The essential role of trees in adapting cities to climate change

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Summarised by Clive Stevens, Bristol TreeForum

communityforestsnorthwest
supporting the mersey, red rose and pennine edge forests

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Northwest
REGIONAL DEVELOPMENT AGENCY

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INTERREG IVB

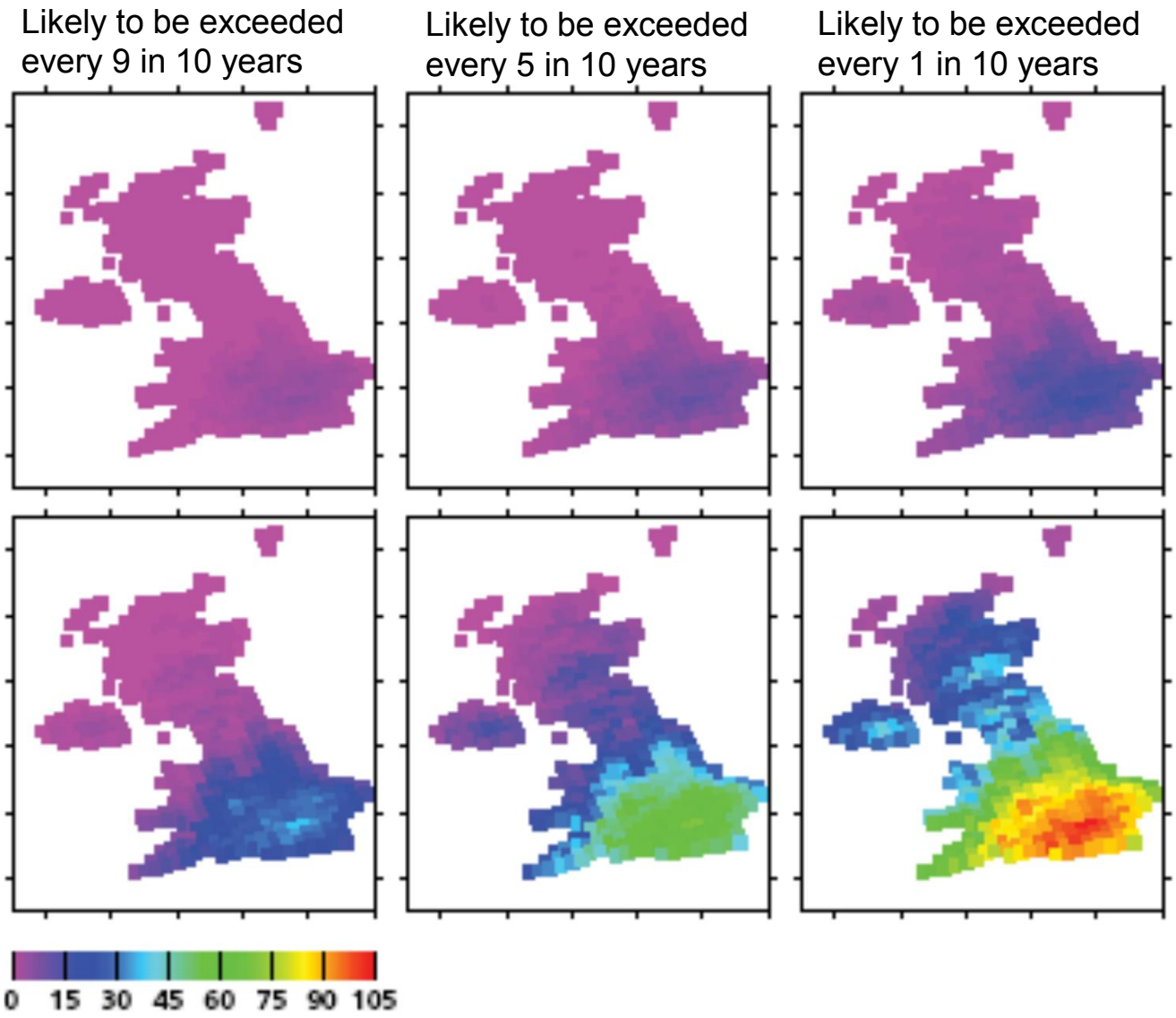
- **Climate Change**

UK Climate Projections 2009

http://ukclimateprojections.defra.gov.uk

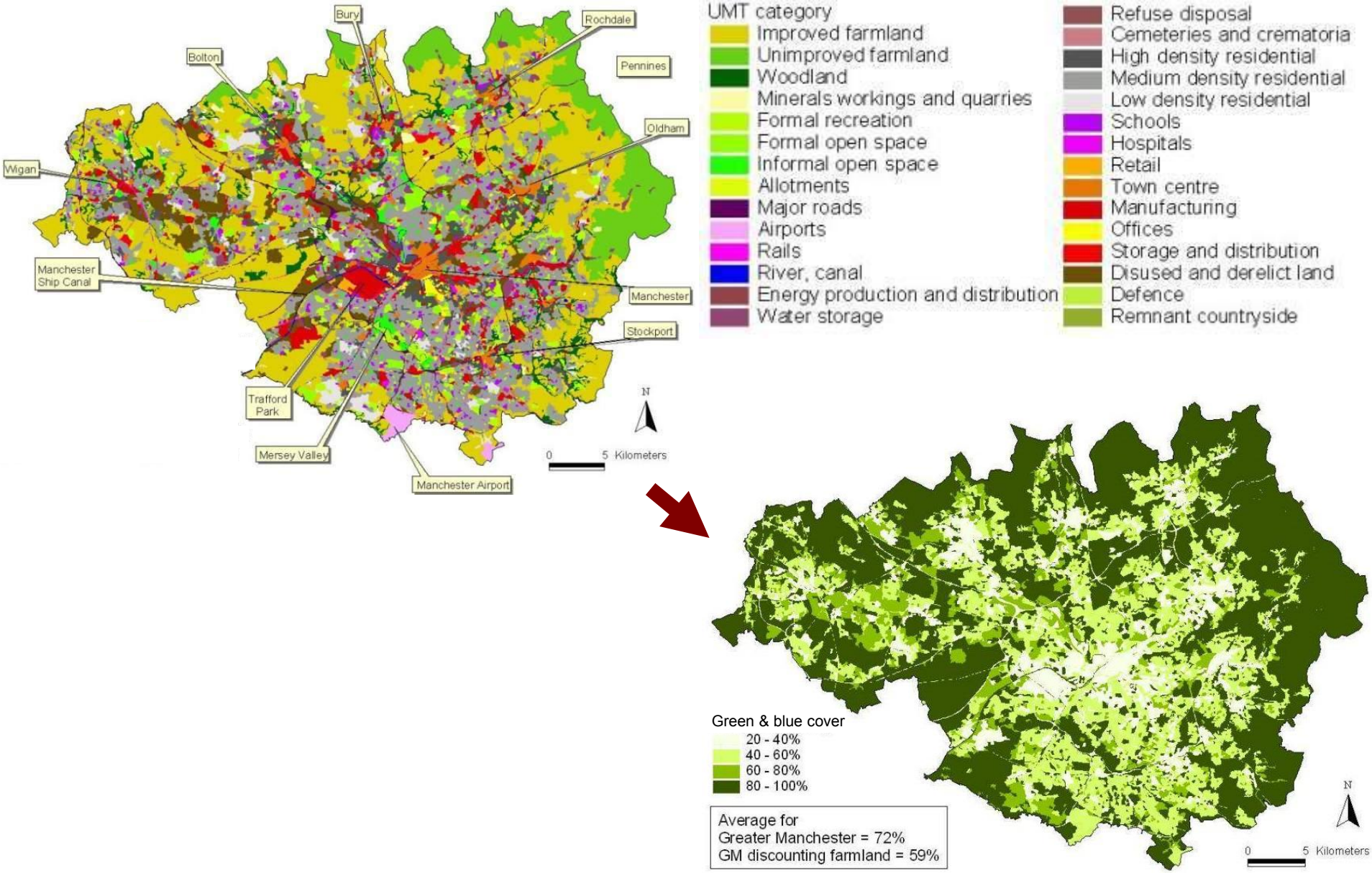
- Warmer, wetter winters
- Hotter, drier summers
- More extreme events
  - Rainfall
    - Heavy rain days (>25 mm) over most of lowland UK increase by 2-3.5x in winter, & 1-2x in summer (2080s medium emissions scenario, central estimate)
  - Heatwaves

Number of hot days (>25°C) annually, estimated by the weather generator



- **Green infrastructure for climate change adaptation in urban areas**

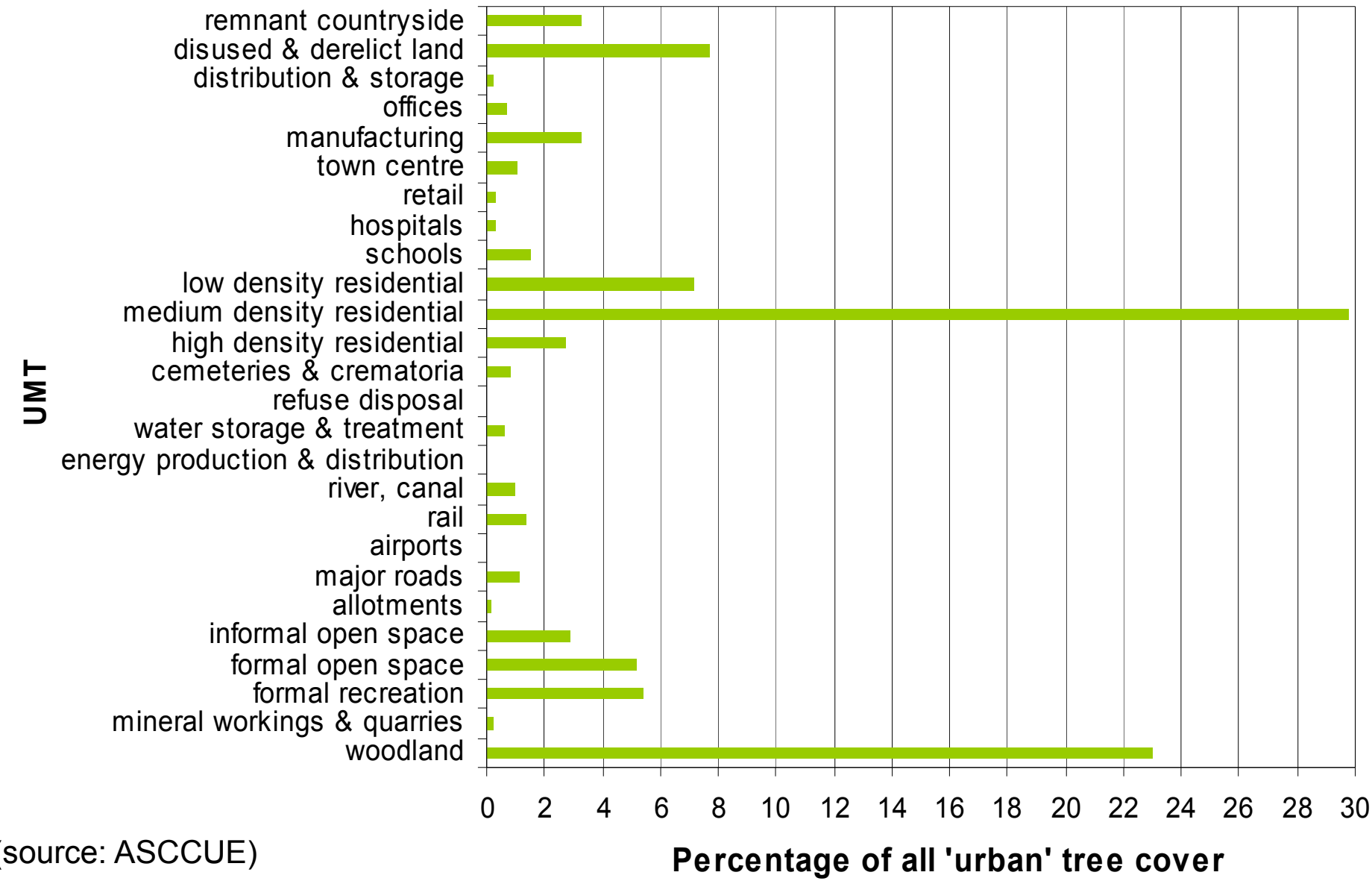
Greater Manchester Urban Characterisation



27% of urban green & blue cover is trees

(source: Gill, 2006)

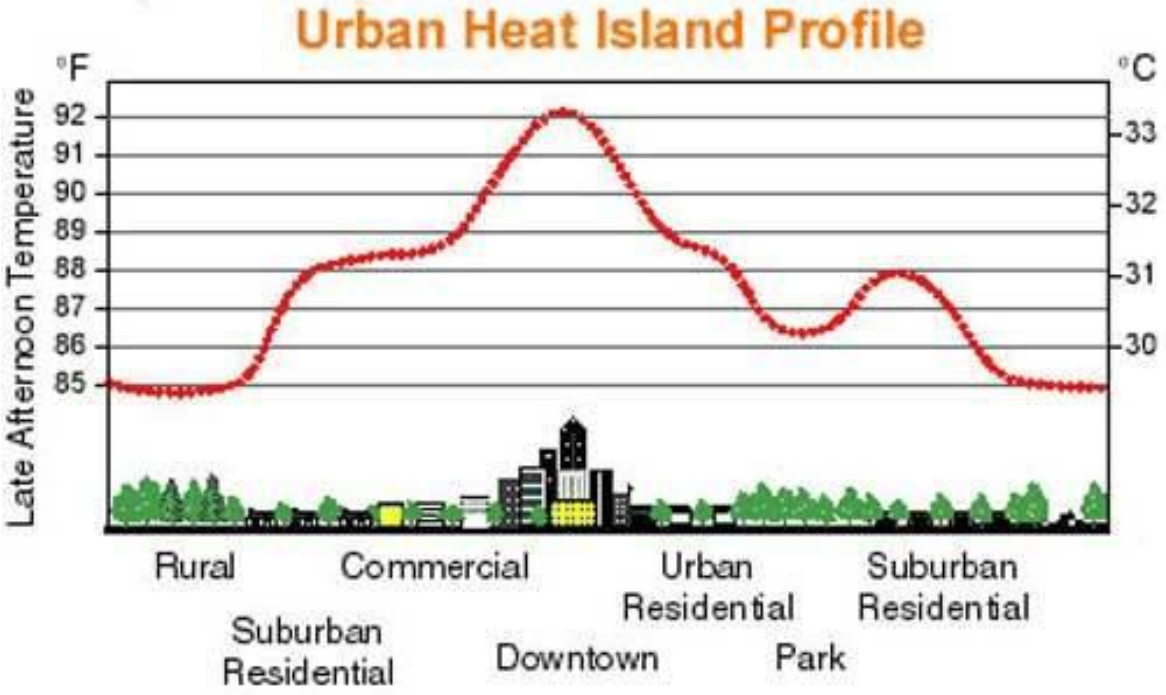
‘Urban’ Tree Cover in Greater Manchester



(source: ASCCUE)

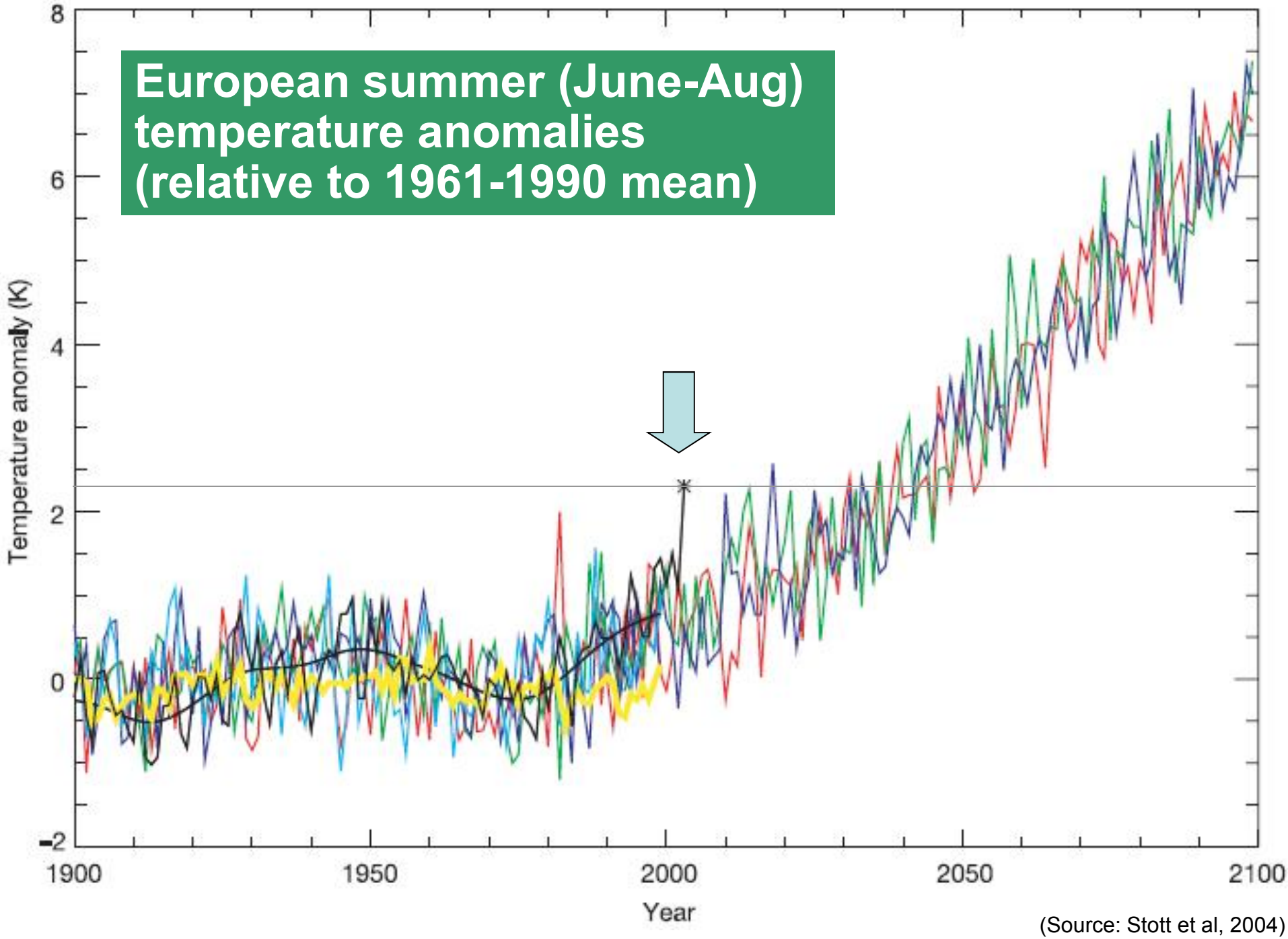
- **Managing high temperatures**

Urban temperatures & climate change



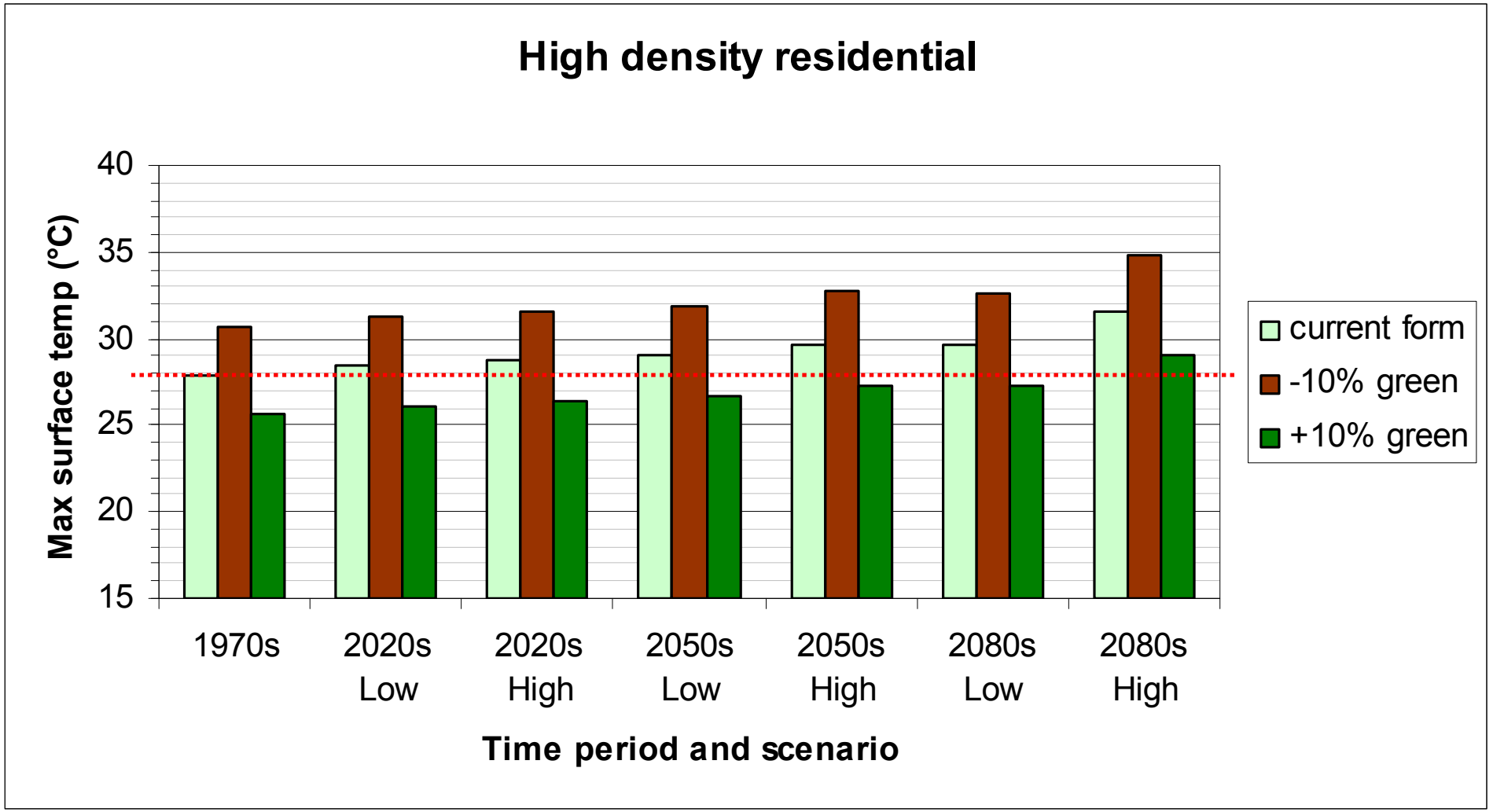
+ climate change

= Heat stress & mortality
Summer ozone episodes & associated ill health
Urban areas less attractive to live, work, visit, invest



(Source: Stott et al, 2004)

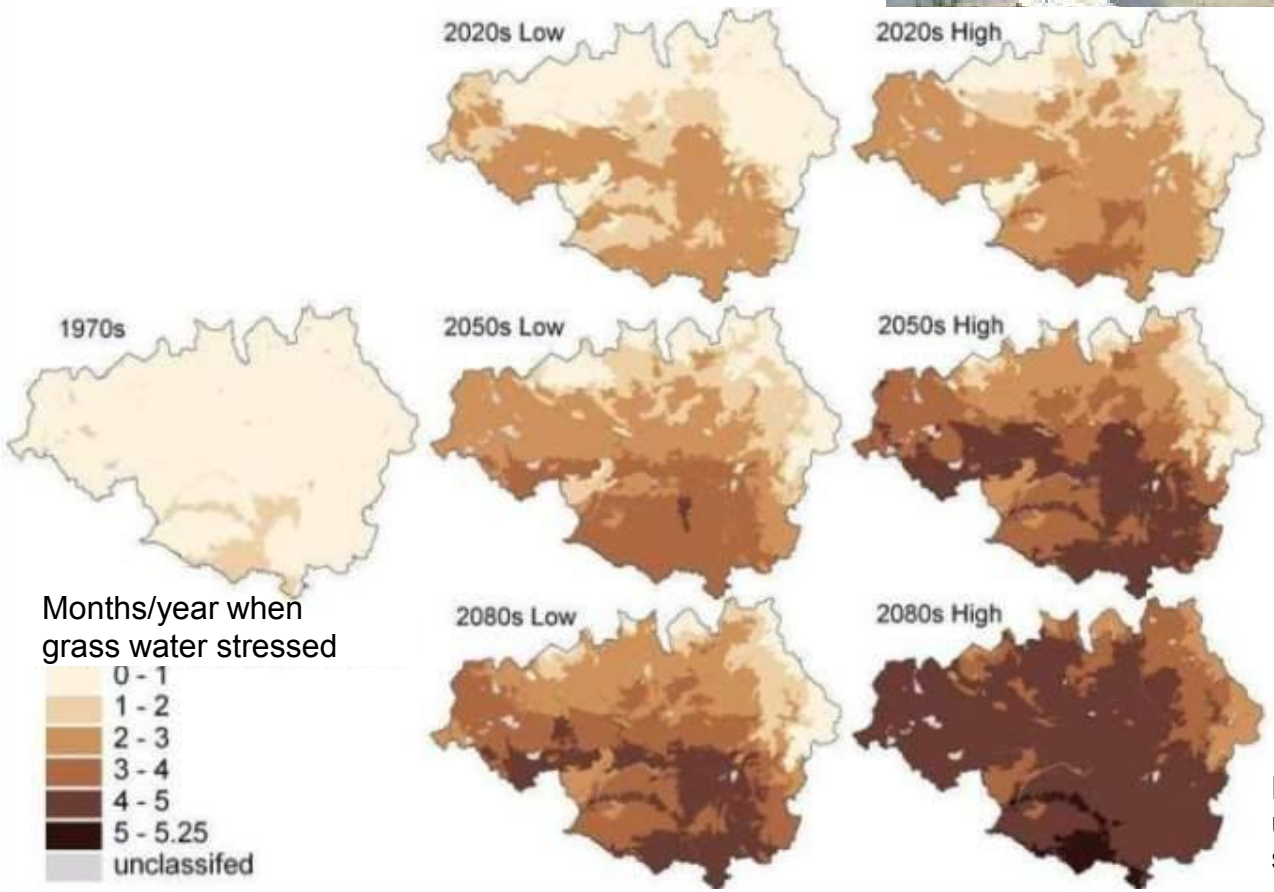
Green infrastructure can manage temperatures through evaporative cooling



Modelling for Greater Manchester, using UKCIP02 climate change scenarios (Gill, 2006)

If green infrastructure does not evapotranspire…

(Manchester Evening News, 2006)



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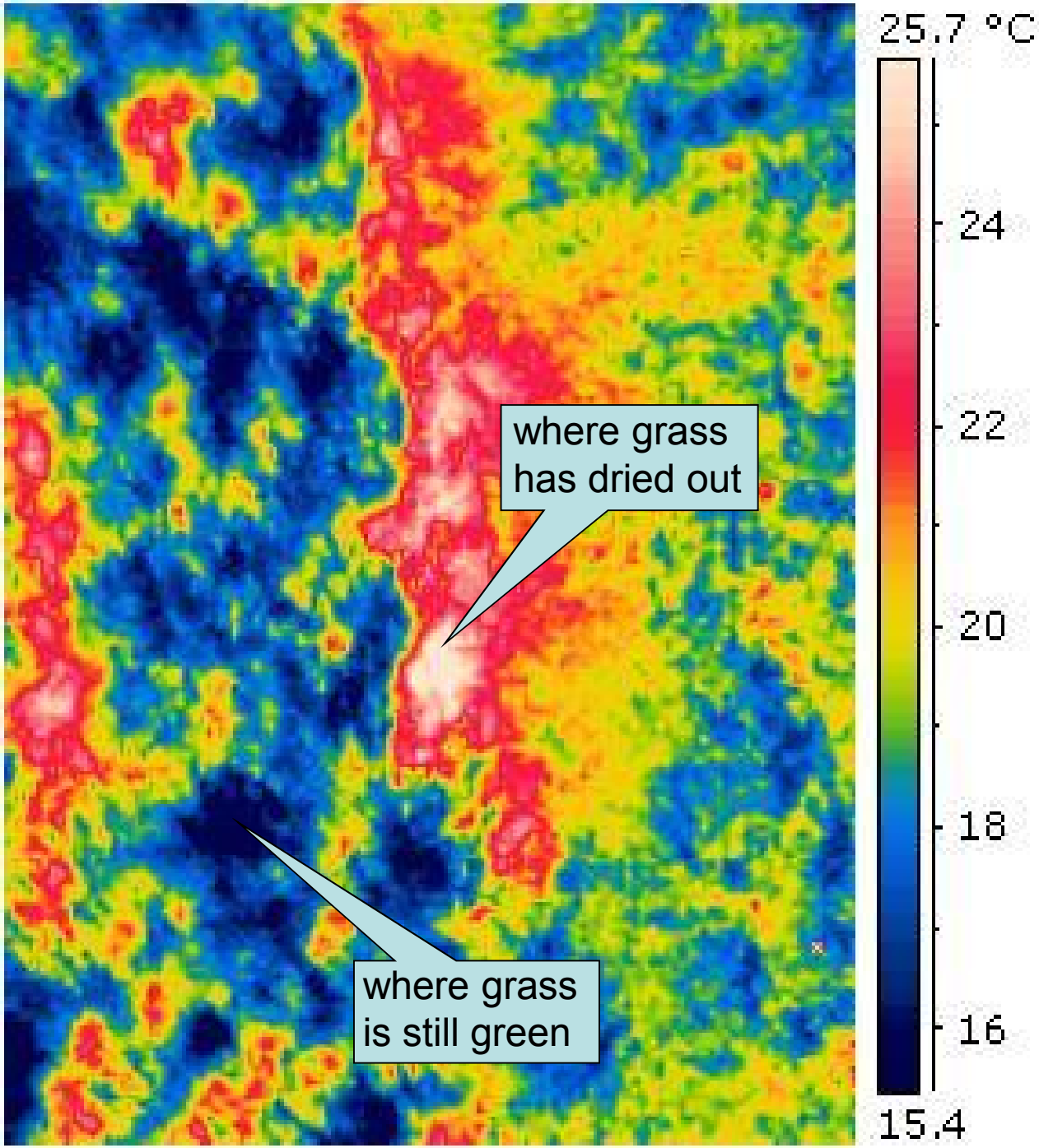


Infrared photograph of grass surface temperature

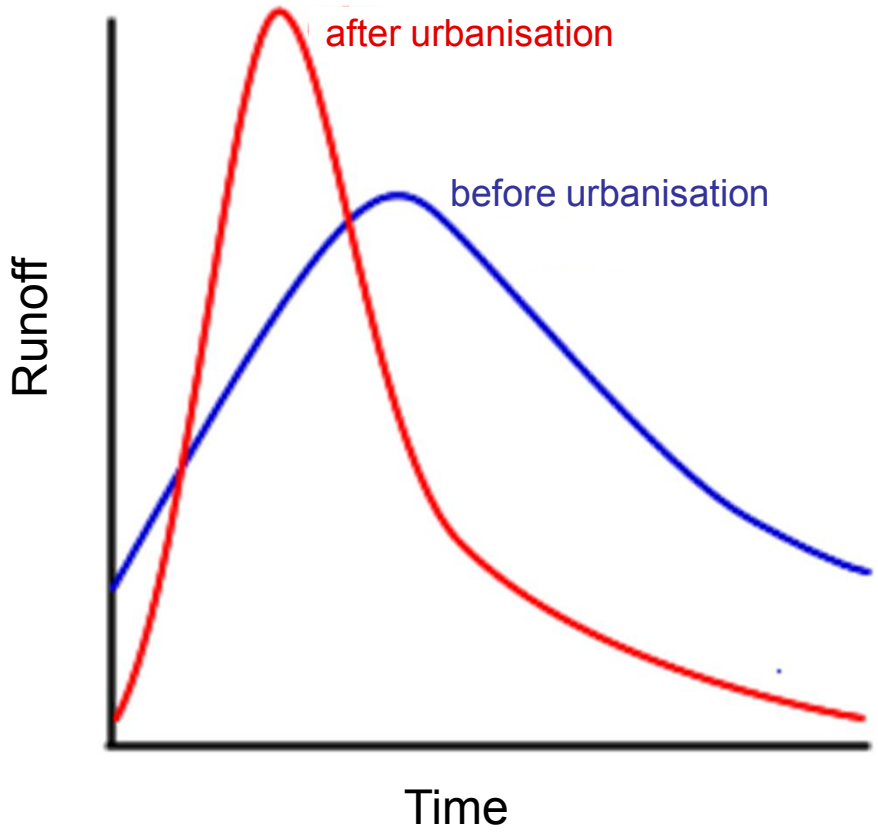
Image courtesy of David Armson, University of Manchester

Adaptation in the public realm

- Sustainable irrigation to ensure evaporative cooling
- Water surfaces continue to provide evaporative cooling
- Large mature tree canopies to provide shade – for people & buildings

- **Managing pressure on drainage systems & flooding**

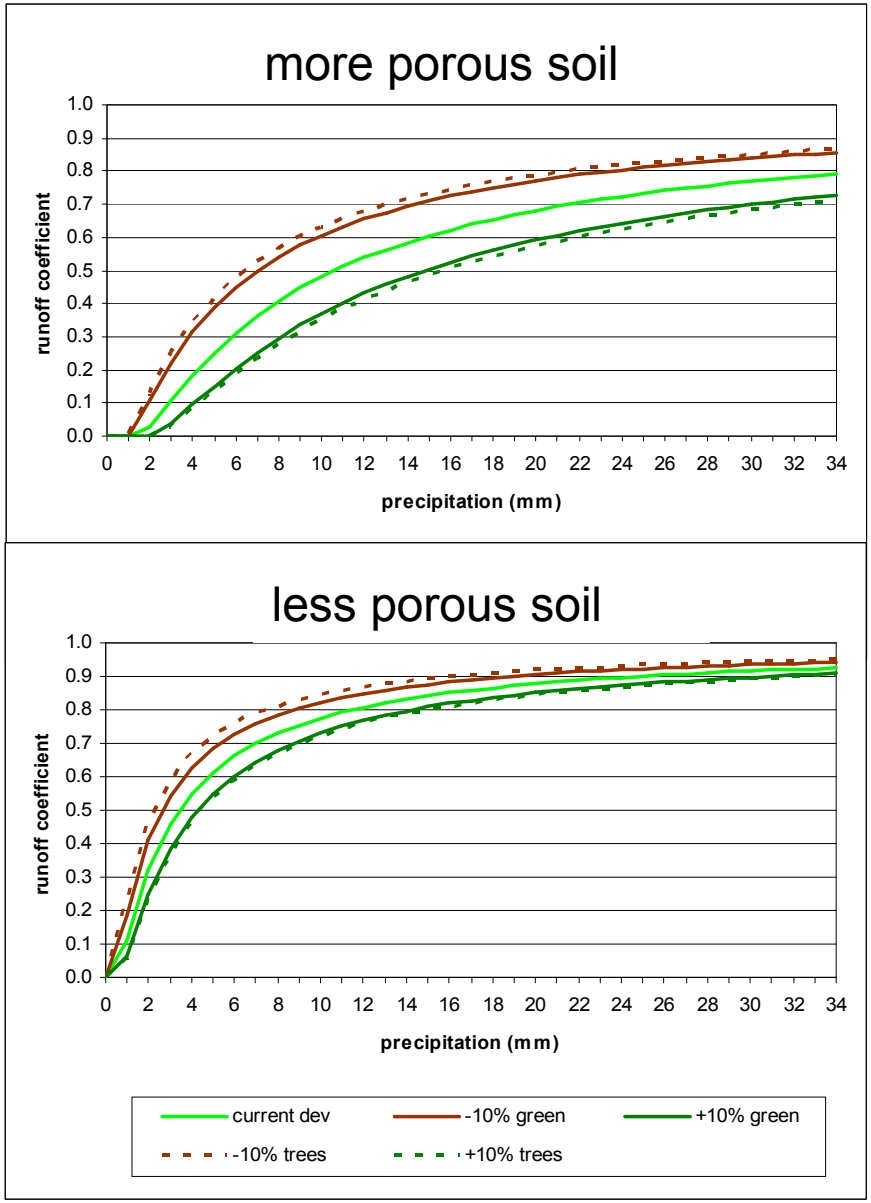
Urban hydrology & climate change



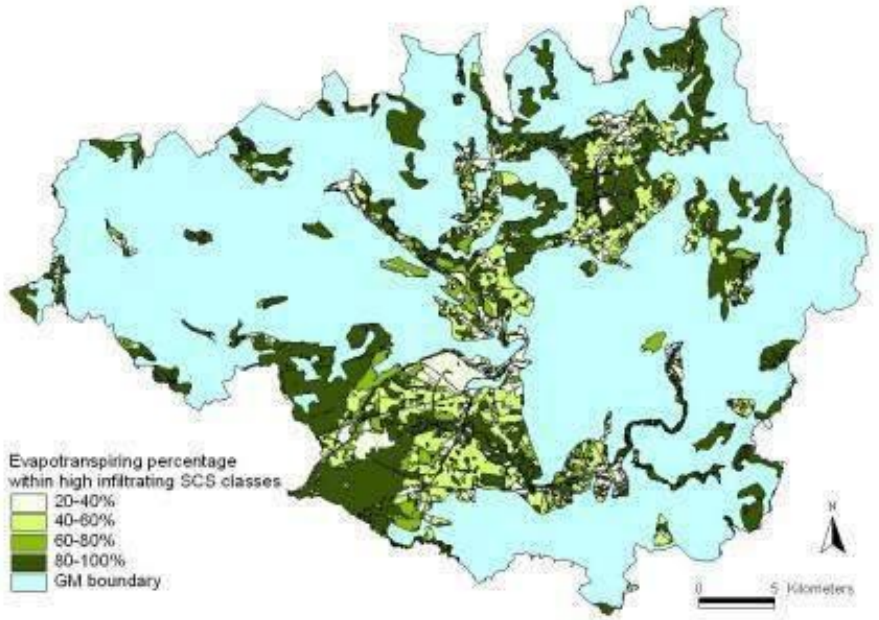
+ climate change

= Pluvial & fluvial flooding
Stress, disruption, costs to people & businesses

Impact of green infrastructure on runoff



- Reduces rate & volume of runoff, trees especially good
- Especially on porous soils
- BUT less effective with more rainfall, so still have increased runoff with climate change



Store excess rainwater & use to irrigate green space (& sustain evaporative cooling)

Chavasse Park, Liverpool One (Source: John Melmoe, Willerby Landscapes)

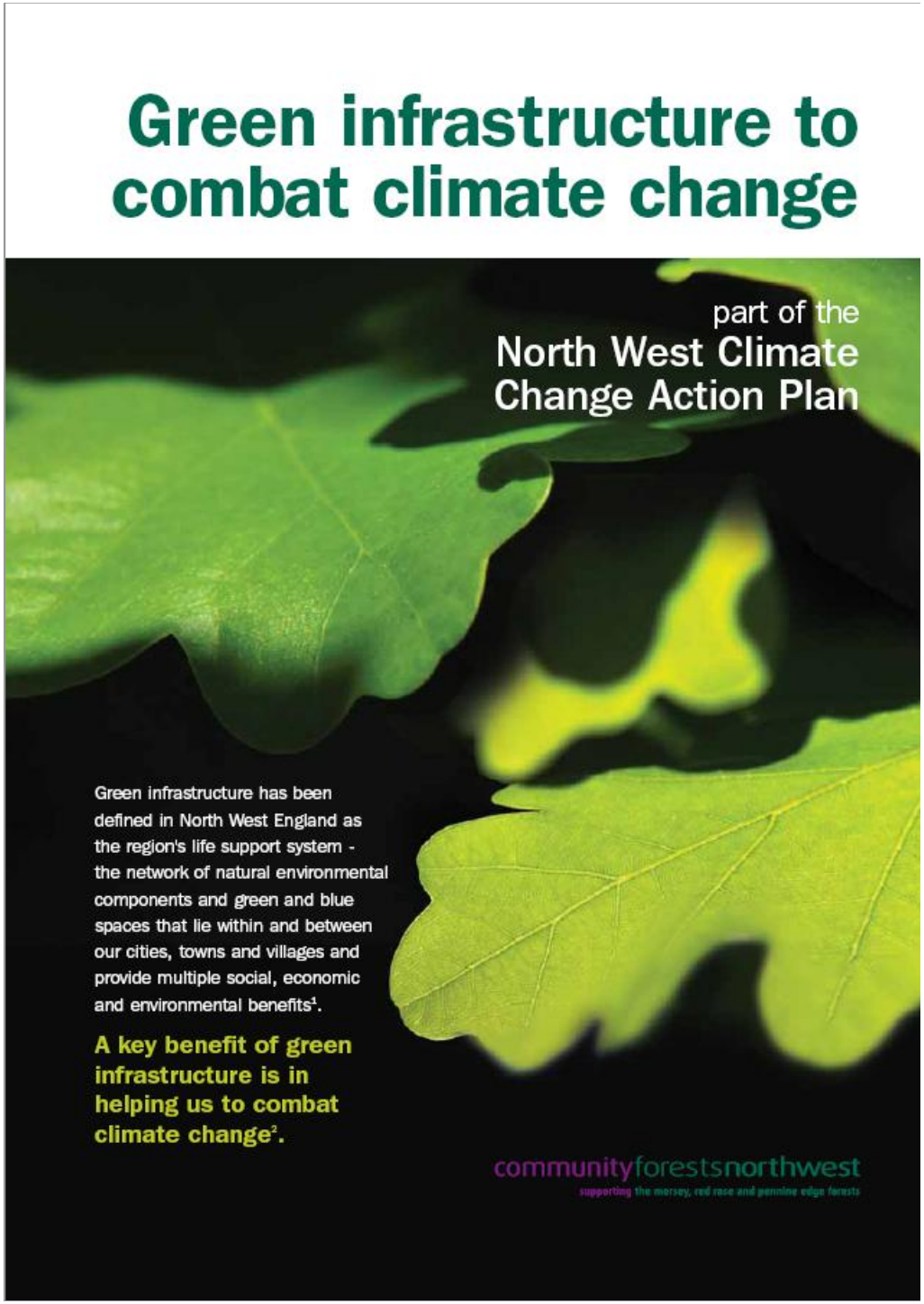
Managing flooding through woodland creation

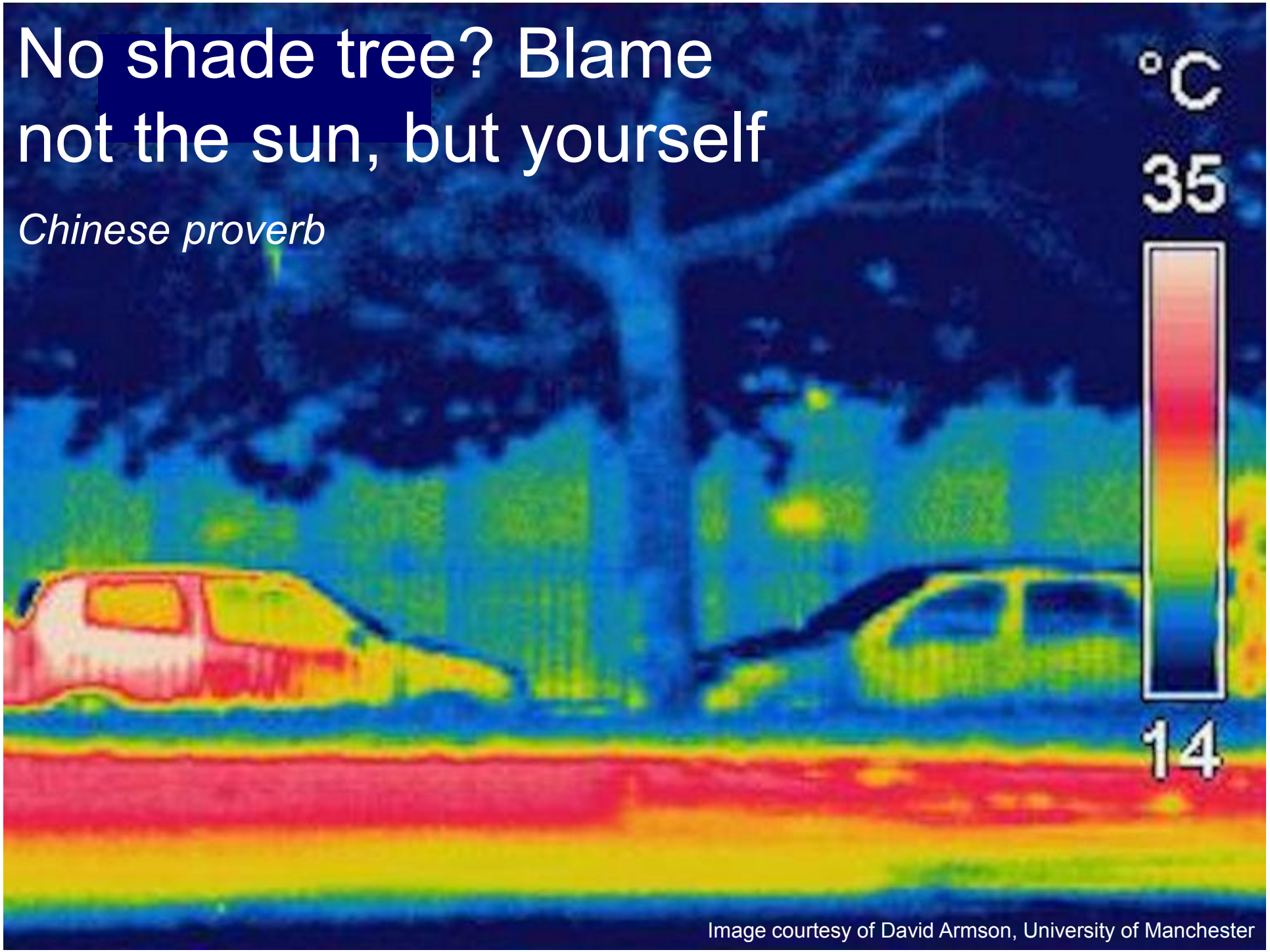
- Large scale afforestation may not be justifiable on grounds of flood control
- Carefully designed woodland planting could be beneficial
  - Buffers in compacted upland pastures
  - Riparian planting along upland streamsides
  - Re-creation of carefully designed floodplain forests
  - Disused & derelict land
- Reducing flooding & soil erosion

The 200,000m^3 that didn't flood Doncaster (The Wildlife Trusts, 2008)

- **The need for strategic planning**

- NW Climate Change Action Plan
- Potential for green infrastructure to adapt & mitigate climate change
- www.ginw.co.uk/climatechange




No shade tree? Blame not the sun, but yourself
Chinese proverb
°C
35
14
Image courtesy of David Armson, University of Manchester

Targets	Indicators
Enhance the quality of publicly accessible open spaces in the city	Amount and % of eligible open spaces managed to Green Flag Award standard (Core Output Indicator NCOI 4c)
Retain areas of biodiversity importance	Change in areas of biodiversity importance (Core Output Indicator E2 (NCOI 8))
Improve management of local biodiversity sites	Improved local biodiversity – active management of local sites (National Indicator 157)
Increase tree cover	% of tree cover
	Number of let allotments in the city

Increase tree cover : % of tree cover

the need for strategic planning

... Bristol