Woodwell Climate Research Center

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Month in Review • July 2025
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On July 29, the EPA proposed rolling back the 2009 Endangerment Finding– a landmark legal finding that greenhouse gases endanger public health. This attack on the cornerstone of U.S. climate regulation is the latest in a series of efforts to undermine critical work of addressing the climate crisis. As we watch violent storms, catastrophic wildfires, devastating flooding, and record-breaking heat impact communities across the country this summer, it is clear that climate change is already creating unlivable conditions for communities across the United States, and these conditions will only continue to worsen without urgently-needed action on mitigation and adaptation. We must double down on science-based solutions that will prepare and strengthen our communities—not roll them back.

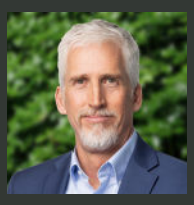
As my statement from the same day says...

"The 2009 Endangerment Finding is a critical foundation of U.S. efforts to fight climate change, and this attempt to undermine the rule reveals complete disregard for the severity of climate hazards.

Climate change endangers public health and efforts to limit greenhouse gas emissions are critical for a safe, stable, and sustainable future. Ten years after it was established, Woodwell helped lead a scientific review of the Endangerment Finding that showed 'that the case for endangerment, which was already overwhelming in 2009, is even more strongly justified in 2018.'

Today's efforts by the EPA will lead us to a more unstable climate and a more dangerous future for all Americans."

Woodwell remains deeply committed to the work of advancing essential climate research and developing effective solutions that will benefit communities throughout the U.S. today and for generations to come. We will continue to build science-based solutions and conduct the highest quality research, in the U.S. and across the globe. The climate crisis will not take four years off, and neither can we. Woodwell will be submitting a public comment in support of the Endangerment Finding, and we encourage others to do the same.



Max

Dr. Max Holmes
President & CEO

We cannot afford to retreat

Finding purpose in the wake of climate tragedy

Dr. Max Holmes President & CEO

In the early morning of July 4, the waters of the Guadalupe River in central Texas rose an astounding 35 feet in just two hours, washing away homes and vehicles and leaving hundreds—including dozens of children—missing or dead. I know this area, having lived not so far away decades ago.

Officials and journalists are still working to determine what could have been done better or differently to save lives in Kerr County, but some key lessons are already becoming clear. First and foremost, climate change is making our weather more extreme and we must do everything in our power to slow, stop, and eventually reverse, the dangerous acceleration of warming. Secondly, every community in our country deserves to understand the escalating risks they face, to have the best possible forecasts and warnings in a timely manner, and to be supported in planning and building for resilience, as well as recovering from disasters. We honor those lost in Texas when we heed these lessons and work tirelessly to prevent other such tragedies.

This is work that we here at Woodwell Climate are engaged in daily on multiple levels. Our scientists have made seminal contributions to our understanding of how changes in our atmosphere are altering weather systems, and shared these insights with the public in thousands of news stories—including coverage of the Kerrville flood. Our project teams have partnered with more than 50 communities to directly address the need for climate risk assessments and support the resilience planning process. Our experts have briefed legislators and agency officials about the need for enhanced

federal climate information services, and served on prestigious federal advisory panels that guide earth science and climate adaptation priorities.

At a moment when the need for this work is painfully clear, it is dismaying to see what is being enacted in D.C., through both executive actions and now legislation, taking us in the opposite direction. Already, we have seen science advisory committees dissolved, key climate reports removed from public view, flagship science agencies hit hard by staffing cuts, and funding for climate adaptation projects (some informed by Woodwell's work) revoked.

The reconciliation package passed by Congress and signed into law ten days ago does even more damage by rescinding important IRA funding, including for NOAA research, community climate action planning, environmental and climate justice grants, and forest protection and ecosystem restoration. While the administration says they aim to restore a gold standard for science, these actions erode the quality and integrity of American science and reduce Americans' access to important information and insights.

In addition, this legislation will obstruct our ability to limit carbon emissions that are rapidly and dangerously warming our planet. While our own work at Woodwell Climate focuses primarily on nature-based climate solutions, we fully recognize that our lands and waters alone cannot bear the burden of our greenhouse gas emissions; it is imperative that we move toward low- or no-carbon energy, transportation, and industry as quickly as possible. The vast majority of Americans think clean energy should be a priority for our federal government and support the transition to a clean energy economy. In contrast, accelerating the phase-out of clean energy tax credits will make it immeasurably harder for renewable energy and electric vehicle innovators to advance this transition.

Together, these actions further endanger the public health and safety of countless communities across the country at a time when—more than ever before—they need their government to protect them from increasingly extreme weather and other climate risks. Put simply, this bill takes us backwards at the worst possible moment.

Kerrville. Los Angeles. North Carolina. The impacts of climate change are mounting—across the country, and around the globe. We cannot afford to retreat, and we will not. We will continue to push the boundaries of our understanding, to form partnerships where there have been divides, and together, forge the solutions so urgently needed. We owe it to those lost, to those still at risk, and to those yet to come. Thank you for all you continue to do to make it possible.

Onward.

"There's too much fire now": Fire suppression as a climate solution

For Dr. Kayla Mathes, community perspectives have driven home the need for fire suppression as a tool to protect people and climate

Dr. Kayla Mathes Postdoctoral Researcher

When I started at Woodwell Climate, I had very little personal or professional experience with boreal wildfire. I was a forest ecologist drawn to this space by the urgency of the climate crisis and the understanding that northern ecosystems are some of the most threatened and critical to protect from a global perspective. More severe and frequent wildfires from extreme warming are burning deeper into the soil, releasing ancient carbon and accelerating permafrost thaw. Still largely

Hazy skies over Fort Yukon, Alaska. / photo by Kayla Mathes

unaccounted for in global climate models, these carbon emissions from wildfire and wildfire-induced permafrost thaw could eat up as much as 10% of the remaining global carbon budget. More boreal wildfire means greater impacts of climate change, which means more boreal wildfire. But when I joined the boreal fire management team at Woodwell, the global picture was the extent of my perspective.

This past June, under a haze of wildfire smoke with visible fires burning across the landscape, Woodwell Climate's fire management team made our way back to Fort Yukon, Alaska. Situated in Yukon Flats National Wildlife Refuge at the confluence of the Yukon and Porcupine Rivers, this region is home to Gwich'in Athabascan people who have been living and stewarding fire on these lands for millennia. Our time there was brief, but it was enough to leave us humbled by the reality that the heart of the wildfire story—both the impacts and the solutions—lie in communities like Fort Yukon.

We listened to community members and elders tell stories about fire, water, plants, and animals, all of which centered around observations of profound change over the past generation. As we shared fire history maps at the Gwichyaa Zhee Giwch'in tribal government office, we were gently reminded that their knowledge of changing wildfire patterns long preceded scientists like us bringing western data to their village. We learned that fire's impact on critical ecosystems also affects culture, economic stability, subsistence, and traditional ways of life. Increasing smoke exposure threatens the health of community members, particularly elders, and makes the subsistence lifestyle harder and more dangerous. A spin on the phrase "wildland urban interface," Woodwell's Senior Arctic Lead Edward Alexander coined the phrase "wildland *cultural* interface," which brilliantly captures the reality that these fire-prone landscapes, culture, and community are intertwined in tangible and emotional ways for the Gwich'in people.

"There's too much fire now" was a common phrase we heard from people in Fort Yukon. Jimmy Fox, the former Yukon Flats National Wildlife Refuge (YFNWR) manager had been hearing this from community members for a long time, along with deep concerns about the loss of "yedoma" permafrost, a type of vulnerable permafrost with high ice and carbon content widespread throughout the Yukon Flats. With the idea originating from a sharing circle with Gwich'in Council International, in 2023 Jimmy enacted a pilot project to enhance the fire suppression policy of 1.6 million acres of yedoma land on the Yukon Flats to explicitly protect carbon and climate, the first of its kind in fire management policy. He was motivated by both the massive amount of carbon at risk of being emitted by wildfire and the increasing threats to this "wildland cultural interface" for communities on the Yukon Flats.

above: Kayla Mathes, Brendan Rogers, Edward Alexander, and Executive Director of the Council of Athabascan Tribal Governments Dorothea Adams examine maps of yedoma permafrost across the Yukon Flats region. / photo courtesy of Kayla Mathes

Ever since I met Jimmy, I have been impressed by his determination to use his agency to enact powerful climate solutions. Jimmy was also inspired by a presentation from my postdoctoral predecessor, Dr. Carly Phillips, who spoke to the fire management community about her research showing that fire suppression could be a cost-efficient way to keep these massive, ancient stores of carbon in the ground. Our current research is now focused on expanding this analysis to explicitly quantify the carbon that would be saved by targeted, early-action fire suppression strategies on yedoma permafrost landscapes. This pilot project continues to show the fire management community that boreal fire suppression, if done with intention and proper input from local communities, can be a climate solution that meets the urgency of this moment.

The ultimate vision is for a diverse set of fire management strategies, with a particular focus on the revitalization of Indigenous fire stewardship and cultural burning...

"Suppression" can be a contentious word in fire management spaces. Over-suppression has led to fuel build up and increased flammability in the lower 48. But these northern boreal forests in Alaska and Canada are different. These forests do not have the same history of over-suppression, and current research suggests that the impacts of climate change are the overwhelming driver of increased fire frequency and severity. That said, fire is still a natural and important process for boreal forests. The goal with using fire suppression as a climate solution is never to eliminate fire from the landscape, but rather bring fires back to historical or pre-climate change levels. And perhaps most importantly, suppression is only one piece of the solution. The ultimate vision is for a diverse set of fire management strategies, with a particular focus on the revitalization of Indigenous fire stewardship and cultural burning, to cultivate a healthier relationship between fire and the landscape.

The boreal wildfire problem is dire from the global to local level. But as I have participated in socializing this work to scientists, managers, and community leaders over the past year, from Fort Yukon, Alaska to Capitol Hill, I see growing enthusiasm for solutions that is not as widely publicized as the crisis itself. I see a vision of Woodwell Climate contributing to a transformation in boreal fire management that has already begun in Indigenous communities, one that integrates Indigenous knowledge and community-centered values with rigorous science, and ends with real reductions in global carbon emissions. Let's begin.

Cold-air outbreaks continue in a warming world

A new paper from climate researchers highlights the impacts of stratospheric polar vortex behavior on cold-weather events across the U.S.

Despite a warming climate, disruptive winter cold spells still invade the U.S., and a new study helps explain why. Researchers found that two specific patterns in the stratospheric polar vortex, a swirling mass of cold air high above the Arctic, can steer extreme cold to varying regions of the country. One pattern drives Arctic air into the northwestern U.S., and the other into central and eastern areas. Since 2015, the Northwest has experienced more of these cold spells owing to a shift in stratospheric behavior tied to a warming climate—more proof that what happens in the Arctic doesn't stay in the Arctic.

As winters in the United States continue to warm on average, extreme cold snaps still manage to grip large swaths of the country with surprising ferocity. A new study offers a powerful clue: the answer may lie more than 10 miles above our heads, in the shifting patterns of the stratosphere.

The research reveals how two specific patterns in the stratospheric polar vortex—a high-altitude pool of frigid air over the Arctic encircled by a band of strong west winds—can contribute to bone-chilling weather events across regions of North America. The patterns are described as "stretched" because the vortex is elongated relative to its typical, more circular shape. One such pattern reinforces intense cold in the northwestern U.S., while the other variation takes aim at central and eastern states. Both patterns are associated with changes in how atmospheric waves, in both the stratosphere and lower atmosphere, can alter the jet stream and allow Arctic air to penetrate far southward.

"Understanding the stratosphere's fingerprints on changing weather patterns-particularly the counterintuitive connections between a warming globe and extreme cold weather events-could improve long-range forecasting, allowing cities, power grids, and agriculture to better prepare for winter extremes," said Dr. Jennifer Francis.

above: snow blankets the reflecting pool and National Mall. / photo by Joe Flood/NOAA

High-level workshop builds pathways to stronger climate commitments in the DRC

Woodwell partners with the Congolese Ministry of Environment and Sustainable Development to support the country's net-zero planning

Sarah Ruiz Science Writer & Editor

Last month in Dakar, Senegal, Woodwell Climate Associate Scientist Glenn Bush and Forests & Climate Change Coordinator Joseph Zambo facilitated a high-level workshop with the Democratic Republic of Congo's Director of Climate Change, Aimé Mbuyi, lead scientist on the country's Nationally Determined Contributions (NDC) reporting process, Prof. Onesphore Mutshaili, and project consultant Melaine Kermarc. The goal of the workshop was to begin generating a clear set of priorities for the next five years for stepping up the ambition of the country's NDCs, and to discuss strategies for monitoring and reporting on emissions.

Under the Paris Agreement, each country is required to submit to the UN Framework Convention on Climate Change a detailed description of their emissions reduction commitments and then regular reports on progress. Currently, DRC has pledged to reduce emissions by 21% by 2030, focusing on reform in their energy, agriculture, forestry, and other land use sectors. While NDCs are intended to represent a country's highest possible ambition, DRC is looking to step up further. Officials are at work developing a plan to reach net-zero emissions, which would place the country among the leaders of climate policy in Africa.

In order to do this, DRC needs a reliable framework for measuring and monitoring emissions, so that progress can be accurately reported on. At the workshop, Bush, Mbuyi, Zambo, Kermarc and Mutshaili discussed ways to strengthen the NDC reporting process. Among the top needs identified was stronger institutional scientific capacity, increased coordination and data sharing, and more funding and awareness of the process at local and provincial levels.

"High quality data is essential to building a high integrity NDC," says Bush. "Improving the scope and quality of data available to monitor carbon will not only help the country meet the highest tier of reporting standards, but also access performance-based payment mechanisms to help finance the transition to a low emissions economy."

Through their conversations about challenges and opportunities, the group identified three areas for intervention that will help the country navigate towards a stronger emissions reduction plan. These recommendations were outlined in a report on the workshop proceedings.

above: (from left) Melaine Kermarc, Dr. Glenn Bush, Joseph Zambo, Aimé Mbuyi, and Prof. Onesphore Mutshaili discuss DRC's climate commitments. / photo courtesy of Glenn Bush

1. Improved governance and policy management: Establishing a National Climate Change Council to better integrate climate policy into national development plans.
2. Science-backed carbon accounting and budgeting: Developing credible data standards for measuring emissions and ecosystem services to support transparent and effective reporting on climate performance.
3. Cross-sectoral integration: Promoting emissions reductions across all sectors through collaborative partnerships, particularly in the field of climate-smart agriculture and carbon payment mechanisms.

Mbuyi, Head of the Climate Change Division (CCD) at the DRC's Ministry of the Environment and Sustainable Development, declared that "these recommendations reflect an important set of practical steps to move from aspiration to operational reality in order to increase the financing and impact to conserve our forests and stimulate sustainable development in the DRC."

Woodwell Climate Research Center has been a long-time partner of the Ministry of Environment and Sustainable Development. The Center is assisting the ministry in laying the technical foundations to support the NDC improvement process and helping build in-country scientific capacity to make a net-zero emissions plan a reality. This and other partnerships will be essential in transitioning the DRC to a low-carbon economy.

"We appreciated the long-standing trust that has developed over years of formal and informal collaboration on climate policy," said Mbuyi. "The scientific partnership with Woodwell is invaluable to us at CCD, providing actionable information that has proven essential to advancing the climate mitigation and adaptation agenda."

Selected news coverage

In a *New York Times* article about the wildfire's threat to forests and their carbon storage, Dr. Rich Birdsey explained how regrowth after the loss of an old-growth forest leads to a "carbon debt." The article was also published in the *Boston Globe*.

Dr. Chris Neill's July column in the *Falmouth Enterprise* provided a window into the Buzzards Bay Coalition Baywatchers program, and how regular water sampling data reveals important insights about the surrounding land.

In an article about the recent Restoring Arctic Exceptionalism conference in Washington, DC, The Arctic Institute covered a panel discussion featuring Edward Alexander, titled, "Arctic Exceptionalism and Climate Crisis."

Board member Dr. Daniel Reifsnyder was quoted in *The Washington Post* on the importance of US leadership in addressing climate change.

A widely-syndicated *CNN* article quoted Dr. Jen Francis about the importance of preparedness for extreme storms, in light of new research which shows climate change is strengthening nor'easters. She also told *DiscoverWildScience* that the flash floods in Texas are what climate change looks like.

Dr. Zach Zobel spoke to *Bloomberg* explaining heat domes and their impacts on human health and life. The article was republished in *Gulf Times*.

Climate Cosmos published an article rounding up recent research on permafrost, including a Woodwell Climate study which showed that one-third of the Arctic tundra is now a carbon source.

An article published to *NewsBreak* quoted Dr. Kyle Arndt to provide an Arctic permafrost perspective on why methane is a bigger problem than you think.

Inforegión published a story about a workshop for Indigenous youth planning to attend COP30 to represent their communities in the Amazon. The event was hosted by the Indigenous Science and Knowledge for the Amazon project, of which Woodwell Climate is a partner.

Many outlets looked to Dr. Jen Francis this week to explain the connection between climate, extreme rainfall, and flooding, including *Grist*, *Bloomberg*, *ABC News*, and *The Wall Street Journal*. In an article by *RTO Insider*, Jen described how climate change is weakening the jet stream, causing more temperature and precipitation extremes in the northern hemisphere. Jen was also quoted in an article from *Economic Times* about how wildfire soot creates a positive feedback loop for Arctic warming.

Dr. Zach Zobel spoke to the *Boston Globe* about how a warmer atmosphere supercharges flash floods, and upgrades to infrastructure, forecasting, and warning tools are needed to adapt.

The Court of Justice of the State of Acre announced a seminar Dr. Foster Brown will be teaching at the Acre Judiciary School: "Journey for Decarbonization."

A recent episode of *This Way Up*, a podcast from The Arctic Council, featured Edward Alexander, Dr. Sue Natali, and Dr. Brendan Rogers speaking about how Arctic wildfires are reshaping landscapes, threatening communities and accelerating global climate change.

cover: Research Assistant Zoë Dietrich (far right), with Max and Roel Ruzol from University of Maine, collect soil samples, soil gas, and soil moisture data on methane and carbon dioxide fluxes, soil temperature, and soil moisture. / photo by Marly Bartkus

Donations play an important role in securing the future of Woodwell Climate Research Center's work—and help safeguard the health of our planet for generations to come.

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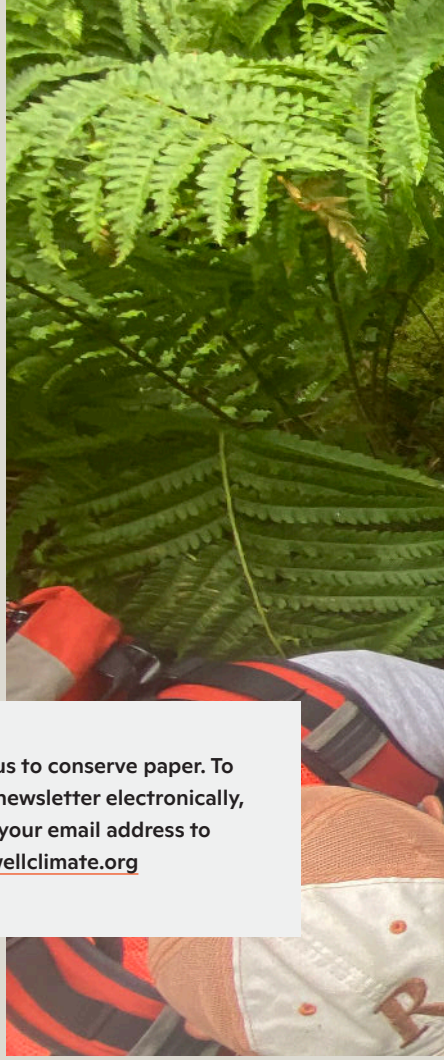

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