Preaching to the choir

Dr. Philip B. Duffy
President & Executive Director

I am sometimes admonished to stop “preaching to the choir,” talking about climate change to those who already understand the seriousness and urgency of the problem. People are often surprised when I defend this as maybe the most useful thing any of us can do.

How can that be? It’s simple. Change occurs in part because those who care enough about an issue put time and energy into fighting for it. Social scientists have a name for those people — the “issue public.” They are always a small fraction of the population, whatever the issue. Surprisingly, perhaps, those people, although they may care very much, are often not as well-informed as they might be. That’s especially true about a complex issue like climate change. That’s why informing and motivating the issue public is very valuable.

The other necessary ingredient for societal change is acquiescence of everyone else — the “non-issue public.” If this majority is strongly opposed, then change is difficult. I am pretty sure that Abraham Lincoln knew that he wanted to abolish slavery well before he did so. The issue public (abolitionists) had been agitating for some time, but the rest of the public wasn’t ready until 1863, and even then it didn’t go so great in the South because much of the public there wasn’t ready to accept this change.

I think there’s a lesson here about how to make progress on climate change. It’s important to engage the issue public, but also important not to forget about everyone else. The broader the support, the better. That’s especially true because the societal changes needed to meaningfully address climate change aren’t going to be small.

Recent public opinion polling data show large and increasing proportions of the public understand the reality of climate change and its human causation. The bad news is that although addressing climate change is a higher priority than it used to be, most people still don’t rank it very high. That’s not ideal, but maybe it can be good enough. That is maybe we can get science-based climate policies if a few people demand them, and enough of everyone else is ready to accept them.

Our approach at WHRC reflects this two-track theory of change. Most of the folks who read this newsletter or follow us on social media are part of the issue public. We try to feed them informative news that is interesting and appealing enough for them to pass on to others. We also work to engage others who have different perspectives. That’s why we’ve created a partnership between faith leaders and climate scientists, why we work with a conservative think tank (the Niskanen Center) in Washington, D.C., and why we’re doing joint research with a major investment firm (Wellington Management).

I hope you agree that this work has the potential for outsized impact. We are certainly excited to have the opportunity to be part of it. Thanks as always for your interest and support.
WHRC’s Dr. Jennifer Francis testifies to congressional hearing on climate change

by Dave McGlinchey

The House of Representatives Committee on Science, Space, and Technology, held a climate science hearing on February 13, and the event was marked by a bipartisan agreement that climate change requires urgent attention.

WHRC Senior Scientist Dr. Jennifer Francis testified to the committee about the connection between climate change and extreme weather.

“It’s not your imagination: extreme weather events have become more frequent in recent decades,” Francis said. “Images of floods caused by feet of rain unleashed by hurricanes Harvey and Florence, docks sitting on dry soil in California’s reservoirs, a sunken New Jersey roller coaster in the wake of Superstorm Sandy—to name only a very few—are forever etched in our memories. Yes, extreme weather has always happened, but there’s no question that it’s more vicious now, and all signs point to it getting worse.”

After a decade of contentious hearings, in which Republican members of the committee often challenged the existence of human-caused climate change, the change in tone came abruptly. As their witness, the minority Republicans invited Dr. Joseph Majkut, director of climate policy at the Niskanen Center. In 2018 WHRC signed an agreement to work with the Niskanen Center on delivering climate science to Congress.

“Climate change is real and global emissions of greenhouse gases are driving latter day global warming. Manifestations of that warming are increasingly observed,” Majkut said. “As climate change continues more severe and perverse effects will manifest themselves causing economic harms and damages to individuals and ecosystems ... science tells us also that limiting climate change means ceasing global emissions.”

With a few exceptions, the questions from the committee members were focused on understanding climate change impacts and the potential for climate change solutions. Rep. Michael Waltz (R-Florida) said that climate change impacts are indisputable, and that he wanted the United States “to lead this effort ... with rapidly growing clean energy markets.”

Rep. Frank Lucas (R-Oklahoma), the senior Republican on the committee, said that a “changing climate has intensified” the impacts of droughts and heat waves. Lucas called for more federal funding for research on climate change impacts.

Committee Chairwoman Rep. Eddie Bernice Johnson (R-Texas) said that this hearing was the first of several that she would convene on climate change impacts and solutions.

Polar Vortex Puts WHRC Senior Scientist in National Spotlight

by Miles Grant

When record cold temperatures hit the Midwest early this year, the national news media turned to WHRC Senior Scientist Dr. Jennifer Francis to understand the phenomenon.

Francis is world-renowned for her research on Arctic warming and its disruptive effect on weather in other regions of the world. Francis’ research has focused specifically on the connection between the rapidly warming Arctic and a weakened jet stream.

When Arctic cold brought temperatures as cold as 30 or 40 degrees below zero, many news organizations cited Dr. Francis to explain the unusual weather and its connection to climate change. She was interviewed by The New York Times, USA Today, The Guardian, and PBS NewsHour, among many other outlets.

“Taking these complicated research results and weaving them into a story that people can understand — I see that as a really important part of my job,” Francis said. “WHRC is becoming a destination for the media to get good scientific information and to get help translating it in a way that can connect with non-scientific audiences.”

Francis said that emerging research showed that a warming Arctic—and in particular sea ice loss—was disrupting the polar vortex and causing it to split. Gaining a better understanding of how warming temperatures and melting sea ice disrupt global weather patterns is one of Francis’ top research goals.

Francis came to WHRC from the Rutgers University Department of Marine and Coastal Sciences. Francis received her Ph.D. in Atmospheric Sciences from the University of Washington and her undergraduate degree from San Jose State. Before becoming a senior scientist, she served on the WHRC President’s Council.

Working with the press on the polar vortex has been encouraging, according to Francis. “I’m getting fewer questions from the media about whether climate change is real or not. Those have pretty much dried up, which is a great thing. As the public becomes more affected by extreme weather and sea level rise, people are getting more hungry for more meaty information. There’s a genuine increase in level of sophistication of questions from the media, because their audience wants it.”
A new study shows fire-damaged trees are especially vulnerable to windstorms for several years or even decades — especially the largest, and most carbon-rich trees.

WHRC Assistant Scientist Paulo Brando is part of a team releasing the new research in the *Journal of Ecology*. The discovery was made in the same study area at the heart of a 2014 landmark paper. That previous study compared the fire resilience of three connected plots in the Amazon forest — one burned annually, one burned every three years, and a never-burned control plot. A fortuitously-timed windstorm allowed the team to take their study one step further: How does fire affect tropical forest’s durability in windstorms, and what can that tell us about their survival in a climate-changed future?

The Amazon has already lost 800,000 square kilometers of forest, an area equivalent to 1/10th of the lower 48 United States, much of it to intentional burning to clear land for agriculture.

The original study established that fires leave surviving trees more vulnerable to other stressors like drought for decades to come. When a short, high-intensity windstorm swept through the study area, Dr. Brando and the team realized they had a chance to examine a new variable.

“Suddenly this storm sweeps through and there are chairs flying around our camp,” Brando said. “But as we were cleaning up, we had a moment of realization that we’d just sampled the tree plots the week before with a three-dimensional laser scanning system called LiDAR. We had a unique opportunity to study, with high certainty and in great detail, how each of the three plots survived the storm.”

Their study showed that not only were trees in the burned plots more likely to be uprooted or snapped (often at the height of fire scars), but that damage was much more likely to prove fatal over the following years. The damage was greatest around the edges of the plots, showing the compounding dangers of forest fragmentation.

“The lesson is that even areas that look like they’ve survived initial burning will continue degrading in ways that are unpredictable, non-linear, and worsened by global warming. We can’t separate out the effects of burns, drought, and global warming — they can interact in unpredictable ways,” Brando said. “It’s critically important that we learn all we can about how to protect its remaining canopy, especially for the oldest and largest trees that provide the most wildlife habitat, cycle the most moisture through the ecosystem, and store huge amounts of carbon.”

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**Public Lecture Series: Climate Change Action in the Private Sector**

This series, focusing on climate change action, from the financial to the outdoor industry sector, to the educational and faith-based communities, wraps up with two lectures in April. Come hear how the private sector and other communities are responding to climate change.

April 2019  |  Environmentalisms in practice: an overview of the politics of conservation in Costa Rica's Osa Peninsula
Clate Korsant, Ph.D.

April 2019  |  How the OIA is helping small businesses scale best practices in sustainability throughout their supply chains
Nikky Hodgson, Manager, Sustainable Business Innovation, Outdoor Industry Association
New approach will allow large-scale monitoring of soil carbon
by Emily Marshall

Measurements of the amount of light that soils can absorb at different wavelengths can be used to quickly and cost-effectively produce large datasets on soil properties, according to a new paper released this week in the journal Soil Systems.

The research was led by WHRC’s Dr. Jon Sanderman and Dr. Shree Dangal and was funded by the U.S. Department of Agriculture’s (USDA) National Institute of Food and Agriculture. According to Sanderman, the study aimed to better understand and predict how soil carbon responds to land use change, especially under a changing climate.

The researchers focused on increasing the availability of soil data by making it cheaper and easier to measure properties such as organic carbon and texture. Sequestering carbon in soils is a major climate mitigation strategy, primarily through improving agricultural practices and encouraging strategies such as no-till farming and the planting of cover crops. This approach has been hampered, however, by insufficient data. Unlike aboveground forest carbon, soil carbon cannot be measured using satellite imagery.

"While accurate measurement of different soil properties, like organic carbon and texture, is routinely possible, it is currently laborious and expensive," Dangal said. "By utilizing the light absorbed by soil at different wavelengths, we have developed statistical routines to accurately estimate soil properties that can possibly replace traditional laboratory-based laborious and expensive methods." The paper identified the total cost of standard soil characterization procedures at the US National Soil Survey Center to be about $2,500 [per small unit] with processing times of 6–12 months.

Sanderman and Dangal used diffuse reflectance spectroscopy — essentially measuring how much light soil can absorb at different wavelengths. In the past, this approach has been primarily applied for specific projects but the team used the USDA's National Soil Survey Center mid-infrared spectral library and associated soil characterization database to demonstrate that the approach could be used at the scale of the continental United States. They tested and optimized several advanced statistical approaches for providing routine predictions of numerous soil properties relevant to studying carbon cycling.

"You cannot manage what you cannot measure," Sanderman said. "Measurement and ongoing monitoring of soil carbon is a major barrier to implementing effective soil-based climate mitigation projects."

Polaris Project research continues
by Emily Marshall

Rhys MacArthur (left) and Natalie Baillargeon (right) participated in WHRC’s Polaris Project in 2018, an Arctic research program that takes undergraduate students on a two-week field expedition to the Yukon-Kuskokwim Delta, Alaska, followed by two weeks of analysis at WHRC.

After their time with Polaris, both women were inspired to continue their research. "Polaris never really ended for us, we never stopped," Baillargeon said. MacArthur and Baillargeon, both undergraduate science students at Hampshire College, started seeking out various opportunities to support their continued research. They were awarded Hampshire College's Roddenberry Sustainability Grant, which allowed them to continue studying the Arctic soil and vegetation samples they collected on their Polaris trip.

While their classmates enjoyed a winter break away from the classroom, they decided to travel to WHRC to use the laboratory equipment. "As undergrads, we had this feeling of, we're just science students, we're not actual scientists yet," MacArthur said. "But WHRC made us see ourselves as actual players in the field, as real Arctic scientists."
WHRC researchers study forest conservation incentives for Congo
by Dave McGlinchey

The Congo Basin in central Africa is one of the largest reservoirs of aboveground forest carbon in the world, but deforestation for expanding small-scale agriculture and fuel use is threatening this vital climate mitigation resource.

In late 2018, WHRC environmental economist Dr. Glenn Bush and research assistant Nolan Kitts traveled through remote communities in the Democratic Republic of the Congo (DRC) to lay the groundwork for a survey that will help identify the economic incentives that will stop villages and farmers from clearing forests.

“We were conducting preliminary research to frame a behavioral economics study,” Bush said. “We need to understand people’s preference on states of the environment versus development benefits.”

The DRC is the largest country in sub-Saharan Africa, roughly 900,000 square miles. Bush and Kitts visited several villages in the DRC’s Equateur Province, meeting with different focus groups representing a range of social and demographic sectors within the region—including a women-only group. The information they gathered is being developed into a household survey for five different communities, chosen along a spectrum from most to least deforested. The survey of 350 households will be conducted in May, with final results available in August.

“The goal of this survey is to understand, broadly speaking, the environmental concerns and development concerns of the communities that live on edge of this deforestation, and understand the nexus of issues,” Bush said. “The application of this study will be to design effective packages of support to achieve these conservation and development outcomes. But we need to first quantify the local drivers of deforestation and the incentives that will help stop that deforestation.”

Bush said that he also plans to put the results into an academic paper, and develop research briefs for Congolese officials to help inform national policy decisions.

News briefs

Continuing WHRC’s partnership with Wellington Management, its Managing Director Chris Goolgasian spoke on January 16 about “How Capital Markets Can Influence Climate Change.” Chris plays a lead role in Wellington’s efforts to integrate climate science and asset management and is integral to the strategy surrounding the research initiative with WHRC.

On February 13, Rev. Mariama White-Hammond spoke in February at WHRC about “Climate Justice OR Climate Just Us: A Moral Case for Putting Equity at the Center of Climate Action.” Rev. White-Hammond is pastor of New Roots AME Church in Boston and a fellow of the Green Justice Coalition, committed to engaging the faith community on climate change and ecological justice issues.

On February 17, WHRC Senior Scientist Dr. Rich Birdsey spoke at the AAAS Annual Meeting, as part of a session on “Carbon Cycle Processes, Policies, and Uncertainties: New Perspectives.” Birdsey’s talk was about the federal government’s Second State of the Carbon Cycle Report. Birdsey was an author on that report.

In the news

Why the Midwest’s deep freeze may be a consequence of climate change. WHRC Senior Scientist Dr. Jennifer Francis was interviewed by PBS News Hour about the polar vortex and its connection to climate change. January 30.

Midwest Prepares for Subzero Polar Vortex. Dr. Francis was quoted in a Wall Street Journal article about the record low temperatures. January 28.

Warming Arctic waters increase shipping challenges already ‘the bane of everyone in the North.’ Melting ice is opening ship lanes - but the ice’s retreat and advance can be rapid and unpredictable, leading to some high-risk rescues, reports the Financial Post. The article cited a study conducted by WHRC’s Greg Fiske and Tufts University’s Paul Berkman, using radar data from marine vessels between 2009 and 2016, that shows cruise ships and pleasure yachts increasingly venturing into Arctic waters. January 2.
Forests as mountains.
This map shows aboveground forest carbon located in the Amazon. It presents biomass as 3D elevation surface, so the higher the "mountain," the more carbon stored within that area. // data: Alessandro Baccini et al., map: Greg Fiske