A world on fire

Emily Hough reviews a new book, 'The heat will kill you first: Life and death on a scorched planet,' by Jeff Goodell

Most readers of the *CRJ* are all too well aware, as they should be, of the effects of climate disruption. Flooding and flash floods, wildfires, intense and more frequent storms, droughts, and heatwaves are all high on the risk radar when it comes to planning and response, whether public or organisational.

The cascading effects of such events – mass migration of animals and humans (with subsequent unrest and clashes among and between both), famine and food insecurity, loss of biodiversity, ocean level rise, and the inexorable march of disease vectors into hitherto unaffected areas, to name but a few – are all widely predicted and documented, and many are occurring now.

Yet, heatwaves and extreme heat garner media and public attention only fleetingly, even when they claim thousands of lives or decimate crops. Media pictures of people enjoying themselves in the sunshine or cooling off, followed by hand wringing hyperbole, public inquiries, and promises that poor preparedness or response must never happen again, all occur with regularity before the 'weather' moves out of the public eye, leaving those affected to mourn their losses or try to salvage what is left of their crops or businesses.

The scale of what is required for humans to survive when extreme heat becomes the norm, particularly in those areas that historically have been temperate, appears to be overwhelming. A paper published by *Nature Solutions* in October 2023 found that: "Extreme heat has been increasing at global scale, with a rapid rate in several regions. In Western Europe, summer temperatures and heat extremes have warmed much faster than elsewhere in the mid-latitudes over the last two decades." Indeed, as I type this, ice shelves in the Antarctic are melting at a rate that is, according to *New Scientist*, leaving scientists "shocked". Never has the boiling frog analogy been more starkly illustrated in real life.

Racing to our graves

With all this in mind, I started to read Jeff Goodell's book, *The heat will kill you first: Life and death on a scorched planet*, with some trepidation, hoping to learn more about practical measures that can be transduced into meaningful advice for resilience, infrastructure, emergency planning, and response.

The author says his goal is to get readers to: "Think about heat in a different way," and indeed, much of the book describes the physical effects of extreme heat on the human body in great detail, from how heat shaped humanity, how humans evolved to regulate our body temperatures, to what happens when this internal regulation is overwhelmed and the physiological responses caused by hyperthermia.

Says Goodell: "The heat management strategies of humans, like those of all living things, have been optimised for the Goldilocks Zone we have been living in for the last 10,000 years. They are a holdover from a world that is changing fast – far too fast for evolutionary selection to keep up."

Food supply is an obvious current crisis, and one that has the potential to become far worse. As regularly reported in the *CRJ*, the number of people facing acute food insecurity has risen from 135 to 345 million. Although these figures are said to be exacerbated by the Covid-19 pandemic and the Ukraine war, a warming planet will only exacerbate this crisis.

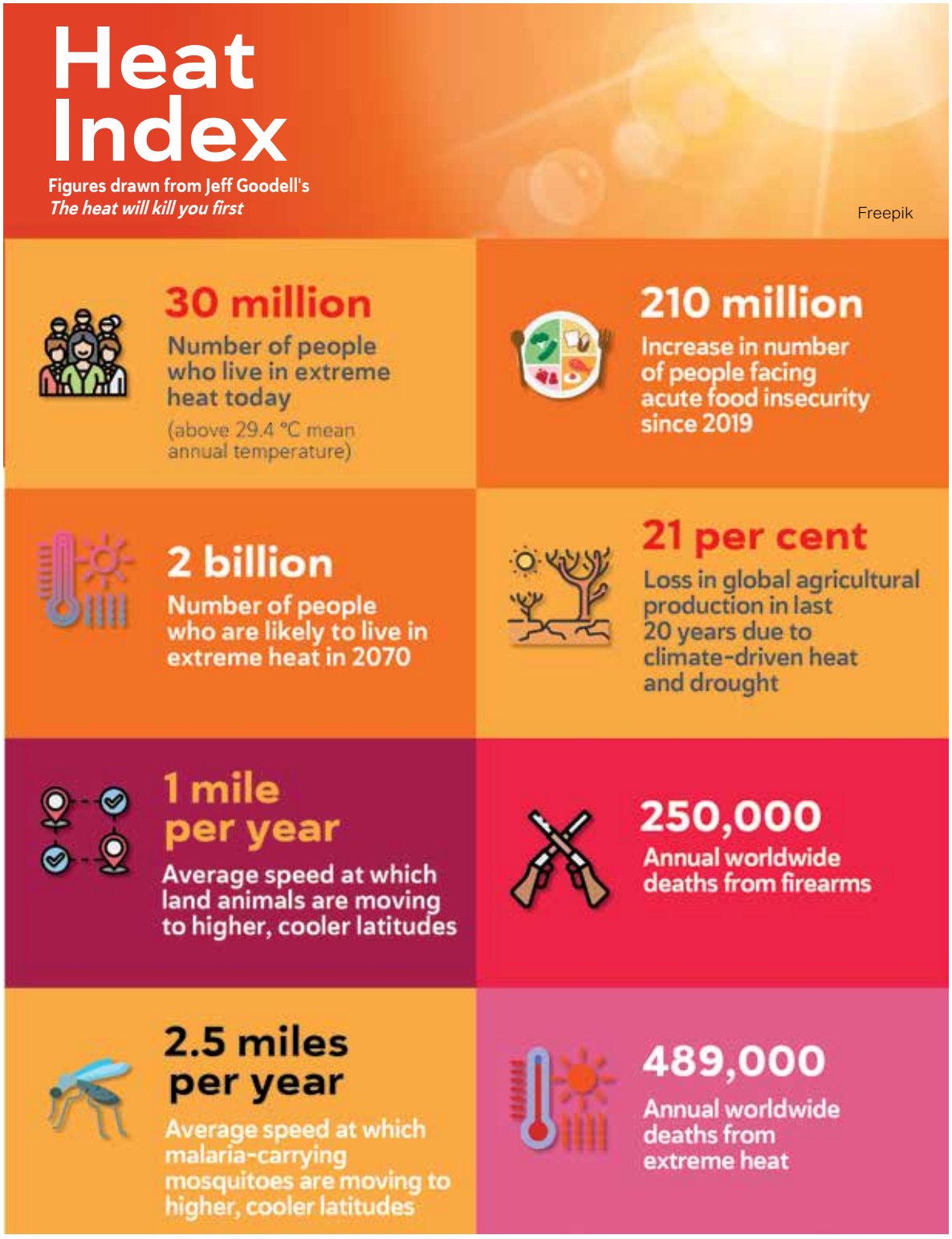
Goodell cites a Cornell University-led study that found global crop production today is 21 per cent lower than it would have been without climate change. He also discusses the increased vulnerabilities brought about by phenological shifts (see the article in *CRJ* 17:2 by Claire Sanders, reporting on the *UN Report Frontiers 2022: Noise, Blazes and Mismatches*, in which she explains that climate change, habitat, and food availability are inextricably linked to phenological shifts in the timing of life cycle events).

The animal kingdom is under stress from warming temperatures; displacement is already happening. The book discusses how animals, plants, fungi, insects, wild creatures, and humans are all migrating in search of survivable habits. I will skip over the effects of heat on the natural world, not because they are unimportant – they are – but because these have been well documented over the pages of past *CRJs* and elsewhere. However, it is safe to say that as temperatures rise, it is generally accepted that they will: "Drive a great migration of humans, of animals, of plants, of jobs, of wealth and of disease."

So, let's focus on the humans in this review. A fascinating aside is a study quoted in the book, which compared temperature and air moisture levels in around 37 homes in America to outdoor climates around the world. In all but three of the homes, the preferred temperature was approximately 22C, with low humidity. This, Goodell points out, is a: "Combination that most closely resembled the temperature and humidity in East Africa – the same region of the continent where the first humans lived hundreds of thousands of years ago."

Cities, unsurprisingly, are acutely affected, with a lack of tree shade, water, and hot tarmac all augmenting heat. Human hubris is firmly to blame, bringing us onto one of my personal soapbox subjects: air conditioning. Goodell dives deep into the history of air conditioning, telling us how it has: "Changed the landscape of America, opening up whole new frontiers to migration and development." Of course, it is not just America that has succumbed to this seductive, yet highly discriminatory technology. However, the result is the same anywhere in the world – traditional building knowledge has been lost, and cooling measures on streets, such as water and trees, have been dug up and paved over; those who can afford it turn the temperature down, while those who can't simply swelter. The reliance on air conditioning for cooling in extreme temperatures is a double-edged sword of feedback loops.

Globally, air conditioning accounts for nearly 20 per cent of the total electricity used in buildings, says Goodell. This contributes to a significant amount of the



greenhouse gases that are heating up the atmosphere. "The hotter the planet becomes, the more aircon feels like a necessity, the more electricity is needed to power it. It's a vicious cycle. And it is even more vicious in cities, especially in older and poorer neighbourhoods where old, inefficient window air conditioners hang out of every building, sucking heat out of the interior but blowing it out into the street. In this sense, air conditioning is not a cooling technology at all – it's simply a tool for heat redistribution." Failure of urban infrastructure, for whatever reason, has – and will continue to – lead to disaster in extreme heat. A blackout caused by vandalism, wildfire, terrorism, an electrical fault or surge in demand, for example, can be catastrophic. Buildings with air conditioning are tightly sealed, trapping the heat, and temperatures inside rise rapidly.

Goodell highlights one example: Hurricane Irma cut the power supply to a nursing home for several days, leaving it without air conditioning. Outside, the temperature was in the mid 20s Centigrade but, inside, the: "Poorly built, poorly ventilated air conditioning-dependent building, the temperature soared, especially on the upper floors."

He adds: "The nursing staff ignored the slowly broiling patients." Emergency services were not called until two days after the power went out; 12 patients died, some with body temperatures as high as 42°C.

The author highlights another failure of societal infrastructure involving the death of a 72-year-old woman in Phoenix, Arizona, who died of heat exposure in her home in 2018. It was subsequently discovered that the energy company had switched her power off over an unpaid bill of $51, and reports revealed that 39,000 such cut-offs occurred: "During the particularly scorching months of May through September."

The book examines cities outside America, speaking to people struggling with heat in Chennai, India, described by one journalist as a: "Case study in what can go wrong when industrialisation, urbanisation and extreme weather converge and a booming metropolis paves over its floodplain to satisfy demand for new homes, factories and offices."

In terms of novel, practical solutions, there is such a patchwork of initiatives in various cities around the world that are so dependent on local government take-up and public acceptance that the whole nature of the author's message would have had to shift from raising awareness into a completely different book if he had covered more of them. That said, he does research several initiatives that are already having a positive effect.

"Nobody should die in a heatwave," he writes. "People die because they are alone and don't know what to do and don't ask for help. Or they don't have air conditioning (or the money to run it). Or they can't get to a cooling centre. Or they are afraid that their employer will fire them if they stop working." The cooling centre comment is noteworthy as many have found them to be of limited use: "Because the people who need them the most are often those who don't have the means to get to these centres."

Also, many people die because they do not understand the warning signs of heat exhaustion and heat stroke. Goodell describes the work of Kathy Baughman McLeod, who made extreme heat the focus of the Adrienne Arsht-Rockefeller Centre Resilience Foundation. This has created new positions for chief heat officers in cities, a heat health science panel, and developed a toolkit for policymakers to understand what they can do to reduce heat mortality and morbidity. Its the main priority has been ranking and naming heatwaves.

The ranking system looks exclusively at mortality rather than other indicators of health effects, such as visits to emergency rooms. "It blends several factors, including humidity and night-time temperatures, which affect heat-related mortality into a single score," the author explains. "It is also based on actual past history in an actual place, so works with data very specific to a city or region."

The city of Seville in Spain committed to a pilot programme that involved ranking and naming heatwaves. In July 2022, city authorities named and announced heatwave Zoe. Importantly, this triggered a series of alerts, warnings, and other messages on social media to let people know how they could protect themselves from the heat.

A survey commissioned by Arsht-Rockerfeller in Seville a few months after the heatwave found that people who recalled hearing about 'Zoe' were more likely to engage in safe behaviours like drinking water and working from home to avoid the heat. "They were also more likely to talk about it with others and to believe that the government was working to protect them," notes Goodell.

> "In many places in the world today, heat is rising faster than our ability to adapt to it," writes Jeff Goodell

So, public information, warnings, and advice aside, what else can be done to existing cityscapes that were designed and built for a more gentle, temperate age? A number of solutions discussed includes: Urban gardens, plexiglass awnings to shade people in markets, painting streets white, green roofs, and using underground waterways to provide cooling.

The European heatwave of 2003 killed 20,000 people, 15,000 of them in France. Many of those who died lived in Paris, in non-insulated attics under zinc roofs that heated up "like frying pans." One solution involves a company that builds platforms on top of these zinc roofs, which could become rooftop terraces, simultaneously growing food and providing protection from heat.

Trees are another solution, but they must be the right sort of trees for the future environment and are not the silver bullet answer to urban heat, not least because trees have to be kept alive and cities are tough environments for them to flourish in. And there's always a conflict between heritage, planners, and the public as to how a historic city that is currently maladapted for the heat of today and tomorrow can make itself habitable and more efficient in the face of future extremes.

What of solar geoengineering? This was discussed in *CRJ* 16:2, when Janos Pasztor warned that this approach brings about very real physical, social, and geopolitical risks, risks that are echoed by Goodell.

Primarily, the aim of this book is to raise awareness and help the reader visualise and understand the current reality and the future potential catastrophe of an overheating world. I doubt that readers of the *CRJ* will need further affirmation of just how bad things might yet become. Yet, this book is a useful reminder of the voices of those who are already badly affected by extreme heat; it personalises the issue and brings it to life. It is another book that should help to galvanise us all – planners, responders, governments, the private sector, city planners, and individuals – to hone our adaptation planning now.

I will leave the last words to Alexandre Florentin, member of the Paris City Council, who states in the book that: "We need a social and cultural transformation on a level that I'm afraid people who have been in power for the last 20 years cannot really imagine." CRJ

■ Jeff Goodell, *The heat will kill you first: Life and death on a scorched planet*, is published by Little, Browne and Company, ISBN 978-0-316-49757-2

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