

Climate report warns of escalating crisis

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An international coalition led by Oregon State University scientists concludes in its annual report that the Earth's worsening vital signs indicate a "critical and unpredictable new phase of the climate crisis" and that "decisive action is needed, and fast."

The collaboration directed by OSU's William Ripple and former postdoctoral researcher Christopher Wolf outlines areas where policy change is needed – energy, pollutants, nature, food and economy – in "The 2024 State of the Climate Report: Perilous Times on Planet Earth," published in BioScience.

"A large portion of the very fabric of life on our planet is imperiled," said Ripple, a distinguished professor in the Oregon State University College of Forestry. "Ecological overshoot, taking more than the Earth can safely give, has pushed the planet into climatic conditions more threatening than anything witnessed even by our prehistoric relatives.

"We're already in the midst of abrupt climate upheaval, which jeopardizes life on Earth like nothing humans have ever seen," he added. "For example, Hurricane Helene caused more than 200 deaths in the southeastern

United States and massive flooding in a North Carolina mountain area thought to be a safe haven from climate change."

Of the 35 planetary vital signs the scientists use to track climate change annually, 25 are at record extremes, he notes.

The three hottest days ever came in July 2024, and fossil fuel emissions are at an all-time high, as are human population and ruminant livestock population, the climate report shows.

Human population is increasing at the rate of approximately 200,000 people per day, and the number of ruminant livestock – hooved mammals such as cattle, sheep and goats that produce greenhouse gases and are energy intensive to raise – rises by roughly 170,000 each day.

The annual consumption of fossil fuels climbed by 1.5% in 2023, mainly because of big jumps in coal (1.6%) and oil use (2.5%), the report indicates.

Renewable energy use also increased in 2023 – solar and wind consumption together were up 15% over 2022. But the use of renewables is just one-fourteenth of fossil fuel use, and the recent rise in the use of renewables is attributable mainly to increased demand rather than because they are replacing fossil fuels.

The report shows that annual tree cover loss globally rose from 22.8 million hectares in 2022 to 28.3 million in 2023, and based on global year-to-date averages, the concentrations of atmospheric carbon dioxide and methane are at all-time highs.

"The growth rate of methane emissions has been accelerating, which is extremely troubling," said Wolf, now a scientist with Corvallis-based Terrestrial Ecosystems Research Associates, known as TERA. "Nitrous oxide, which is potent and long-lived, is also at a record high."

Other points of concern from the report, Wolf notes, are:

The Earth's average surface temperature is at an all-time high.

Ocean acidity and heat content, as well as average global sea level, are at record extremes.

Greenland ice mass, Antarctica ice mass and average glacier thickness are at all-time lows.

Twenty-eight amplifying feedback loops – those that exacerbate climate change, such as permafrost thawing – have been identified.

In 2023, there were an estimated 2,325 heat-related deaths in the United States, a 117% increase from 1999.

"Since the publication of our 2023 report, multiple climate-related disasters have taken place, including a series of heat waves across Asia that killed more than a thousand people and led to temperatures reaching 122 degrees Fahrenheit in parts of India," Ripple said. "Climate change has already displaced millions of people, with the potential to displace hundreds of millions or even billions. That would likely lead to greater geopolitical instability, possibly even partial societal collapse."

The scientists say their goal is “to provide clear, evidence-based insights that inspire informed and bold responses from citizens to researchers and world leaders.” Specifically, they recommend the rapid adoption of policies that:

Implement a global carbon price that could limit emissions by the wealthy while potentially providing funding for further climate action.

Enhance energy efficiency and conservation while replacing fossil fuels with low-carbon renewables.

Curb emissions of greenhouse gases, including those categorized as short-term pollutants such as methane.

Protect and restore biodiverse ecosystems, which play key roles in carbon cycling and storage.

Encourage a shift toward eating habits that emphasize plant-based foods.

Promote sustainable ecological economics and greatly reduce overconsumption and waste by the wealthy.

Integrate climate change education into global curriculums to boost awareness, literacy and action.

“Despite six reports from the International Panel on Climate Change, hundreds of other reports, tens of thousands of scientific papers and 28 annual meetings of the UN’s Conference of the Parties, the world has made very little headway on climate change,” Wolf said. “Humanity’s future depends on creativity, moral fiber and perseverance. If future generations are to inherit the world they deserve, decisive action is needed, and fast.”

This year’s meeting – officially the UN Framework Convention on Climate Change – will be held Nov. 11-22 in Baku, Azerbaijan, and “it’s imperative that huge progress is made,” Ripple said.

Researchers from Harvard, University of Pennsylvania, University of Sidney, University of Exeter, and the Swiss Federal Institute of Technology, contributed to the OSU-led report. The CO2 Foundation and Roger Worthington, an attorney and the owner of Worthy Brewing in Bend, Oregon, provided funding for the research.

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