

We are in a Climate Emergency and Biodiversity Crisis

Climate emergency declarations in 1,261 jurisdictions and local governments cover 798 million citizens

Posted on 18 December 2019



Over 70,000 landscape architects around the world are taking action as global citizens to limit planetary warming to 1.5° C.

So what can we do?

Climate and Environmental Change

Global warming

Extreme weather events

Heat waves Floods

Damage to Infrastructure

Loss of life and livelihoods

Reduce impact with blue/green infrastructure

Nature Based Solutions

Liveability of cities is under threat worldwide

UK is no longer a cold country and must adapt to heat, say climate scientists

Experts call on UK officials to prepare for periods of extreme heat or risk thousands of excess deaths

Extreme UK weather - live updates



Source: guardian.com

UK is no longer a cold country and must adapt to heat, say climate scientists

Delhi suffers at 49C as heatwave sweeps India

By Shweta Khanna & Niraj Kumar

BBC News



Source: bbc.com

Delhi suffers at 49°C as heatwave sweeps India

Japan swelters in its worst heatwave ever recorded

By Sam



Source: bbc.com

Japan swelters in its worst heatwave ever recorded

Perth swelters through record six consecutive days over 40C temperatures

West Australian capital also setting records for most days above 40C in a summer with the tally now at 11 days

- Follow our Australia news live blog for the latest updates
- Download the free Guardian app: get our morning email briefing



Locals cool off with a drink in Perth's Swan River on Saturday as the city bakes in 41.3C heat - the 11th day in a row over 40C before a spell was registered on Sunday. A cool change is expected on Monday. [More news from Australia](#)

Source: guardian.com

Perth swelters through record six consecutive days over 40°C temperatures

HEAT STRESS CAN BE LIFE THREATENING

KNOW THE SIGNS AND PREVENT IT



Parsons L.A. et al. [“Increased labor losses and decreased adaptation potential in a warmer world.”](#) *Nature Communications* 2021.

Climate crisis

Climate crisis study finds heatwaves have cost global economy \$16tn

Researchers examining data going back to 1990s find global south has borne brunt despite causing least emissions

Sofia Quaglia

Fri 28 Oct 2022 19:00 BST

f t e



Opinion Education

Making school cool helps children do better in exams

Torsten Bell

Sun 3 May 2020 06:30 BST

Hot weather makes it harder for students to focus, and that shows in their results

MICROWAVE SAFE

LONDON WRAPS HISTORIC BRIDGE IN FOIL TO SAVE IT FROM HORRIFIC HEATWAVE

THEY AREN'T READY FOR THIS HEAT.

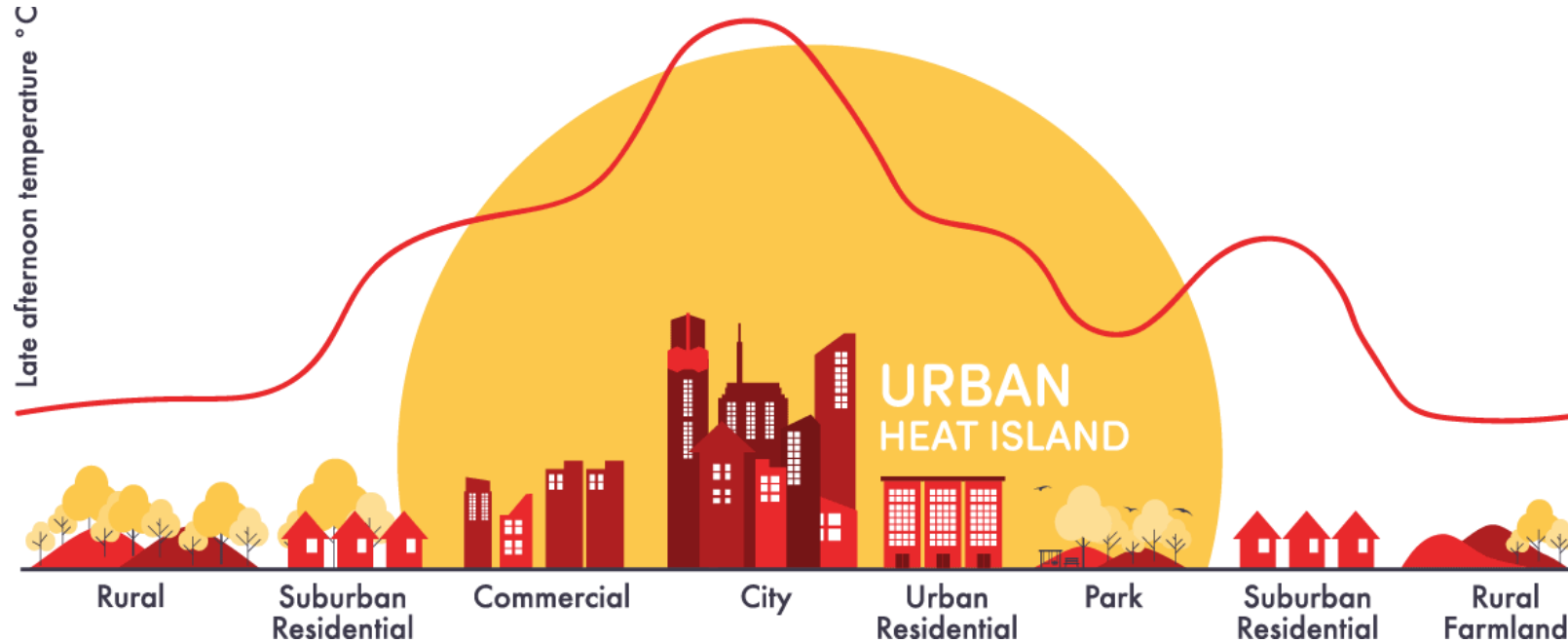
Europe's climate warming at twice rate of global average, says report

Trend of faster warming over last 30 years likely to cause exceptional heat, wildfires and floods, warn scientists

https://www.theguardian.com/environment/2022/nov/02/europes-climate-warming-at-twice-rate-of-global-average-says-report?CMP=share_btn_link



The Urban Heat Island Effect



Cool Towns Project

To provide cities and municipalities with knowledge and tools to become heat-resistant

- Determine objectives regarding heat stress and investment decisions
- Effective spatial interventions with additional benefits - testing and measuring pilot projects - decision tool
- Integrating heat resistance into policy: climate and spatial strategies - road map
- Increase skills and sense of urgency regarding heat resilient urban design among spatial specifiers

The Roadmap

<https://www.cooltowns.eu/roadmap/>

1. What is heat stress ?

2. What places have heat stress potential ?

3. How can heat stress be reduced ?

4. What is the best option to reduce heat stress in your area?

5. Case studies

6. Developing a city-wide strategy



1. What is heat stress ?



Local Stakeholder Workshop

A stakeholder workshop is a good way to engage those who are affected by, have a direct interest in, or are somehow involved with heat stress.

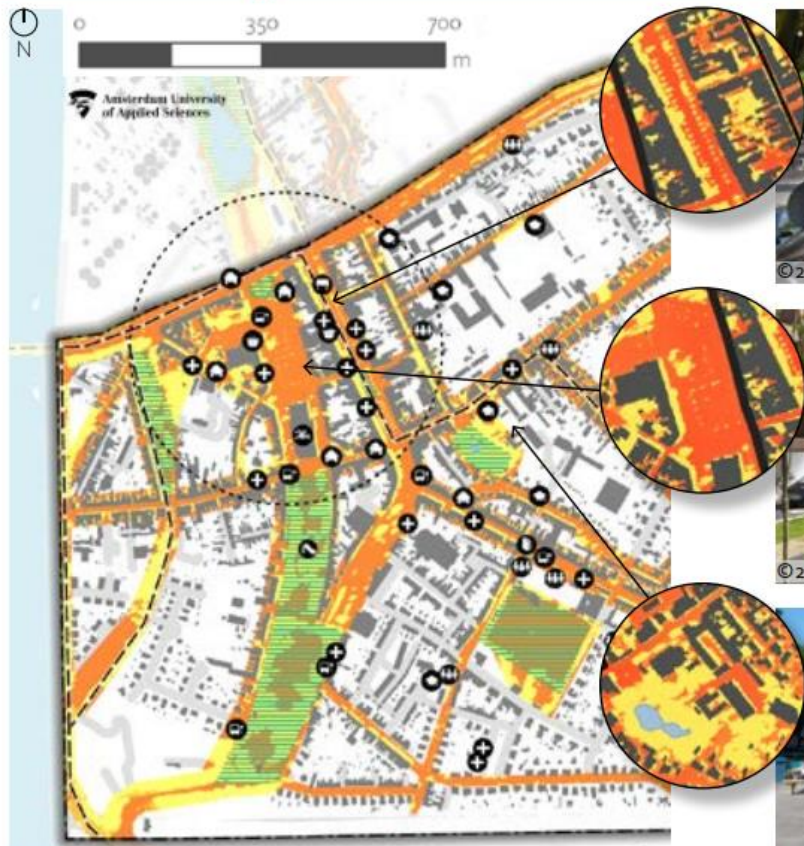
Downloads

- [Practical tips for organizing a workshop](#)
- [Stakeholder workshop green infrastructure](#)
- [Presentation Stakeholder workshop](#)

Raising awareness of heat stress

<https://www.cooltowns.eu/local-stakeholder-workshop/>

Which places call for urgent action?



- **Market area** under Level 2 Extreme Heat stress
- Double row of plane trees, when 10-15 meter tall have a 15-17 °C PET heat reduction capacity
- Aim to make the area car free



- **Bus station route** suffers from Level 2 Extreme Heat Stress
- Re-connecting existing green infrastructure: planting row of trees at the end of 2020 (maple, ornamental pear, rowan)



- **School yard's** forested area offers escape from the heat, heat stress reduced to Moderate level
- Area's exposed to heat serve as Cool Towns pilot sites

Vulnerable health groups

- Elderly
- Children
- Ill people
- Living alone (social isolation)
- Low socio-economic status

Vulnerable activity groups

- Commuters (on foot & bike)
- Leisure (escape the heat)
- Sport players
- Shoppers (daily)

Vulnerable places

Schools

Playgrounds

Care homes

Train + Bus
stations

Shopping
areas

Festival
grounds

Vulnerable Routes

- Towards amenities (e.g. pharmacy)
- Towards large cool places (e.g. parks)
- Towards train station
- Towards centrum area
- Towards bus station

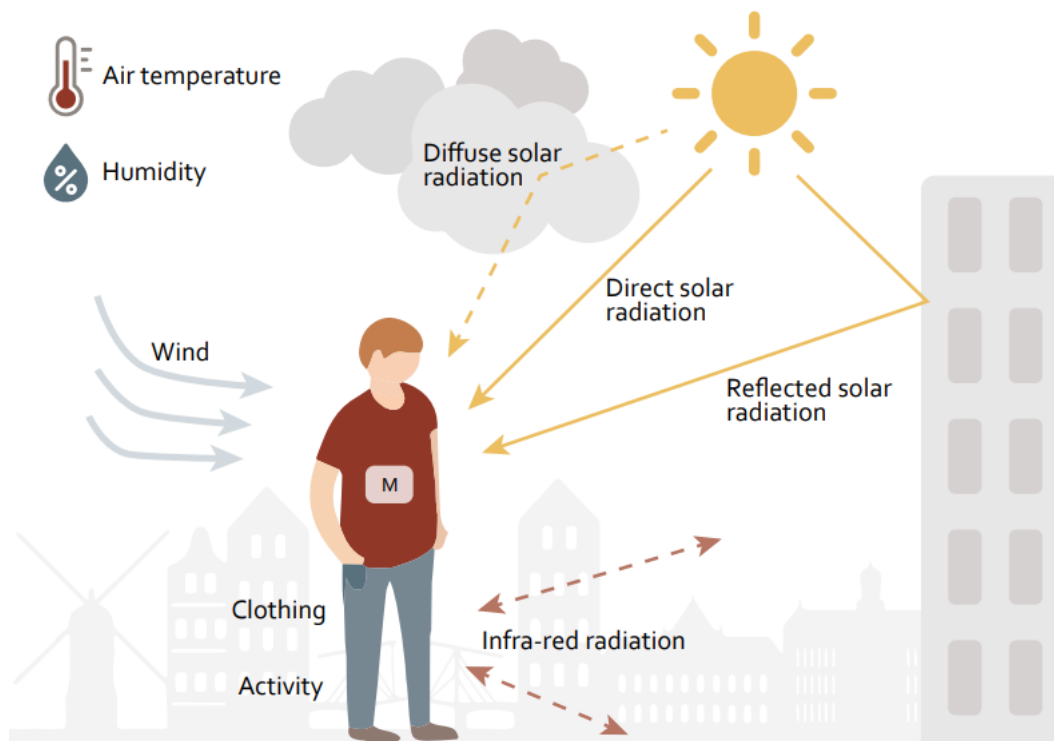


The Urban Heat Atlas

Gideon Spanjar, Debbie Bartlett,
Sába Schramkó and Jeroen Kluck

A standardised assessment
for mapping heat vulnerabilities
in Europe

Heat stress: Physiological Equivalent Temperature



Adapted from Havenith (1999)

PET	Stress Category
<4	Very high cold stress
4 – 8	High cold stress
8 – 13	Moderate cold stress
13 – 18	Slight cold stress
18 – 23	No thermal stress
23 – 29	Moderate heat stress
29 – 35	High heat stress
35 – 41	Very high heat stress
>41	Extreme heat stress

We know what helps but it is still difficult to achieve





Amsterdam University of Applied Sciences

Cool Towns Heat Stress Measurement Protocol

Gideon Spanjar, Luc van Zandbrink,
Debbie Bartlett and Jeroen Kluck

Thermal comfort
assessment at
street-level scale



Measuring effect on PET



Street level solutions: Intervention Catalogue



Tree(s)



Single tree, Ghent (BE)

- single tree
- row of trees
- group of trees



Shelter Canopy



Shade sails, Amsterdam (NL)

- shade sail
- awning
- pergola



Green Wall



Indirect green facade, Ardoorie (BE)

- direct green façade
- indirect green façade
- living wall system
- free-standing green screen



Water Feature



Fountain, Merelbeke (BE)

- fountain
- smaller waterway
- misting



Cool Surface



Vegetated paving, Merelbeke (BE)

- grass
- vegetated paving
- damped pavement

4. What is the best option to reduce heat stress in your area?

Date	31 July 2020
Time	15:46
dPET	13,1 °C PET reduction
Intervention characteristics	
Species	Wisteria
Height	3m
Shade size	100m ²
Ground	concrete tiles
Material	metal pergola structure
Transparency	85%

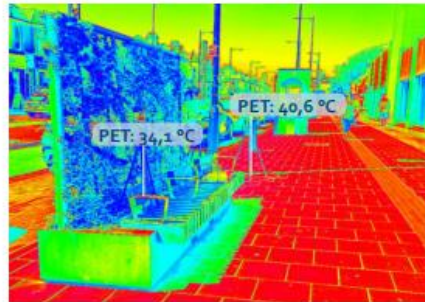
	PET (°C)	T _{air} (°C)	T _g (°C)	MRT (°C)	Wind (m/s)	RH (%)
Intervention	36,6	33,5	35,5	42,1	2,2	26,4
Reference	49,7	34	44,7	10,7	2,2	26,3
Difference	-13,1	-0,6	-9,2	-31,4	0,02	0,06
Int. grade	Strong heat stress					
Ref. grade	Extreme heat stress: Level 2					



Middelburg Municipality



Date	21 July 2021
Time	12:29
dPET	6,5 °C PET reduction
Intervention characteristics	
Species	English Ivy (Hedera helix)
Height	2m
Width	3m
Orientation	North-South
Ground	Concrete tiles
Condition	Good
Coverage	50%



	PET (°C)	T _{air} (°C)	T _g (°C)	MRT (°C)	Wind (m/s)	RH (%)
Intervention	34,1	28,4	33	41,9	0,9	50,4
Reference	40,6	27,3	38	61	1,3	53,5
Difference	-6,5	1,1	-5	-19,1	-0,4	-3,1
Int. grade	Moderate heat stress					
Ref. grade	Strong heat stress					



Green bench Southend England



Cool Towns Intervention Catalogue

Gideon Spanjar, Debbie Bartlett, Sába Schramkó,
Jeroen Kluck, Luc van Zandbrink and Dante Föllmi

Proven solutions to
mitigate heat stress
at street-level

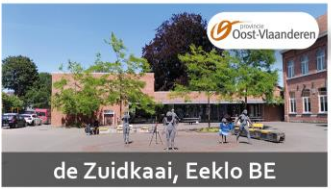
[https://pure.hva.nl/ws/portalfiles/portal/41700065/Spanjar et al. 2023
Cool Towns Intervention Catalogue 175dpi.pdf](https://pure.hva.nl/ws/portalfiles/portal/41700065/Spanjar_et_al._2023_Cool_Towns_Intervention_Catalogue_175dpi.pdf)

Cool Towns Pilot sites

City centres / Shopping areas



Schools / Playgrounds



Residential areas



All interventions have **co-benefits** and **dis-benefits**

Additional benefits:

- Aesthetics
- Air quality
- Noise reduction
- Nature
- Health and wellbeing

Disbenefits:

- Establishment costs
- Maintenance
- Pests & disease
- Leaf fall
- Health & Safety

Elected Representatives



“well done – thank you for all the hard work”

“a lot tidier – used to be a grim parking place”

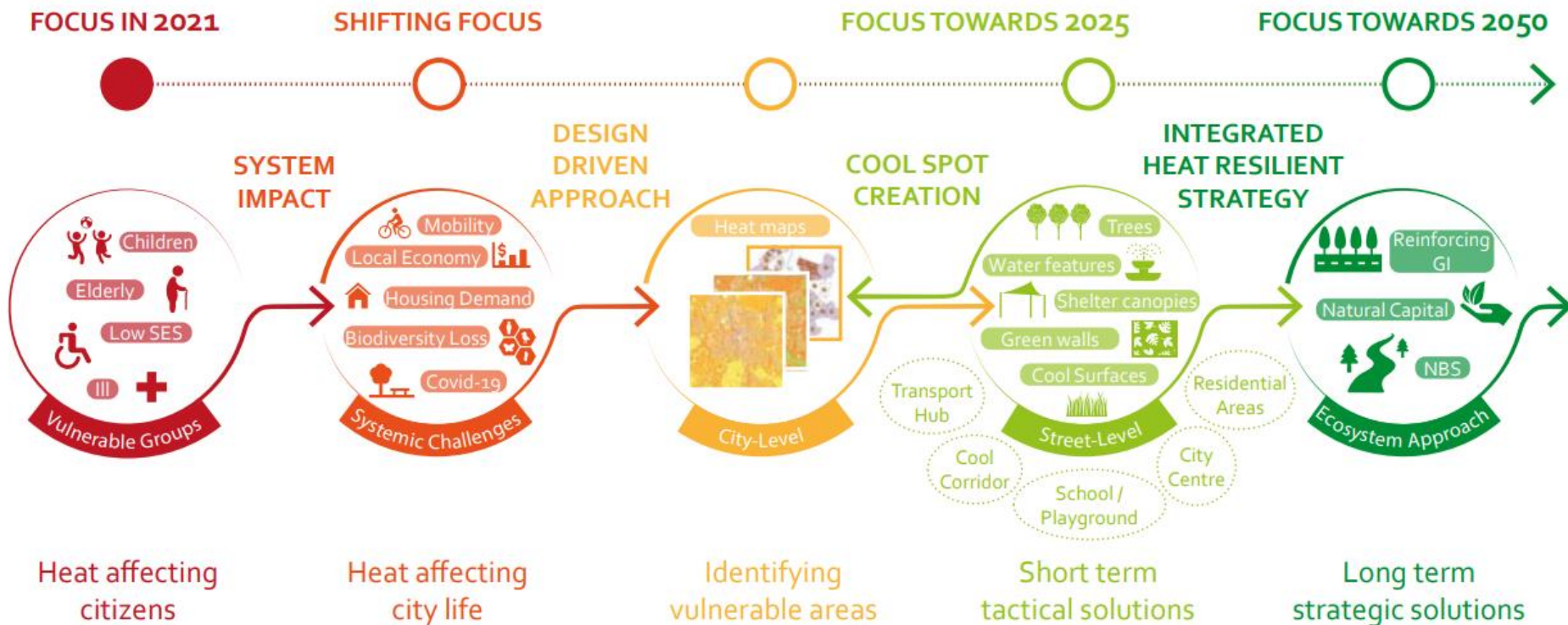
“glad to see house sparrows in the city”

“now its an attractive place and will attract new business”



Positive comments from local people

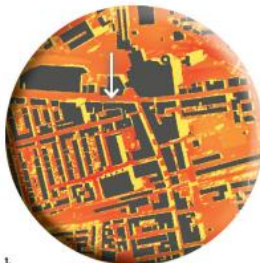
Tackling heat vulnerabilities = shift in focus



1. Urban Heat Island illustration of the rush hour TSI scenario in Southeast, showing the pilot site on London Road.
© Amsterdam University of Applied Sciences

Thermal comfort and its significance for landscape practice

There is a clear role for landscape architects to ensure the liveability of cities is maintained even during extremely hot weather by considering thermal comfort and developing city-scale heat resilience strategies.



² South 31 Hottest day of 2022 saw 638 more deaths than normal in England. The Guardian Jan 20 2023

³ Interreg Europe: <https://www.interreg-europe.eu/> 28-November-2023
⁴ <https://www.interreg-europe.eu/> 2022 saw 638 excess deaths from non-communicable diseases

⁵ Anderson, Mahendran R, Xu R, Li S and Guo Y. Interpersonal violence associated with hot weather. The Lancet 2021, 538

⁶ Spangar G, van Zandbergen J, Bartlett D and Kluck J. The Cool Towns Measurement Protocol Amsterdam: University of Applied Sciences Centre of Expertise Urban Technology 2020, IFaculty of Technology (ISBN: 9789035064212). Available online: <https://www.interreg-europe.eu/>

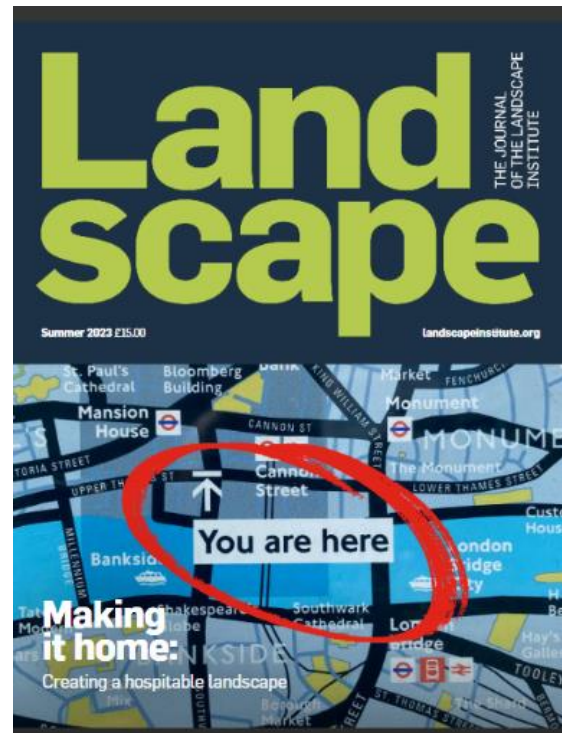


Here in northern Europe, much as we enjoy sunshine and look forward to warm summer weather, particularly in the dreary months of late winter, it can be too much of a good thing. June 2022 saw some of the hottest temperatures ever recorded in the UK.

On the hottest day, June 17, there were 638 excess deaths attributed to heat in England². The effect of heat waves on health and wellbeing has been well documented, particularly among vulnerable groups such as the young, the old and those with existing health conditions. The debilitating effect of lack of sleep on hot nights has an influence on productivity, as well as the ability to learn, and can affect safety for those using machinery, including driving cars, although these effects are difficult to quantify. The association of hot weather with change in behaviour is evident from the term 'hot headed' and the Heat

Hypothesis, reviewed by Anderson³, predicates that hot weather leads to an increase in violent crime. This association is attracting renewed attention as heat waves become more frequent and intense (Mahendran et al 2021), but of wider importance is the effect on everyday activities in a city and the need for urgent action for this environment to remain welcoming, even with high climatic temperatures.

Hot weather can result in a significant drop in the number of visitors to city centres as they are exposed to heat stress there⁴ (Spangar et al 2022), so less money is spent on non-essential purchases. Staying



Trees



Provide many benefits
BUT ONLY
if they establish and grow
They need a long time
to mature

Native species?



Britain's climate zones shifting 5km a year

On 4th November 2020

Rewilding Britain has released a new report claiming that Britain's climate zones are shifting 5km a year, and that a nature recovery era is needed to avert a wildlife catastrophe.



To conclude:

Reducing heat stress is
an **additional** reason
include more
green blue elements
in public open space

<https://www.cooltowns.eu/>



Cool Towns

Cool Towns: European cooperation to combat heat stress in cities

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1990 Düsseldorf, Germany



2019



A
little
inspiration