



European Regional Development Fund











Amsterdam University of Applied Sciences



Kent.gov.uk





AGENCE D'URBANISME & DE DÉVELOPPEMENT Pays de Saint-Omer - Flandre Intérieure



Creating a better Southend www.southend.gov.uk



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

Project Runs from Sept 2018 - Sept 2022





This presentation will cover

- Heat stress basics
- The risks
- Action to mitigate heat stress



Met Office

UK heavy rainfall / floods

Extended periods of extreme winter rainfall are now **7 times more likely**.

Extreme weather: October downpour sees UK's wettest day on record

By Matt McGrath

Environment correspondent

6 hours ago Science & Environment

Saturday 3 October was the wettest day for UK-wide rainfall since records began in 1891, Met Office researchers have said.

The downpour followed in the wake of Storm Alex and saw an average of 31.7mm (1.24ins) of rain across the entire UK.

UK weather: Hottest August day for 17 years as temperatures top 36C

🛈 7 August

UK heatwaves



The UK has seen its hottest day in August for 17 years, as temperatures reached more than 36C (96.8F) in south-east England.

Crowds headed to the coast to enjoy the weather, but people have been urged to adhere to social distancing.

Exceptionally hot weather is set to continue in parts of the UK throughout the weekend, the Met Office said.

Climate change

Damian Carrington Environment

editor

1345

@dpcarrington Tue 30 Jun 2020 16.00 BST

 \square

Likelihood of 40C temperatures in UK is 'rapidly accelerating'

Such deadly heat may become regular occurrence later this century, scientists find





Poll 1

Most of us welcome hot weather, but when it's too hot for too long, there are health risks. In England, there are on average 2000 heat related deaths every year. If hot weather hits this summer, make sure it does not harm you or anyone you know.

https://www.nhs.uk/live-well/healthy-body/heatwave-how-to-cope-in-hot-weather

<u>Curr Epidemiol Rep. 2014 Jun; 1(2): 67–74.</u> Published online 2014 Apr 5. doi: 10.1007/s40471-014-0009-1 PMID: <u>25422797</u>

3

Health impacts of heat in a changing climate: how can emerging science inform urban adaptation planning?

Elisaveta P. Petkova, DrPH, Haruka Morita, MPH, and Patrick L. Kinney, ScD^{II}



<u>BMJ</u>. 2003 Sep 6; 327(7414): 512–513. doi: <u>10.1136/bmj.327.7414.512</u> PMCID: PMC192832 PMID: <u>12958084</u>

Death in heat waves Simple preventive measures may help reduce mortality

William R Keatinge, emeritus professor

UK heatwave may have caused hundreds of deaths

Fears for elderly and vulnerable as sharp rise in fatalities is linked to hot weather



▲ Women enjoy the hot weather in Weymouth, Dorset. An official health alert is in place warning that the heatwave poses a risk to the elderly and vulnerable. Photograph: Kathy deWitt/Alamy

Britain's heatwave could have caused a sharp rise in deaths over the past two weeks, health officials warned today.



Wellcome Trust press release Oct. 19, 2020

The London-based philanthropy, which spends more than £1 billion

per year, announced boost in research funding for the

health impacts of global warming, which include the spread of

infectious diseases and heat-related sickness and death



Friday 26 July 2019 12:45 pm

Rail industry Why the heatwave railways

London heatwave: Tower Bridge manually cooled to stop it jamming shut

From sagging lines to buckled rails heat's effects on rail travel

Michael Searles



Rob Davies

ByRobDaviesThu 25 Jul 2019 12.01 BST





RISKS for the Economy

nature climate change

PUBLISHED ONLINE: 4 MAY 2015 | DOI: 10.1038/NCLIMATE2623

Heat stress causes substantial labour productivity loss in Australia

Kerstin K. Zander^{1*}, Wouter J. W. Botzen², Elspeth Oppermann¹, Tord Kjellstrom^{3,4} and Stephen T. Garnett⁵

Industrial Health 2013, 51, 3-15

Review Article

Effects of Heat Stress on Working Populations when Facing Climate Change

Karin LUNDGREN¹*, Kalev KUKLANE¹, Chuansi GAO¹ and Ingvar HOLMÉR¹

Estimated that in a future warm year economic **loss due to heat stress** on productivity could be 0.4% of Gross Value Added (GVA) totalling around **£1.9 billion for London**.

Centre for Climate Change Economics & Policy/Grantham Research Institute on Climate Change and the Environment (Costa et al, 2016)

Education

Making school cool helps children do Education better in exams Torsten Bell

Sun 3 May 2020 06.30 BST

Opinion

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

Recent research has demonstrated the physiological impacts of heat directly interfere with learning and the effect is cumulative

Prediction under medium warming scenario is of 10% lower achievement in an average school year with impacts for macroeconomic growth

Heat and Learning

R. Jisung Park Ioshua Goodman Michael Hurwitz Jonathan Smith

AMERICAN ECONOMIC JOURNAL: ECONOMIC POLICY VOL. 12, NO. 2, MAY 2020 (pp. 306-39)





Heat stress is a hazard with significant and increasing risk to People
The economy

- >The economy
- ➢Infrastructure







UrbClim' simulation for the mean temperature at midnight London (source VITO)



Are there places in your area where people are likely to suffer heat stress?



Public open space in towns is typically paved, with few trees or features to provide good access and usability





Creating Heat Maps

Open squares are hot every hour of the afternoon

No shadow in North-South orientated streets

Enables identification of where heat resilience interventions are most needed

What could support authorities to pin-point those places?

The model will combine information on temperature, thermal comfort, spatial functions and vulnerabilities in GIS. This will be high-resolution so authorities can pinpoint the places in their territory where heat resilience interventions are most needed and compare the expected effectiveness of different measures





Vulnerability mapping

Grade

Cool area per inhabitant "pin-point the places ... where heat resilience interventions are most needed"





Thermal comfort: Physiological Equivalent Temperature



What can be done?

Increasing Shade Evaporation Reflection and Ventilation

Can all make people cooler



Poll 2











Green & Blue Infrastructure



But which is most effective for

EQRS effectiveness depends on:

- Foliage shape and dimensions
- Leaf area density
- Seasonal cycle
- Daily transpiration
- Water availability

Shade potential:

- Height
- Shape
- Canopy spread

Additional benefits:

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

Disbenefits:

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















Measuring cooling

effect

Interreg 2 Seas Mers Zeeën European Regional Development Fund



Decision Support Tool Kit

- ✓ Effectiveness at mitigating heat stress
- ✓ Cost/maintenance implications
- ✓ Product information/case studies
- ✓ Co benefits & Public opinion

The role of GBI in mitigating heat stress is an additional argument

for inclusion in public open space design



Drawdown: trees for carbon sequestration

Tree planting on the up in England

Defra Press Office, 12 June 2020 - Uncategorized



On Thursday 11 June, the Forestry Commission published the latest government tree planting statistics.

Analysis of the statistics has been covered by national media today in <u>The</u> <u>Times</u>, <u>The I</u> and The Sun, as well as regionally in The Yorkshire Post. Coverage notes that tree planting in England increased last year but was below the rate needed to reach the manifesto commitment to plant 30,000 hectares of trees across the UK by 2025. The articles also reference calls by campaigners for government to ramp up tree planting efforts to meet targets to help absorb carbon emissions.

Tree-planting in England falls 71% short of government target

New figures show 1,420 hectares were planted in year to March 2019 against target of 5,000

11 Jun 2020

Disappointing planting figures in England still far below Government target



source

How to decide which species?

The Right Tree in the Right Place for a Resilient Future

This Urban Tree Manual provides advice on selecting and procuring the right tree' for the right place in urban areas. For the purposes of this manual urban areas are defined as places in and around where people live and work. The manual also highlights long term issues of the threats to existing trees from pests, disease and climate change, and describes the benefits to the environment and for well-being that urban trees can provide.

The Manual is not intended as an exhaustive compendium on tree selection, aftercare and management. Instead, it presents current thinking on these matters and provides valuable sign posting to further relevant information.

https://www.forestresearch.gov.uk/tools-and-resources/urban-tree-manual/



Native species?



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I am an ecologist or a environmental manager e

I want to be an ecologist or r environmental manager I need an ecologist or environmental manager



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.

Well fitted species?



Remember Ellenburg's Indicators?



Climate change challenges conventional ideas reminding us the future will not be the same as the past.

Effective urban landscape design requires plantings based on ecological concepts using plant species well fitted to the local environment based on three critical factors: precipitation, CO₂ concentration, and temperature

suggests planting maritime climate species (well-fitted) and southern European, Mediterranean climate species (intermediate-fitted) as these will be sustainable in current/future UK climate scenarios.

B. Alizadeh B & Hitchmough J D (2020) Designing sustainable urban landscape and meeting the challenge of climate change: a study of plant species adaptation and fitness under different climate change scenarios in public landscape of UK, Landscape Research, 45:2, 228-246, DOI: 10.1080/01426397.2019.1606185

Poll 3

Incidence and risk factors for heat-related illness (heatstroke) in UK dogs under primary veterinary care in 2016

Emily J. Hall 🖾, Anne J. Carter & Dan G. O'Neill



https://www.nature.com/articles/s41598-020-66015-8

HEAT STRESS WARNING SIGNS

- nocturnal animals out during the day
- arboreal (tree dwelling) animals on the ground
- animals displaying any loss of balance, seizures or confusion.



Original Article

Forecasting wildlife die-offs from extreme heat events

H. U. Ratnayake 🗙, M. R. Kearney, P. Govekar, D. Karoly, J. A. Welbergen

First published: 31 January 2019 | https://doi.org/10.1111/acv.12476 | Citations: 10

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Birds Are Falling Out Of The Sky Dead, In Australia, Because Of Heat Exhaustion

3 min read () 2 K Shares

£ 🔰





https://www.indiatimes.com/trending/environment/birds-are-falling-dead-inaustralia-because-of-heat-exhaustion-even-as-koalas-die-of-wildfire-502865.html

Australia's severe heat is affecting the sperm of the bird population: study

https://www.smh.com.au/environment/conservation/australias-severe-heat-is-a ffecting-the-sperm-of-the-bird-population-study-20180116h0j7ke.html



Worst marine heatwave on record killed one million seabirds in North Pacific Ocean

https://theconversation.com/worst-marine-heatwave-on-record-killed-one-million-seabirds-in-north-pacific-ocean-129842



Marine heatwaves are getting hotter, lasting longer and doing more damage So the aim was to "Increase skills and sense of urgency regarding heat resilient urban design"

On Thursday 19 November we are launching our open access

Cool Towns Heat Stress Measurement Manual

At the Cool Towns and Nature Smart Cities Experience Exchange Event Sign up using the following link – its free

https://www.trybooking.com/uk/events/landing?eid=14648&

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The Cool Towns Project

https://www.interreg2seas.eu/nl/cooltowns

