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WOODS HOLE RESEARCH CENTER



False solutions are worse than none

Dr. Philip B. Duffy
President &
Executive Director

You've probably heard me say that the conversation we should be having about climate change is not "Is it real?" but "What should we do about it?" Science demonstrated decades ago that climate change is real, and now (tragically) everyday experience confirms that fact. It would seem difficult to deny this, and according to the Yale Program on Climate Change Communication, only 16% of Americans think that global warming isn't happening. Perhaps more to the point, 92% of Democratic voters and 64% of Republicans support regulating CO₂ as a pollutant. Apparently, even our dysfunctional democracy can't ignore those levels of public support forever: climate change has figured prominently in the 2020 presidential election (in notable contrast to 2016), and in recent days House Minority Leader Kevin McCarthy released a package of proposed legislation purporting to address climate change.

In principle this should be cause for rejoicing, or at least should represent a big step forward. The problem is, much of what's being proposed aren't real solutions.

For example, the "trillion trees" proposal originated by three prominent conservation organizations was recently endorsed by President Trump. It is a well thought-through program, and very much in line with work that WHRC does and supports. The idea is to remove CO₂ from the atmosphere through a combination of avoided deforestation and planting new trees. So what's the problem? Nothing, except that this should not be sold as a full solution to climate change. We still need to stop emitting CO₂ from fossil fuel burning and land-use change. CO₂ removal is not a substitute for decarbonization; we need to do both. Furthermore, the Trillion Trees Act introduced in our Congress differs from the original proposal and appears to be a disguised giveaway to the forest products industry. The public would pay to plant trees which the industry can then harvest and sell, thereby removing

SOLUTIONS *continued on next page*



Record-setting winter warmth highlights urgency of climate action

Temperature records fell across the northern hemisphere this winter, as many regions saw warm temperatures and little or no snow. A common pattern in recent years has been soaring Arctic temperatures paired with disruptions in the polar vortex and prolonged cold spells in parts of the lower 48, a pattern that WHRC Senior Scientist Dr. Jennifer Francis has linked to climate change. But this year saw a different extreme—a record-strong Arctic Oscillation kept frigid Arctic air locked solidly north.

January 2020 was the Earth's hottest on record, and February was the second-hottest, according to the Copernicus Climate Change Service. Europe shattered its record for the warmest winter (December-February) ever, topping the old record by 2.5°F. Moscow recorded its warmest winter in nearly 200 years of record-keeping, its first ever with an average temperature at or above freezing. France as a whole had its warmest winter on record, and in Germany, warm temperatures prompted the country's ice wine harvest to fail for the first time on record.

The contiguous U.S. had its sixth-warmest winter on record, according to the National Oceanographic and Atmospheric Administration (NOAA). Many American cities also had one of their top five warmest winters, with some seeing hardly any snow. Boston had its second-warmest winter on record, with just 15.1" of snow (about 30% of normal).

WINTER *continued on next page*

SOLUTIONS *continued from front*

most of the climate benefit. From the point of view of climate, the best version of a Trillion Trees is simply to plant them and leave them alone, except for minimal management needed to manage fire risk.

Another element in McCarthy's package is to extend a tax break for capturing carbon emitted by fossil fuel burning. (This prevents the carbon from contributing to climate change.) That sounds good, but it will take more than a tax break to make fossil fuels plus carbon capture cost-competitive with renewable energy. Even without the added cost of carbon capture, fossil fuels have difficulty competing with renewables, and capturing the emitted carbon adds a lot of expense. Another issue with this proposed legislation is that the main use of the captured carbon may be to inject it underground in order to extract more fossil fuels. So here's another "solution" that pretends that we can continue to use fossil fuels.

Perhaps not surprisingly, neither of these proposals sit well with the far right. If you think no one could object to planting trees,

think again. "The fact is that we have far too many trees in our national forests," said Myron Ebell of the conservative, climate change-denying Competitive Enterprise Institute (CEI). The CEI also (correctly) characterizes carbon capture as "ineffective due to high operating costs."

The danger of false or incomplete solutions, of course, is that they can displace measures which actually work but are less palatable politically. I may be cynical (!) but I fear that as public pressure builds to "do something about climate change," politicians will be unable to resist fig-leaf measures that masquerade as real solutions. That would leave us worse off than we are now, by relieving pressure and postponing meaningful actions.

All of this highlights the need for real, science-based climate policies, as well as for an independent, scientifically-credible institution which has a strong public voice and is willing to tell the truth. That's been our role since George Woodwell founded WHRC in 1985, and it's more important now than ever. Thanks as always for your interest and support.

WINTER *continued from front*

"Warmth like this is exactly what we expect to see more of as fossil fuel emissions continue to drive global warming. While it resulted in an unusually pleasant winter for many parts of the U.S., it's had a violent side as well, with record rainfall in the Midwest and Southeast, along with prolonged dry conditions in California and heavy snows in the Rockies," said Dr. Francis.

The unusual weather will have a lasting impact. Some Midwest states have seen two to three times their usual winter precipitation, raising fears of another disastrous planting season for farmers. Last year's floods led to \$20 billion in losses, a 10-year high. Meanwhile in hot, dry California, brush fires are already breaking out earlier than usual, and California's Department of Forestry and Fire Protection (CAL FIRE) warns "large fire potential may increase to above normal this spring across Southern California."



WHRC hosted a Kaneb Speaker Series event in Washington, DC on February 27, *Rough Weather Ahead: Living and Adapting Through a Time of Rapid Change*, featuring (from left) WHRC's Phil Duffy and Jennifer Francis, Niskanen Center Director of Climate Policy Joseph Majkut, and Rep. Harley Rouda (CA-48).

Coronavirus: WHRC curtailing travel and postponing events

While the global spread of coronavirus hasn't impacted WHRC staff directly so far, it is affecting operations as WHRC works to enact responsible, proactive policies and safety measures. In accordance with the latest guidance from state and federal health officials, WHRC is postponing Science on the Fly events that had been planned for March 26 in Falmouth and April 1 in Denver. Staff are being strongly discouraged from all domestic and

international travel, and any staff who do travel internationally will be required to stay off campus for 14 days after returning.

"I recognize that these measures involve inconvenience and may affect productivity. Unfortunately we are dealing with an extraordinary public health emergency and there's no way to avoid negative impacts. All of this is preferable to facilitating the spread of a serious illness," said WHRC President Dr. Phil Duffy.



Fund for Climate Solutions

New projects receive Fund for Climate Solutions internal grant awards

Six proposals have been granted funding from the Fund for Climate Solutions, an internal funding instrument created by WHRC's Board of Directors. About \$700,000 in funding was granted, marking the largest round of funding to date.

The Fund for Climate Solutions aims to advance climate solutions by extending or augmenting crucial research initiatives, seeding new projects that offer breakthrough policy or scientific impact, and allowing startup projects to get off the ground to show proof of concept work for outside funding opportunities.

The new projects being supported by the Fund:

Evaluating Next-Generation Spaceborne LiDAR for Estimating Biomass

Project Leads: Drs. Alessandro Baccini and Wayne Walker

Within the last two years, NASA has successfully launched ICESat-2 ATLAS and GEDI, two new space-based LiDAR systems. Both of these platforms, which have only just recently switched to operational data collection mode, likely will be central to the future of WHRC's carbon monitoring program, making it critical to begin to gain core competency with these data as soon as possible. What does this data reveal about aboveground forest biomass and carbon density? How does this next-generation technology compare to previous systems? This project is focused on answering these questions, using acquisitions of ATLAS and GEDI data from locations in New England to measure how well the spaceborne measurements correlate with actual biomass. The results from this local effort will provide insight into how the new spaceborne LiDAR systems can be applied to research around the world.

Curbing Amazon forest degradation and fire disturbance by translating science for policy applications

Project Leads: Drs. Marcia Macedo, Wayne Walker, Paulo Brando, Michael Coe

Stopping growing emissions from deforestation and degradation is critical for Brazil and other tropical nations to achieve their greenhouse gas emissions targets, and for the world to address the climate crisis. This project aims to meet the demand for consistent, annual spatial data on emissions from forest degradation, leveraging WHRC's expertise in forest carbon monitoring; our field-based understanding of fire dynamics and forest-climate interactions; and our strong network of collaborators in the region. It will accomplish this by establishing the Woodwell Policy Fellowship Program, designed to promote scientific interaction and policy innovation among WHRC scientists and strategic collaborators from IPAM-Amazônia, the System for Estimating Greenhouse Gas Emissions (SEEG), and the MapBiomass Project. Over the next year, four policy fellows from IPAM and other partners will spend time in residence at

WHRC, allowing for extended interactions and focused time to synthesize existing data; translate our science into policy briefs and products; and promote the operational use of this information for policy decisions.

Primary forest protection and food security

Project Lead: Dr. Glenn Bush

In the Democratic Republic of Congo's Equateur province, primary forests are being increasingly threatened by food production demands. Flooded rice production is a key agricultural technology whose expansion presents a critical risk to primary wetland forest ecosystems and threatens increased emissions from the loss of high carbon density forests and soils. This study will generate novel, empirical, field-based evidence, demonstrating how the implementation of "climate smart" flooded rice production can reduce expected emissions from deforestation and increase product yield for smallholder farmers. The project will apply the data to assess the GHG emissions implications of current versus "climate smart" agronomic practices and the associated social and economic costs and benefits of their adoption at scale. Through the project WHRC will train local scientists and apply findings to a land use optimization analysis to identify priority areas for economically and socially efficient pathways to a low emissions future.

Using Drone Mapping to Improve YKD Carbon Budgets

Project Leads: Drs. Sue Natali and Jennifer Watts

This project aims to improve our understanding of carbon emissions in the Yukon Kuskokwim Delta (YKD) by using very high resolution (5, 3, and 0.72 m) satellite imagery available through Planet Labs, as well as airborne hyperspectral imagery (NASA AVIRIS-NG), to provide fine detail mapping of water and vegetation cover. These land cover maps will then be used to scale up carbon dioxide and methane fluxes from measurement plots to the landscape scale. We will use this research to develop improved methodologies for remote sensing analysis that can be applied over the entire YKD to track long term changes in vegetation properties, water cover, and ecosystem carbon budgets. This project builds upon YKD research supported by FCS and the Gordon and Betty Moore Foundation.

Integrating food production, water use, energy demand, and environmental integrity in a changing climate

Project Lead: Dr. Michael Coe

The Amazon and Cerrado biomes of Brazil contain the world's largest tropical forest and tropical agricultural frontier. Deforestation and increasing greenhouse gasses may significantly alter the climate of this environmentally and economically important region in the coming decades. Both changes are

increasing the temperature, reducing precipitation, shortening the rainy season, and increasing drought frequency and intensity. Together these human-induced changes to climate could threaten the remaining forests and the numerous ecosystem services they provide—agriculture, water quality and quantity, and hydropower energy. In this project, we will simulate the potential climate of the Amazon and Cerrado under changing greenhouse gas concentrations and deforestation scenarios at a spatial resolution tens to hundreds of times finer than has been accomplished before. Very high resolution simulations have the potential to transform our understanding of how the forests of the Amazon and Cerrado influence the climate system and impact Brazil's economic and conservation goals.

Soil carbon restoration opportunity mapping

Project Lead: Dr. Jonathan Sanderman

Interest in soil carbon sequestration is rapidly gaining momentum as governments and industry are looking for climate solutions with economic and environmental co-benefits. This project aims to fill gaps in our existing knowledge by providing more accurate and spatially-resolved estimates of the total soil carbon sink capacity and restoration potential under different improved land use and management scenarios.

To learn more about supporting the Fund for Climate Solutions, contact WHRC Chief Development Officer Leslie Kolterman at lkolterman@whrc.org.

Enduring scientific partnership examines Congo River

Bienvenue Dinga, a hydrologist and WHRC's research partner in the Republic of Congo, visited Falmouth in February, bringing Congo River water samples to WHRC's environmental chemistry laboratory and meeting with staff to discuss progress.

Dinga is head of the National Hydrological Service of Congo, as well as a lecturer and researcher at Marien Ngouabi University. He has partnered with WHRC and WHOI on the Global Rivers Observatory since 2010, collecting monthly samples from the main stem of the Congo River. Though the Congo River Basin is second only to the Amazon in terms of discharge, it has historically been studied much less than the Amazon.

WHRC Deputy Director Dr. Max Holmes first met Dinga a decade ago, when he applied

for a research permit to sample rivers in the Republic of Congo. The government assigned Dinga as WHRC's local scientist, a move that immediately paid dividends when the team's plane was disabled. Dinga arranged for a truck to make the trip and negotiated accommodations (he speaks six languages), allowing the team to take samples along the entire route and get a once-in-a-lifetime experience of life inside the Republic of Congo.

Dinga manages a staff of 18, with WHRC funds supplying equipment and enabling training of new researchers. He's published papers with Dr. Holmes and other Woods Hole scientific community scientists. During his time sampling rivers for WHRC, Dinga says he's seen evidence

of a changing climate manifest in river discharge and chemistry.

"In addition to providing equipment and access to the best analysis, WHRC's consistent support has enabled us to build historical data, which we didn't have before. Studying a river requires a large, years-long data set and we're just now getting to the point where we can see trends," said Dinga. "When I return home with this data, our government ministry is very happy."

The Congo River divides the Republic of Congo on its east bank from the Democratic Republic of Congo on its west bank. In recent years, there's been renewed talk of diverting water from the Ubangi River, a key Congo River tributary, hundreds of miles to Lake Chad, which has been dropping due to unsustainable human withdrawals. Dinga is fighting that effort to protect the communities that depend on the Congo River Basin's waterways for food and transportation.

To learn more about the Global Rivers Observatory's ongoing work studying the Congo River, visit GlobalRivers.org/Congo.



Bienvenue Dinga working with postdoctoral researcher Scott Zolkos.



Presidential candidate Weld visits WHRC for climate science briefing

WHRC hosted William Weld, the former Massachusetts governor now seeking the Republican presidential nomination, for a climate science briefing on February 25. Weld also toured WHRC's laboratory and fielded questions from WHRC staff on his climate policy proposals.

WHRC President Dr. Phil Duffy led the science briefing, detailing the warning lights flashing around rising carbon emissions, worsening deforestation, and thawing permafrost. Weld pressed for details on how fast melting Arctic ice will raise oceans, pointing to research that future flooding could create hundreds of millions of coastal refugees. He asked about the potential for carbon capture and storage of industrial emissions, as well as how improved agricultural practices can help store carbon in soils.

"I believe—as you do—that folks from across the political spectrum need to be

working on climate," Weld told WHRC staff. An outdoorsman, Weld talked about his personal passion for the environment, as well as his administration's progress on cleaning Boston Harbor and the Charles River. Weld said his climate priorities would include issuing an executive order declaring a climate emergency, creating a carbon tax, rejoining the Paris Climate Accord, and incentivizing clean energy.

WHRC has offered informational meetings on our research to all presidential candidates. Gov. Weld is one of two candidates running for the Republican nomination for president and is the only one to take us up on our offer. So far, briefings have been conducted with staff from (withdrawn) Democratic candidates Tom Steyer, Sen. Amy Klobuchar, and former Massachusetts Gov. Deval Patrick.

"WHRC is strictly non-partisan and does not endorse or oppose any candidates



for political office. At the same time, it is a core part of our work to inform policy and we see this outreach as central to that mission," said WHRC Chief of External Affairs David McGlinchey.

In the news : highlights

The melting Arctic gives scientists valuable access to long-dead viruses. *Popular Science* quotes Max Holmes. March 6

Mexico Is Letting an Oil Company Destroy Protected Mangroves for an \$8 Billion Oil Refinery. *EcoWatch* quotes Jonathan Sanderman. March 6

Why does the weather stall? New theories explain enigmatic 'blocks' in the jet stream. *Science* quotes Jennifer Francis. March 5

'Strong Pressure' For Companies Like Amazon To Combat Climate Change, Says Heather Goldstone. WGBH *Boston Public Radio* interview. March 5

Will future East Coast winters be freezing or balmy? Scientists can't agree. *Grist* quotes Jennifer Francis. March 3

U.S. Farmers and Shippers Face Huge Losses From Flooding Again. *Bloomberg* quotes Jennifer Francis. February 29

Cheers & Jeers: Moderate Republicans are Missing in Action. *Cape Cod Times* covers William Weld's visit to WHRC. February 28

Julia Louis-Dreyfus and George Woodwell on Climate Crisis. *NowThis* video in which the 11-time Emmy winner interviewed WHRC's founder. February 25

Still Fighting for GOP Nomination, Bill Weld Talks Climate Change in Woods Hole. WCAI photo features Weld with Greg Fiske. February 25

Weld makes his case for the presidency. *Cape Cod Times* quotes Phil Duffy, mentions Heather Goldstone, and photo features a group of staff. February 25

When will the Amazon hit a tipping point? *Nature* quotes Paulo Brando. February 25

Faith and Climate Change. WCAI's *The Point* interview with Dave McGlinchey. February 25

The One War That The Human Species Can't Lose. *The New Yorker* quotes Spencer Glendon. February 21

Climate-Driven Risk Is Severely Underestimated across Financial, Insurance, and Real Estate Entities, Says Economist Spencer Glendon. Urban Land Institute blog in which Spencer Glendon addresses ULI Governing Trustees at their midwinter meeting. February 21

How climate scientists, activists, and NGOs want to spend Jeff Bezos' money. *The Verge* quotes Phil Duffy. February 19.

Francis gets the science and beauty of the Amazon but falls short on action to save it. *National Catholic Reporter* op-ed by Phil Duffy. February 13

Investors' role in a carbon-neutral 2050. Top1000Funds.com mentions our partnership with Wellington Management. February 13

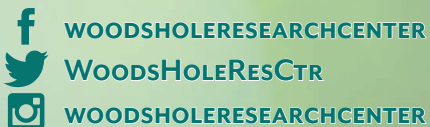
Amazon Deforestation Is Causing 20% of Forests to Release More Carbon Than They Absorb. *EcoWatch* quotes Wayne Walker. February 12

Climate Confession: I Was Wrong. GlacierHub.org op-ed by Jeff Kargel references Jennifer Francis. February 11

Explainer: Nine 'tipping points' that could be triggered by climate change. *CarbonBrief* quotes Brendan Rogers. February 10

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Woods Hole Research Center
149 Woods Hole Road
Falmouth, MA 02540
508-540-9900
www.whrc.org

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