

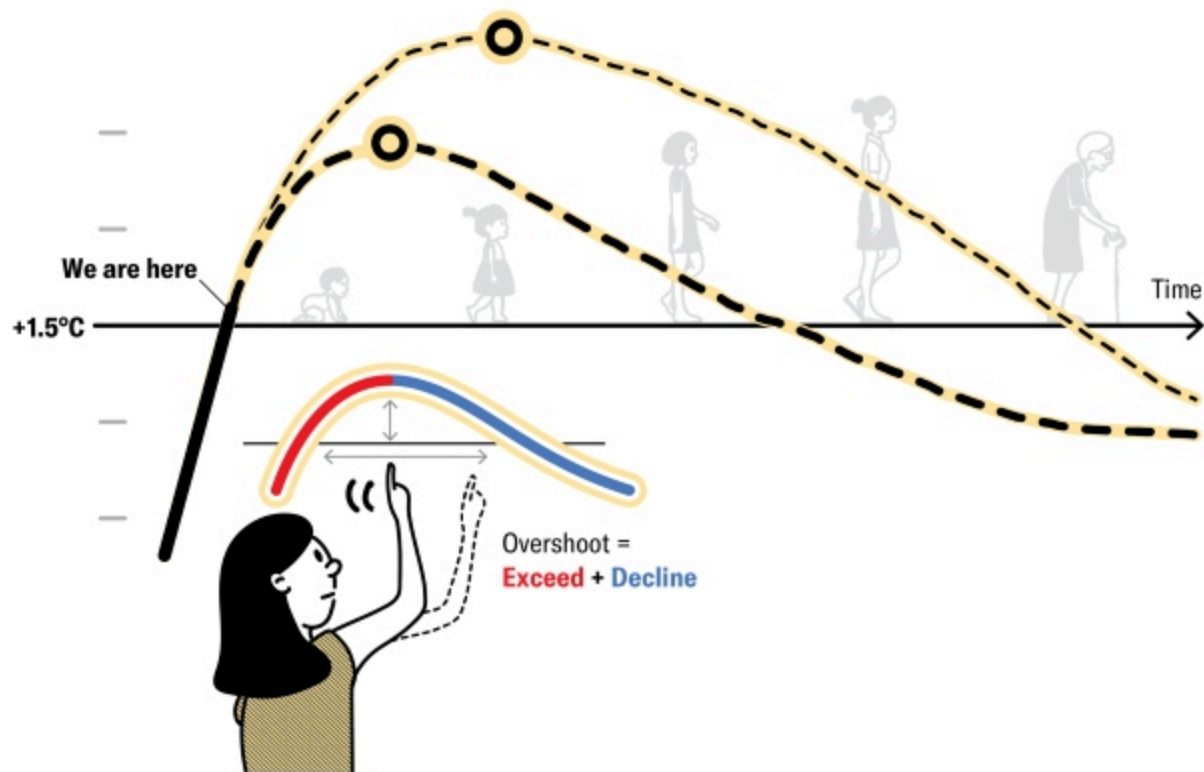
nature briefing

anthropocene

Hello *Nature* readers,

This week, we contemplate what it means to live in the age of climate ‘overshoot’.

Temperature Change in Degrees Celsius (°C)
Relative to 1850–1900 for two illustrative overshoot pathways



And we’ll have some help from information designers Angela Morelli and Tom Gabriel Johansen, co-founders of InfoDesignLab — their work appears throughout this edition and can be found in full in [Scientific American](#). (5 min read) (Angela Morelli and Tom Gabriel Johansen/InfoDesignLab; Source: “Overshoot: A Conceptual Review of Exceeding and Returning to Global Warming of 1.5 °C,” by Andy Reisinger, Jan S. Fuglestedt, Anna Pirani *et al.*, in *Annual Review of Environment and Resources*, Vol. 50; April 14, 2025.)

Editorial

Living in the overshoot age

Climate overshoot is the temporary failure to keep the rise in average global temperature to under 1.5 °C above the pre-industrial baseline — an ambitious goal set in the Paris Agreement — before techniques that remove atmospheric carbon bring it back down. And overshoot “has shifted from

editorial. This means carbon-dioxide removal (CDR) options “will be the central theme in the age of overshoot”, despite our limited knowledge about the effectiveness of these techniques.

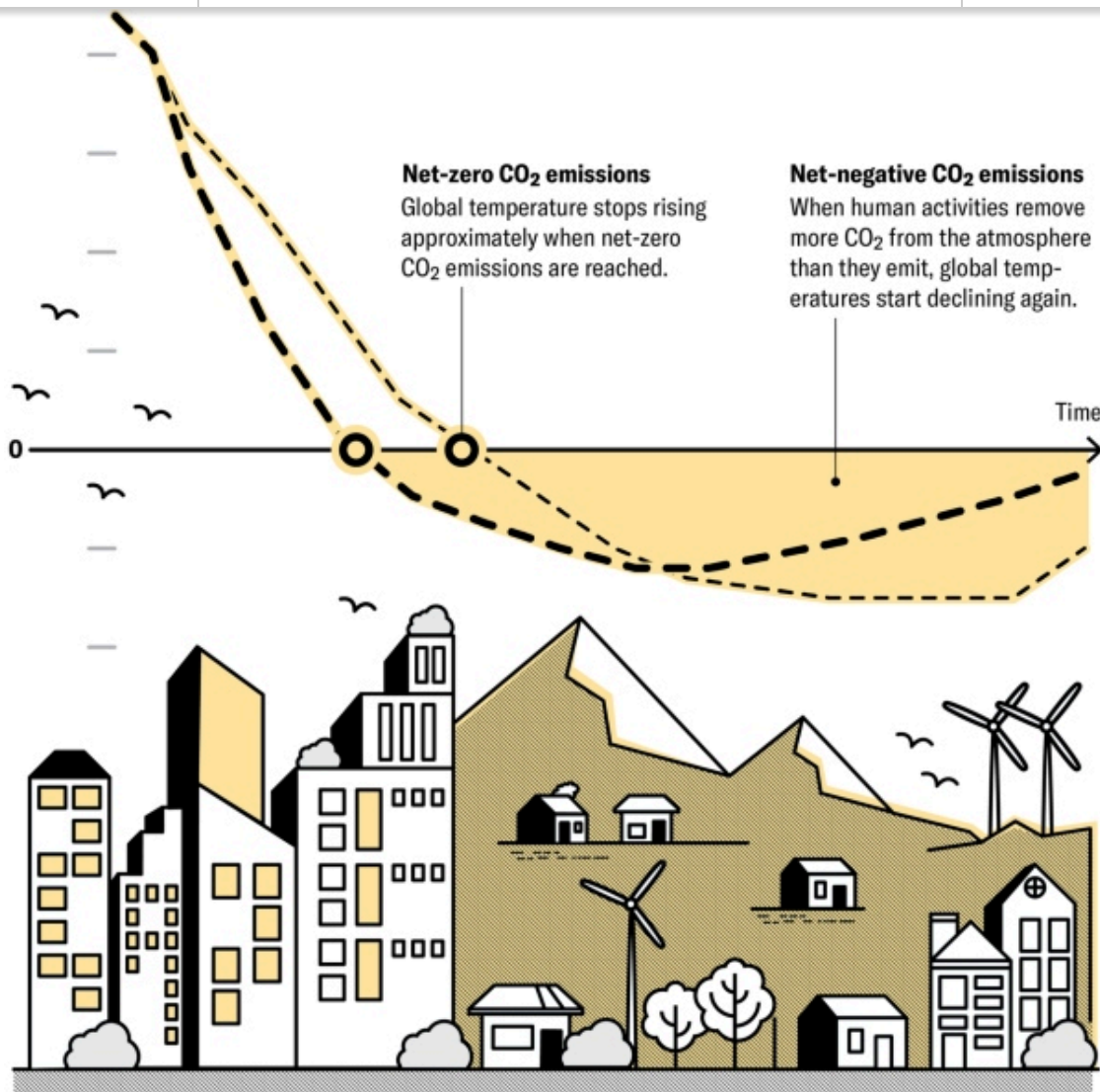
[Nature Climate Change](#) | 4 min read

Explainer

Carbon removal leaves its hype phase

The carbon removal sector — which spawned hundreds of startups promising to sink seaweed or build CO₂-sucking factories — is facing its first serious reckoning. The industry's business model has relied on major companies pre-purchasing tonnes of carbon removal to offset their own emissions, propped up almost entirely by Microsoft. But the future of the tech giant's program, responsible for 80% of all carbon removal purchases to date, is uncertain. [Plus, these startups have only actually removed 940,000 tonnes of CO₂, the amount the United States emits in less than two hours.](#) There's a growing consensus the market simply cannot work with private-sector purchases. "We need policy; it has to be policy," says Erin Burns, who runs Carbon180, a carbon removal nonprofit.

[MIT Technology Review](#) | 11 min read (paywall, from 2025)



Feature

The hard road back from overshoot

The road ahead is perilous. Consider the ecological impact: [models sketch overshoot as a curve back towards safety, but nature offers no such arc](#). “If you go above a temperature threshold and a species goes extinct or ecosystem collapses, it just doesn’t reappear when the world cools again. That’s an irreversible loss,” says climate-risk researcher Christopher Trisos.

Meanwhile, the very methods imagined to cool the planet risk deepening biodiversity loss and justice concerns. Large-scale land-based approaches, such as growing vast new forests or crops for biofuels, requires space. And that kind of space tends to overlap with biodiversity hotspots and Indigenous people’s territories. “You end up with species at compound risk,” Trisos says. “First from changing climate, and then from losing habitat to the solutions we use to fix it.”

[Nature Climate Change](#) | 13 min read

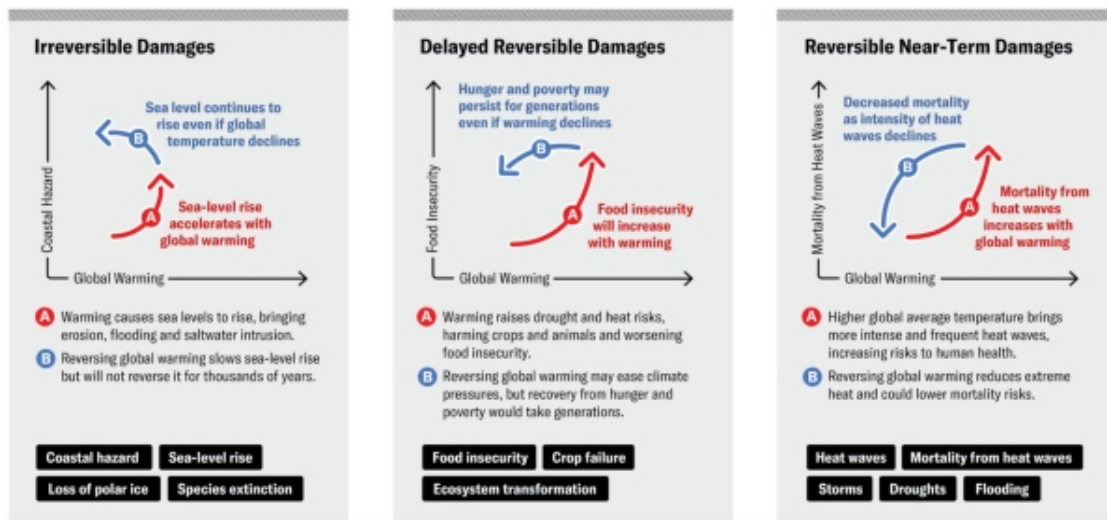
Opinion

Perspective

Climate goals are not a lost cause

“Admitting that we will exceed this threshold doesn’t justify delaying action; it demands acceleration,” argues climate scientist Andy Reisinger. [Every fraction of a degree of warming causes more damage to Earth and people and makes it more difficult for us to go back.](#) While some effects will be irreversible, others could be partially reversed, even if it takes decades.

[Scientific American | 5 min read](#)



Perspective

The need for new overshoot models

Overshoot evolved over 30 years from a concept to a reality — we now need new modelling frameworks that can guide societies through this dangerous era, writes a team of climate scientists, economists and policy researchers. [Their analysis counters several assumptions:](#) higher overshoot doesn’t necessarily translate into more CDR, since most removal is needed to compensate for residual emissions that exist regardless of how much temperatures overshoot; CDR is unproven and the corridor to returning warming to under 1.5 °C in this century is “exceptionally narrow”; and how much we overshoot depends as much on governance choices as on the science itself.

[Nature Climate Change | 34 min read](#)

Now what?

So to close out this week's newsletter, let's try to understand — to use a scientific metric — how screwed are we? Marine biologist Ayana Elizabeth Johnson argues, “we're pretty screwed. But we're not totally screwed. Everything lies in that distinction.” [She makes the case for realism, not optimism or defeatism.](#) “Millions of human lives hang in the balance. And the extinction of so many millions of species we're supposed to be sharing this planet with,” she says. “And it's not all or nothing, win or lose. It actually does matter how right we get it.”

[The Houston Chronicle](#) | 10 min read (paywall)

QUOTE OF THE DAY

“When our efforts are successful, it's time to move on to the next thing. When they're not successful, we keep trying — indefinitely.”

That's a Buddhist perspective on climate overshoot taken from Zen researcher David Loy's book, *Ecodharma: Buddhist Teachings for the Ecological Crisis*. ([Lion's Roar](#) | 8 min read)

And now for some good news. Researchers investigating the fallout from Los Angeles's catastrophic 2025 fires [found](#) the level of harmful metals in the sand and sea are far below safety thresholds.

One would think that a combination of ash and charred plastics, batteries and chemicals might lead to lasting contamination of California's beaches with mercury or lead. And yet: “We're not seeing any evidence for harm in the ecosystem or harm for human health,” says marine biogeochemist Noelle Held.

Small victories matter. And when it comes to the broader challenges we face, it's not too late to limit the damage. What did you think of this week's overshoot-themed newsletter? We'd love to hear your thoughts at anthro-briefing@nature.com.

That's all from me folks. This will be my last *Nature Briefing*.

Anthropocene at the helm. It's been an honour and a pleasure chatting about all things Planet Earth with you. But don't worry you'll be in very capable hands — more on that in our next briefing.

Signing off one last time,

Josh Axelrod, editor, Nature Briefing: Anthropocene

Advertisement feature



Professor Ali Emadi connects with graduate students at the McMaster Automotive Resource Centre, where students and researchers develop and test innovative vehicle technologies. (Georgia Kirkos/McMaster University)

McMaster is driving the electric future

McMaster University is home to one of the world's largest academic EV research programs. At the McMaster Automotive Resource Centre (MARC), students and researchers are focused on transportation electrification and smart mobility. Professor Ali Emadi says MARC is where researchers work independently and in direct partnership with major auto makers. "Students here are on the bleeding edge of technology in collaboration with the industry and they have opportunities to do work with tangible, real-world results," says Emadi. [Learn how McMaster is powering transportation for the future.](#)

Ali Emadi, Vincent Lombardi, Daniel Edward, Laura Giron

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