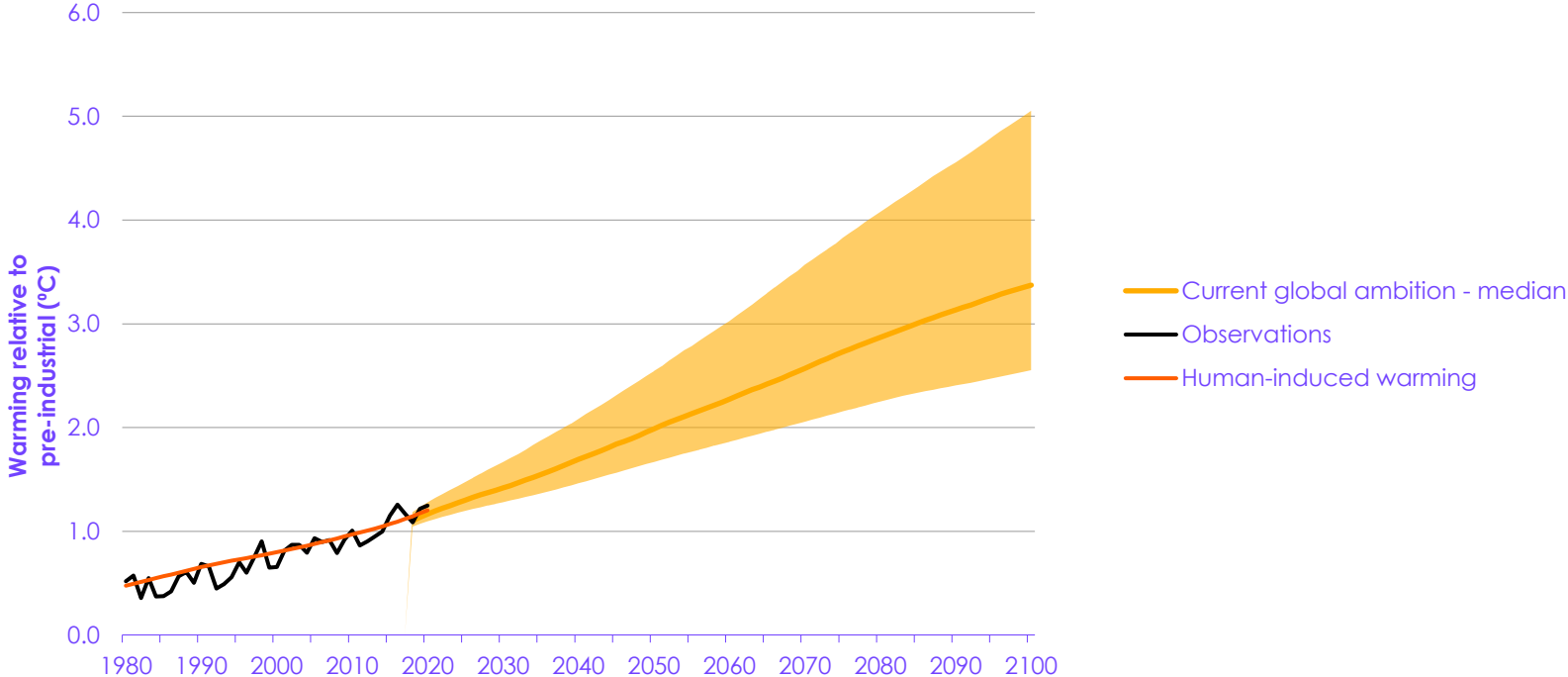
Projected changes in global mean annual surface temperature compared to 1850-1900



Source  
CCC Analysis

# Our changing climate

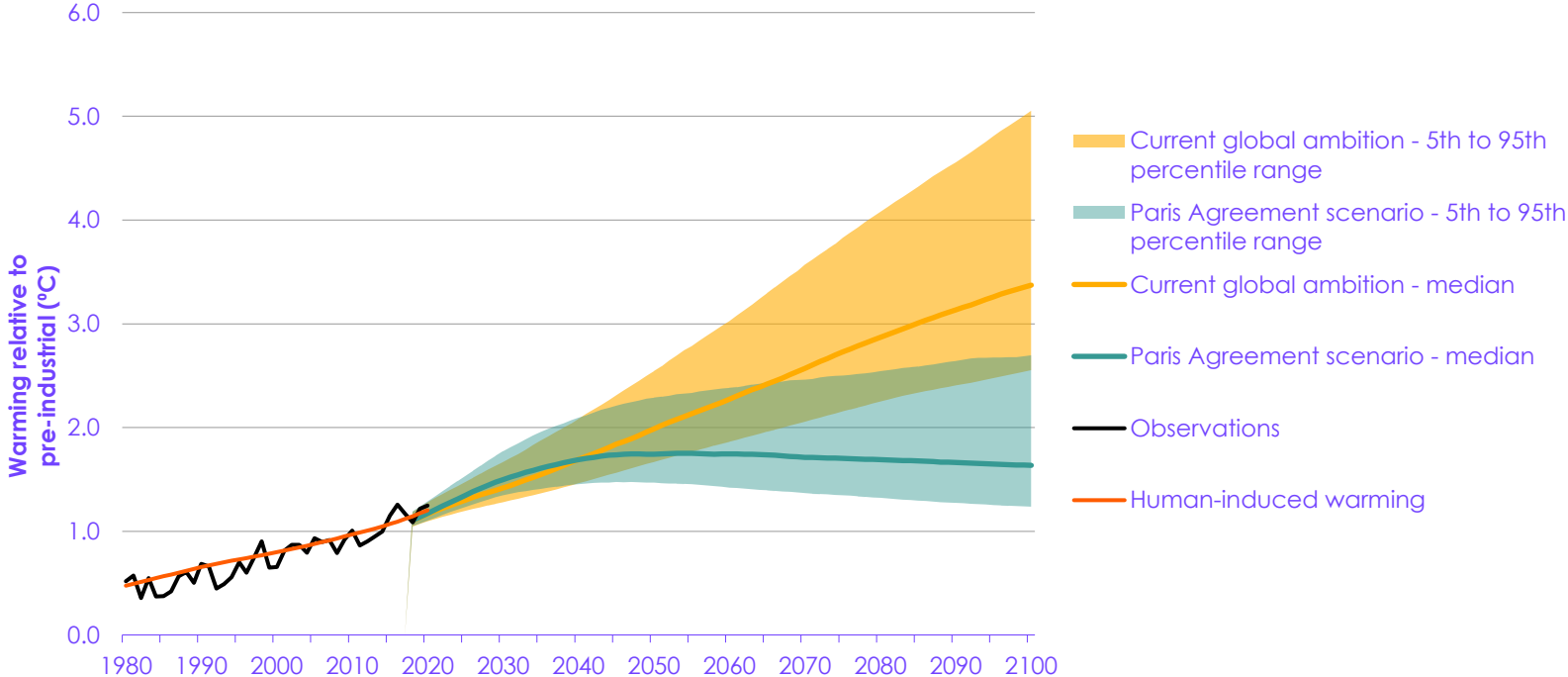
## Projected changes in global mean annual surface temperature compared to 1850-1900



Source  
CCC Analysis

# Our changing climate

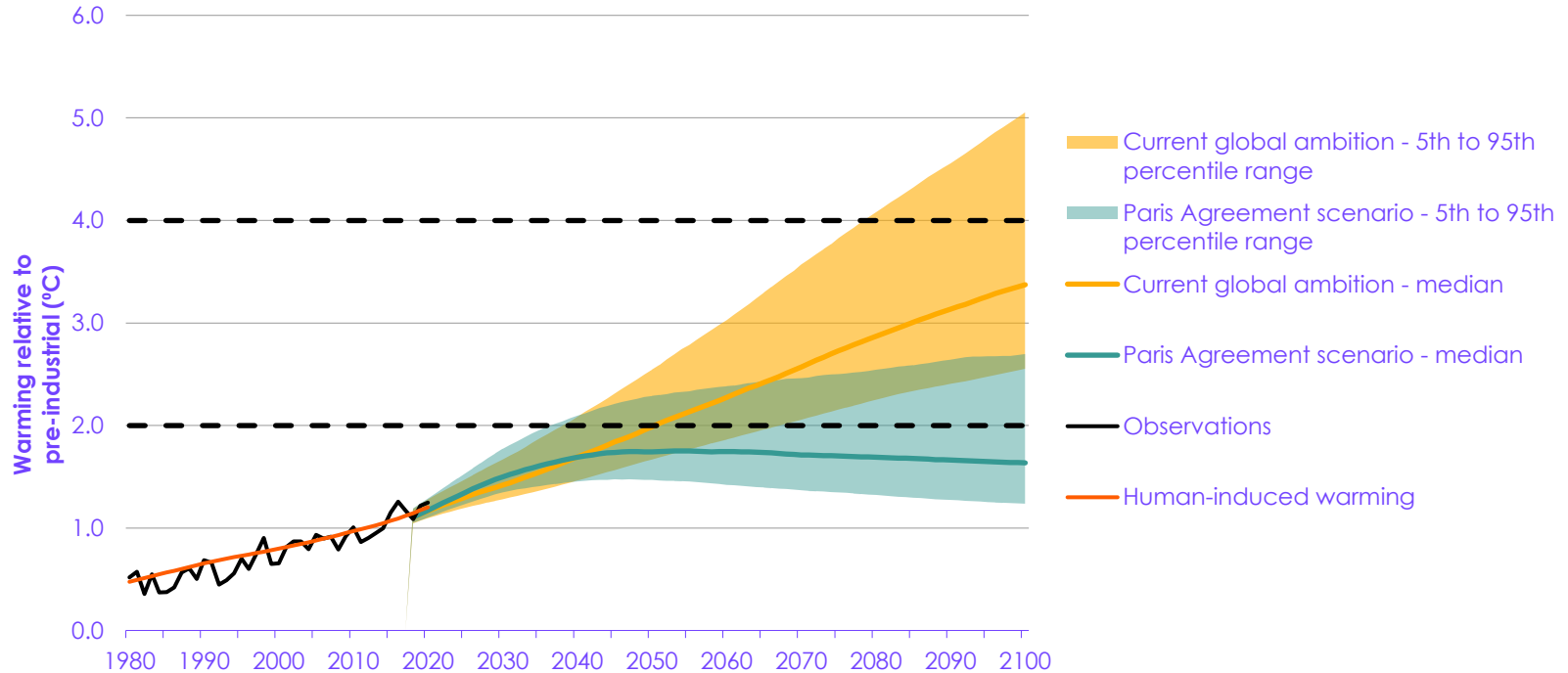
Projected changes in global mean annual surface temperature compared to 1850-1900



Source  
CCC Analysis

# Our changing climate

Projected changes in global mean annual surface temperature compared to 1850-1900



Source  
CCC Analysis



## Risks from heat

Future change in maximum summer air temperature from 1981-2000 baseline



Present day

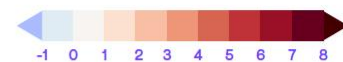


2050s on a pathway to 2°C global warming by the end of the century



2080s on a pathway to 4°C global warming by the end of the century

Maximum air temperature anomaly (°C)

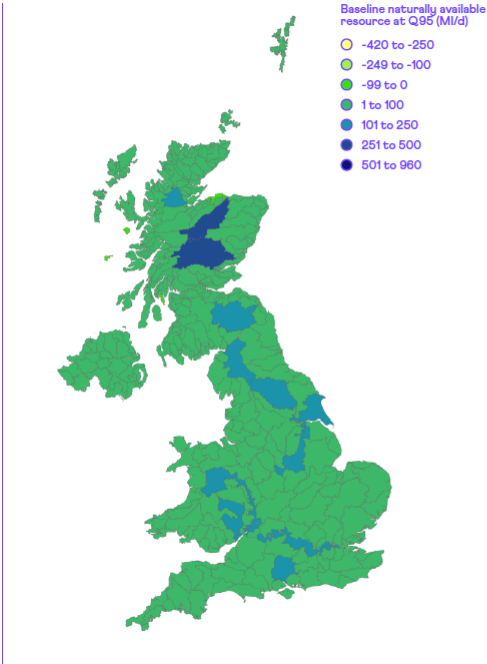


Source

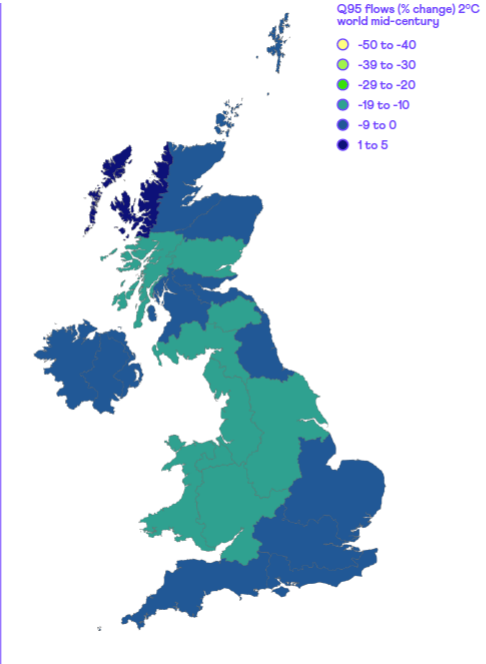
UKCP18 projections

# Risks from water scarcity

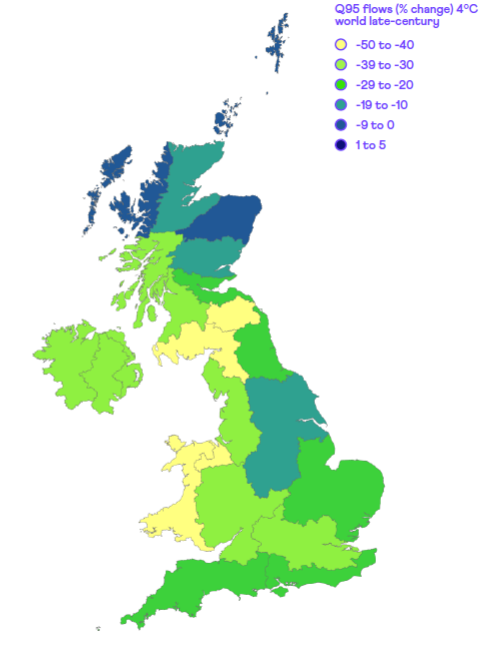
## Projections of future water availability



Present day



2050s on a pathway to 2°C global warming by the end of the century

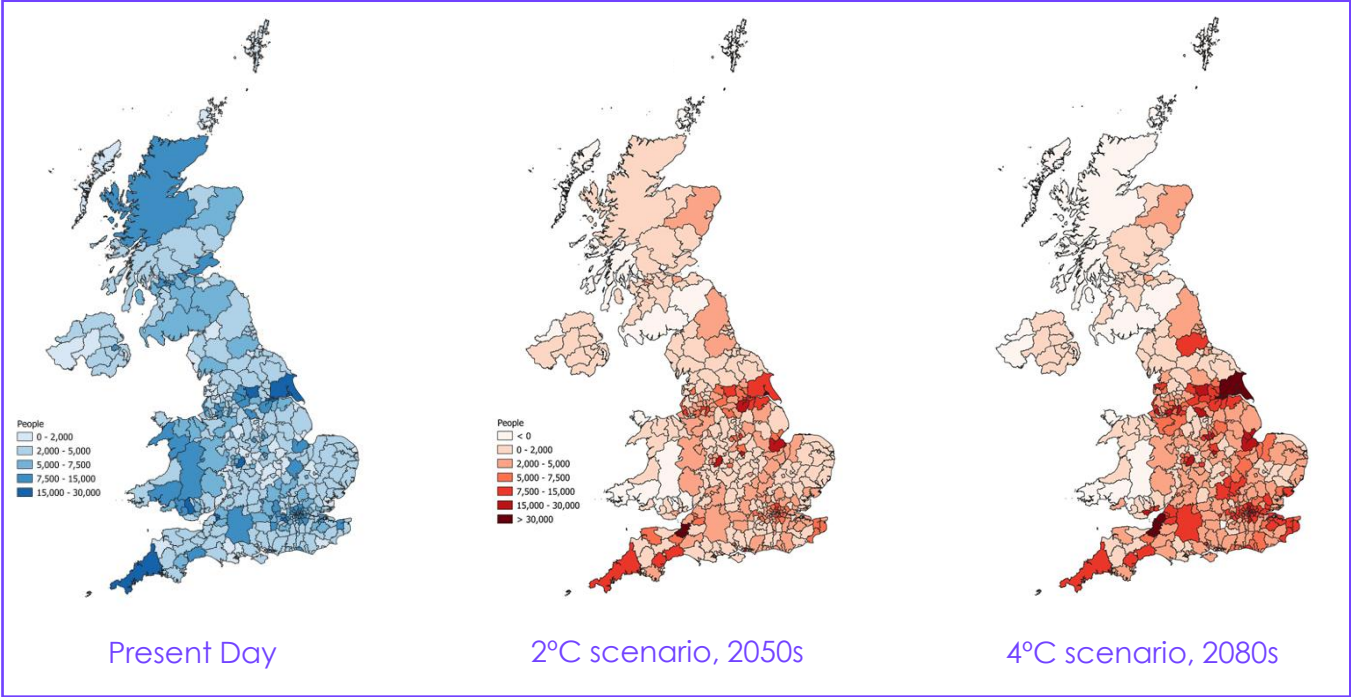


2080s on a pathway to 4°C global warming by the end of the century

Source  
HR Wallingford 2020

# Risks from flooding

## Change in number of people at flood risk from present day



Source  
Sayers et al. 2020

# Risks from fire

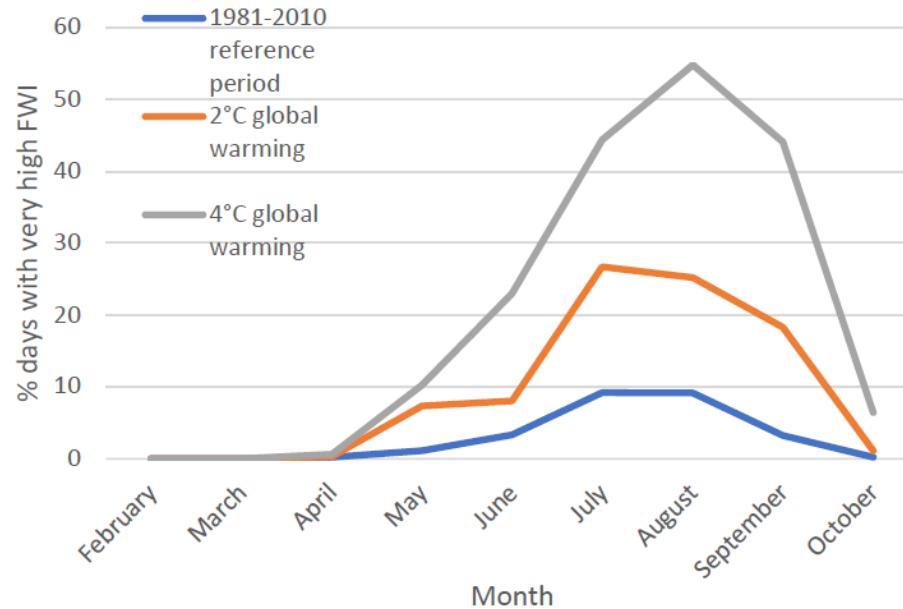
## 2019 was a record wildfire year compared to the previous ten years



## Risks from fire

Conditions suitable for wildfire is expected to become more common in future summers

Predictions for % of days of 'very high' fire weather index based on UK climate scenarios



From Belcher et al. (2021)

Monthly projected % of days with 'very high' Fire Weather Index (FWI) – plotted using data from the Met Office

# Risks and opportunities

61 risks and opportunities identified – 54 with high urgency scores

<b>N1</b> Risks to terrestrial species and habitats	<b>N2</b> Risks to terrestrial species and habitats from pests, pathogens and INNS	<b>N4</b> Risk to soils from changing conditions, including seasonal aridity and wetness	<b>N5</b> Risks to natural carbon stores and sequestration from changing conditions	<b>N6</b> Risks to and opportunities for agricultural and forestry productivity	<b>N7</b> Risks to agriculture from pests, pathogens and INNS	<b>N8</b> Risks to forestry from pests, pathogens and INNS	<b>N11</b> Risks to freshwater species and habitats
<b>N12</b> Risks to freshwater species and habitats from pests, pathogens and INNS	<b>N14</b> Risks to marine species, habitats and fisheries	<b>N16</b> Risks to marine species and habitats from pests, pathogens and INNS	<b>N17</b> Risks and opportunities to coastal species and habitats	<b>I1</b> Risks to infrastructure networks from cascading failures	<b>I2</b> Risks to infrastructure services from river and surface water flooding	<b>I5</b> Risks to transport networks from slope and embankment failure	<b>I8</b> Risks to public water supplies from reduced water availability
<b>I12</b> Risks to transport from high and low temperatures, high winds, lightning	<b>H1</b> Risks to health and wellbeing from high temperatures	<b>H3</b> Risks to people, communities and buildings from flooding	<b>H4</b> Risks to people, communities and buildings from sea level rise	<b>H6</b> Risks and opportunities from summer and winter household energy demand	<b>H8</b> Risks to health from vector-borne diseases	<b>H11</b> Risks to cultural heritage	<b>H12</b> Risks to health and social care delivery
<b>H13</b> Risks to education and prison services	<b>B1</b> Risks to business sites from flooding	<b>B2</b> Risks to business locations and infrastructure from coastal change	<b>B6</b> Risks to business from disruption to supply chains and distribution networks	<b>ID1</b> Risks to UK food availability, safety, and quality from climate change overseas	<b>ID5</b> Risks to international law and governance from climate change overseas that will impact the UK	<b>ID4</b> Risks to the UK from international violent conflict resulting from climate change	<b>ID9</b> Risk to UK public health from climate change overseas
<b>ID7</b> Risks from climate change on international trade routes	<b>ID10</b> Risk multiplication from the interactions and cascades of named risks across systems and geographies	<b>N3</b> Opportunities from new species colonisations in terrestrial habitats	<b>N9</b> Opportunities for agricultural and forestry productivity from new species	<b>N10</b> Risks to aquifers and agricultural land from sea level rise, saltwater intrusion	<b>N15</b> Opportunities for marine species, habitats and fisheries	<b>N18</b> Risks and opportunities from climate change to landscape character	<b>I3</b> Risks to infrastructure services from coastal flooding and erosion
<b>I4</b> Risks to bridges and pipelines from flooding and erosion	<b>I6</b> Risks to hydroelectric generation from low or high river flows	<b>I7</b> Risks to subterranean and surface infrastructure from subsidence	<b>I9</b> Risks to energy generation from reduced water availability	<b>I10</b> Risks to energy from high and low temperatures, high winds, lightning	<b>I13</b> Risks to digital from high and low temperatures, high winds, lightning	<b>H2</b> Opportunities for health and wellbeing from higher temperatures	<b>H5</b> Risks to building fabric
<b>H7</b> Risks to health and wellbeing from changes in air quality	<b>H9</b> Risks to food safety and food security	<b>H10</b> Risks to health from poor water quality and household water supply interruptions	<b>B3</b> Risks to businesses from water scarcity	<b>B5</b> Risks to business from reduced employee productivity – infrastructure disruption and higher temperatures	<b>B7</b> Opportunities for business - changing demand for goods and services	<b>N13</b> Opportunities to marine species, habitats and fisheries	<b>I11</b> Risks to offshore infrastructure from storms and high waves
<b>B4</b> Risks to finance, investment, insurance, access to capital	<b>ID8</b> Risk to the UK finance sector from climate change overseas	<b>ID2</b> Opportunities for UK food availability and exports	<b>ID3</b> Risks to the UK from climate-related international human mobility	<b>ID6</b> Opportunities (including Arctic ice melt) for international trade routes			

More Action Needed

Further Investigation

Sustain Current Action, Watching Brief

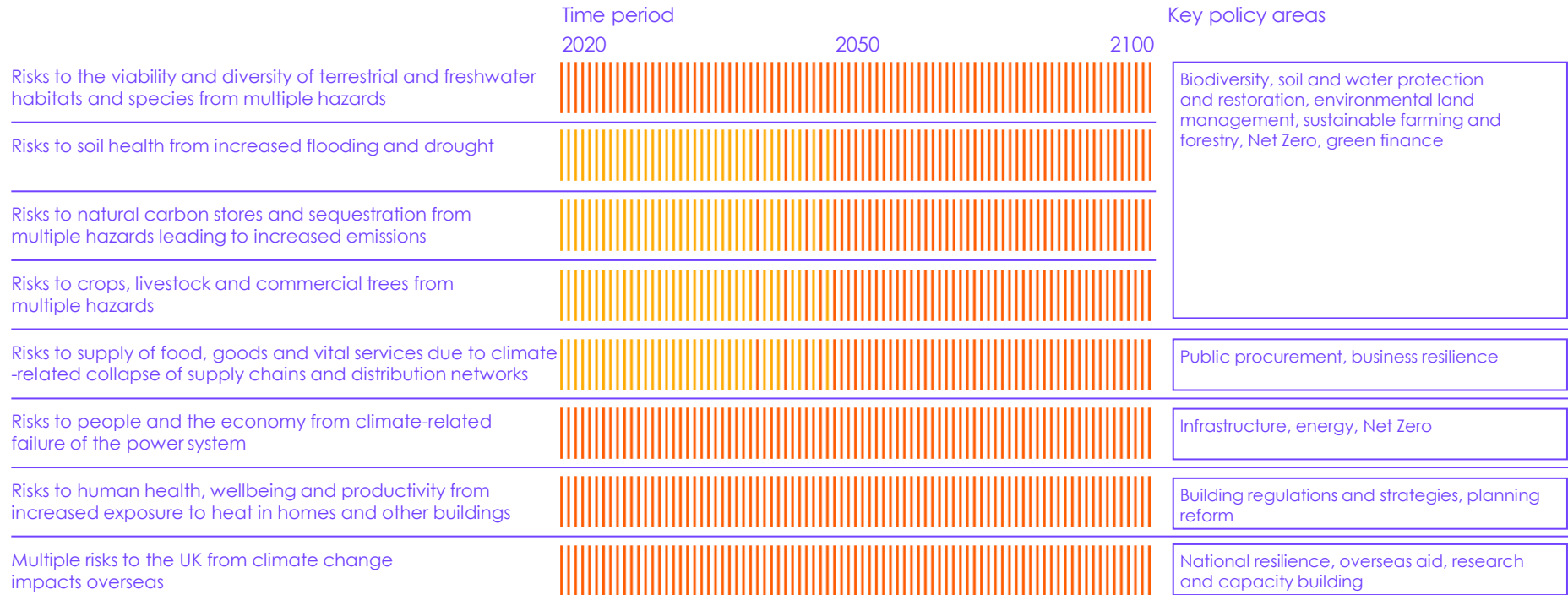
# Acting on adaption

## Highest priorities for further adaptation in the next two years

Magnitude of risk

High

Medium



# Acting on adaptation

## What can be done?

Independent Assessment of UK Climate Risk (CCRA3)	Examples
<b>Engineered solutions</b>	Building design and retrofit, road resurfacing, flood defence investment, drainage
<b>Nature-based solutions</b>	Increasing plant diversity, habitat creation, soil conservation, increased blue carbon (coastal and marine vegetation), green sustainable urban drainage, urban greening, and peatland restoration
<b>New technologies</b>	Precision farming, using new crop and livestock varieties, remote sensing, new designs for infrastructure assets, use of sensing, digitisation and big data for monitoring, evaluation and management
<b>Behavioural</b>	Changing timing of agricultural practices, information sharing, public engagement, skills development in adaptation actions
<b>Institutional</b>	Adaptation standards, supply chain diversification, regulation, advisory services
<b>Financial</b>	Insurance, risk disclosure, adaptation finance
<b>Data, R&amp;D</b>	Monitoring and surveillance, inspections, forecasting, research, decision support tools

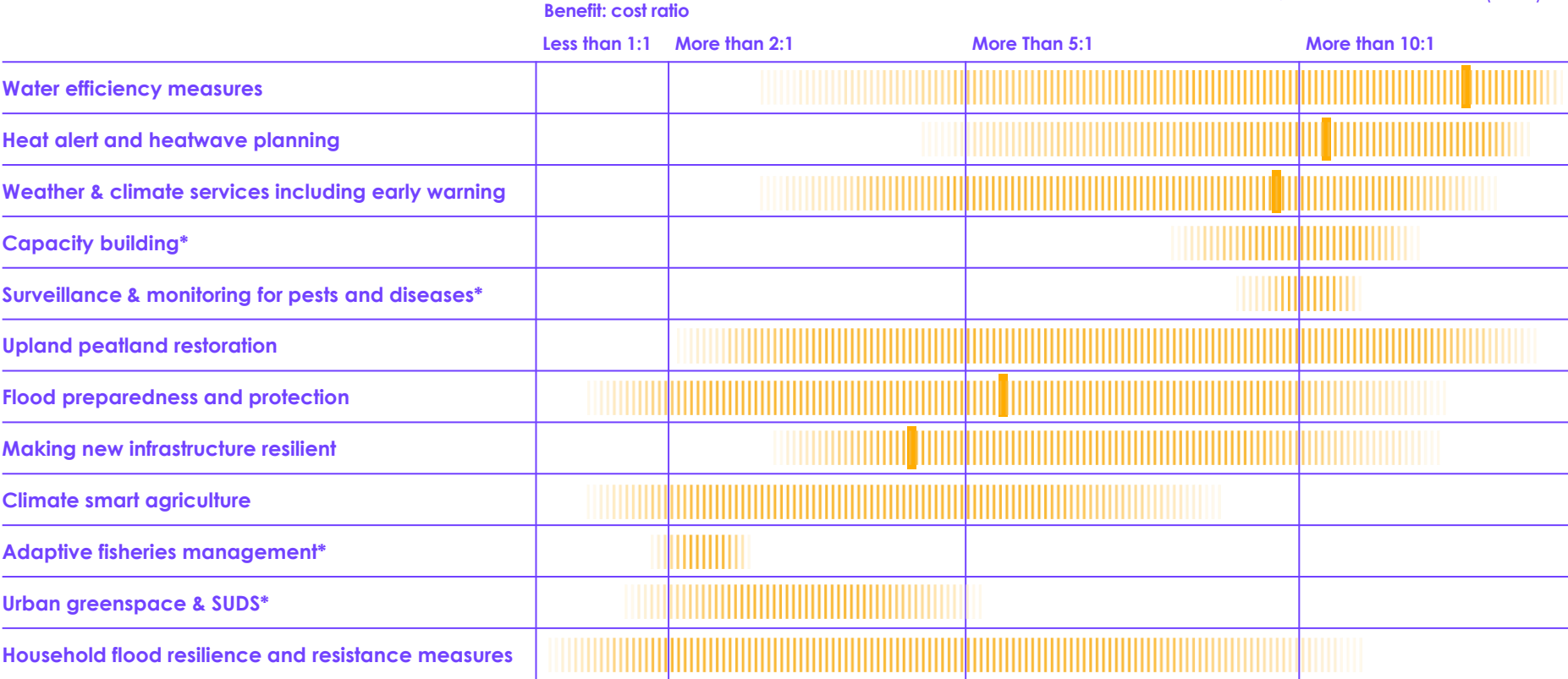


# Acting on adaptation

## Adaptation makes economic sense

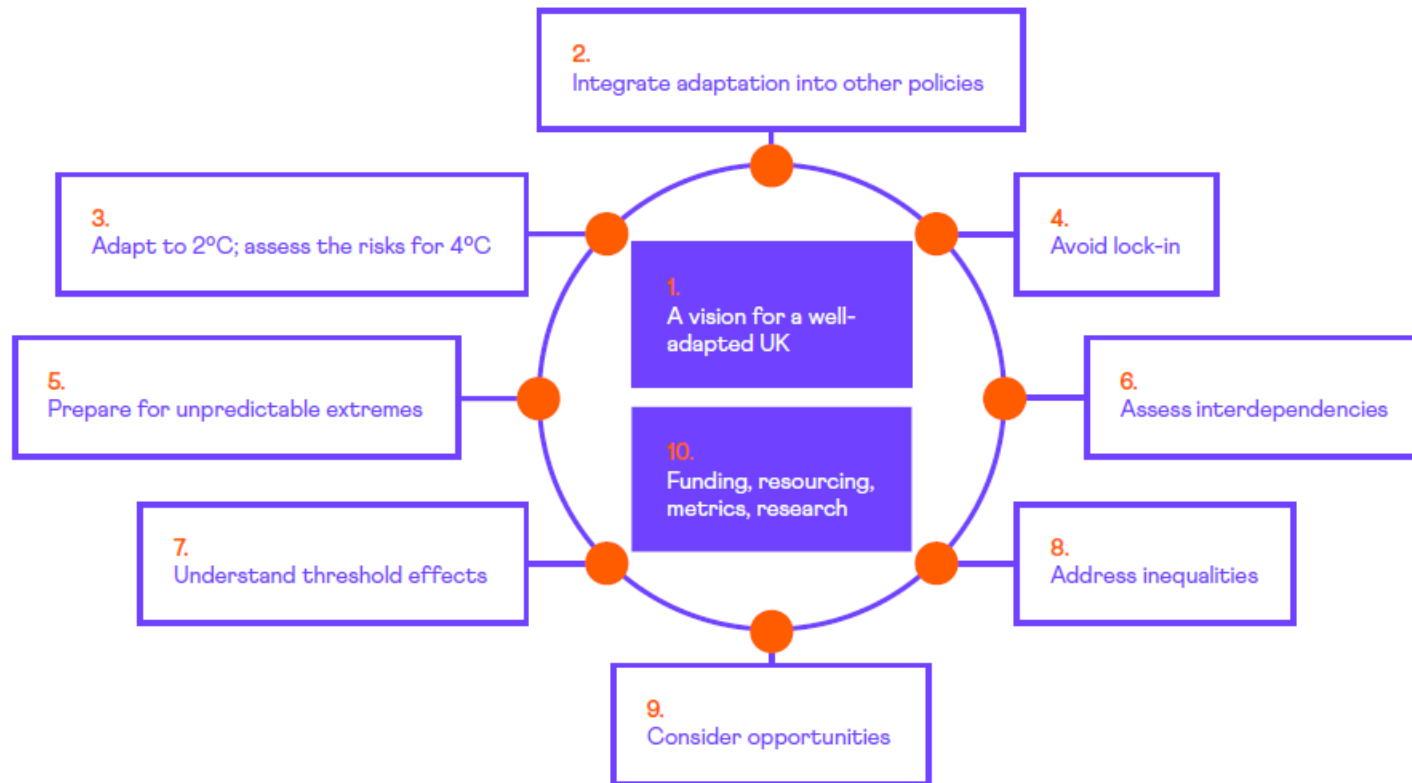
\*Based on single, limited or indicative studies

Source: CCC, based on Watkiss, P (2021)



# Acting on adaptation

## Principles for adaptation action



Source: CCC

## Contact us

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