



Climate scientists, Chesapeake Bay experts look to future with Trump presidency

By Tamara Dietrich November 20, 2016

Drowned neighborhoods, meaner hurricanes, shifting shorelines, the Atlantic lapping at the front door — Hampton Roads knows more than most what climate change bodes for coastal communities.

Now local scientists who study the changing climate and its long-term impacts on the Chesapeake Bay region say they're worried about what a [Donald Trump](#) administration might bode for the area — and the Earth — as well.

Trump has tweeted that climate change is a "hoax" perpetrated by the Chinese, and vowed to pull the U.S. out of last year's landmark Paris Agreement in which 190 countries agreed to cut carbon emissions and to abandon President [Barack Obama](#)'s domestic Clean Power Plan.

He also pledged to power up the country's fossil fuel industries, which scientists fear could trigger even greater greenhouse gas emissions and jeopardize any chance of keeping global warming below what climate models show is a tipping point toward catastrophe.

Randy Chambers, head of the Keck Environmental Lab at the College of William and Mary in Williamsburg, has seen environmental protections ebb and flow from one administration to the next for decades.

"It's a shame that things that are scientifically important — and ought to be important to society as well — shift so dramatically with these political elections."

John Fredericks, conservative talk radio show host and chairman of Trump's campaign in Virginia, believes Trump's energy ambitions won't come at the expense of the environment.

"If you look at climate change right now, there's no question that everybody has to have environmental concerns," Fredericks said. "There's only one Earth."

"I think what President-elect Trump is going to do with his policies is be sure we strike a balance where we're doing whatever we can in order to not pollute the environment. But he also understands you have to produce energy to get jobs."

"We're not going to abandon coal the way Obama did. And we're not going to abandon fossil fuels the way Obama did. I think there's going to be a balance."

Science under the microscope

Striking that balance will be critical for ecosystems like the bay, the largest estuary in North America. Its watershed stretches 64,000 square miles over portions of six states and the District of Columbia and is home to nearly 18 million people.

It's critical for the many communities that line its shores, for the abundant marine species that use it for critical habitat and food, for the residents of Tangier Island who could become some of the country's first climate refugees, for commercial and recreational fisheries, for the tourism industry, for federal research

agencies such as NASA Langley Research Center in Hampton and Jefferson Lab in Newport News and for the area's many military installations that are all learning to adapt to recurrent flooding and sea level rise that's projected to swamp much of their real estate by the end of the century and far beyond.

Trump has not offered a plan on how to achieve that balance. And academics worry whether a man whom Michael Lubell of the American Physical Society in Washington has called "the first anti-science president we have ever had" will rely on scientific evidence to fashion one.

William and Mary paleoclimatologist Nick Balascio drills core samples out of lake beds in the Arctic, Greenland and northern Norway to study climate changes over hundreds and thousands of years.

Earth's climate alters over time due to natural cycles. But what the evidence shows, Balascio said, is that the massive amounts of greenhouse gases humans have introduced into the atmosphere are changing the climate in a way unrelated to natural cycles. CO2 levels in particular are beyond what the planet has experienced in nearly a million years.

"It is frustrating when scientific work or the credibility of scientists is undermined," Balascio said. "It's frustrating because it's one thing to acknowledge an issue but then decide that we can't deal with it or it's not in our national interest or whatever. But it's a completely different thing to question the fundamental science or attack the scientists as the reason why we shouldn't do anything about it."

John Wells, director of the Virginia Institute of Marine Science in Gloucester Point, is assuming a cautious "wait and see" attitude.

"However, I will say it's very disheartening that, in general, science that we do and that a lot of others do in the environmental area, the marine fields, climate change and sea level rise is so heavily politicized. Scientists are not trusted by the political folks in Congress as we were trusted 30, 40 years ago. So I think there's been an overall degradation when evidence-based science is put forward."

VIMS, which is affiliated with William and Mary, was created and still serves as the science adviser to state lawmakers on natural resources management and use.

"Regardless of what happens at the national level and even going forward at the state level, as the administration in the commonwealth changes, we do unbiased science," Wells said. "We are absolutely never, ever going to change the scientific message."

'Winners and losers'

The Chesapeake Bay is at the southern tip of a major zoographic barrier — marking the northern range of many southern species and the southern range of northern ones.

Scientists are working to figure out how the many species and habitats within the region will respond to climate change.

"If it's going to happen," said Mark Luckenbach, an associate dean at VIMS, "there'll be winners and losers."

As waters warm and rise, some native species will migrate out and non-native ones migrate in.

Eelgrass that provides vital habitat for iconic species such as striped bass and blue crab is already being out-performed by warmer-water seagrasses that are less hospitable.

Extreme swings in rainfall and warming waters mean the bay will overdose even more on nutrients in stormwater runoff that fuel harmful algal blooms and dead zones.

As more atmospheric CO2 "sinks" into the bay and its tributaries, the water will grow more acidic, eating away at the shells of oysters and clams.

Native species will face new predators. Already, predatory sea snails called oyster drills, typically more abundant south of here, are moving even farther up the bay.

Chambers at the environmental lab is studying diamondback terrapins — "a species of potential concern because no one really knows how many there are."

One way terrapins respond to warming temperatures is by producing more females than males, which could lead to a change in overall reproduction.

Their life cycle also relies on three distinct habitats: open water, intertidal marsh and uplands.

"What we've been looking at from a sea level rise perspective is the distribution of those sorts of habitats," Chambers said. "And are they going to be sustained or are they going to lose some of those connections."

Students focus on future

Local college students who've been positioning themselves for science or environmental careers are already feeling their own loss of connection.

At VIMS, the associate dean for academic studies met with graduate students a few days after the election to talk through their concerns.

"They focused on the future," said Wells. "Their pathways to becoming scientists that would be engaged and able to find employment."

At the William and Mary Law School, students in the climate change law and policy class had similar concerns.

Carolyn Iwicki has been positioning herself for a career in fisheries science at the National Oceanic and Atmospheric Administration. But Trump says he is planning on a federal hiring freeze.

Fredericks said Trump's intention to downsize the bloated federal workforce through attrition is a smart move for the economy.

"So those that were angling for a career in the federal government, there's going to be likely fewer jobs available," Fredericks said. "And they may have to take a look at their education and rechanneling that" to the private sector.

Iwicki said that on election night she was ready to rechannel to a job posting she found in New Zealand.

"But I decided I'm going to stay, no matter how bad it gets," Iwicki said.

Fellow student Rebecca Ribley concurred.

"Government opportunities seem to not have a clear future," said Ribley. "I still want to do environmental law. But my job just got way harder but way more important."

Professor Lynda Butler had Iwicki, Ribley and her other students came up with ways to respond constructively to the new reality — particularly how to convince Trump that climate change needs attention.

They suggested skipping the science and appealing to the businessman: the entrepreneurial opportunities and jobs in renewable energies and smart infrastructure, and the costs already incurred from severe climate events.

They also suggested posing climate change as a threat to national security and to the nation's standing on the world stage.

'We need their voices'

These students are on the same page as the national and international scientific communities.

On Nov. 14, the American Association for the Advancement of Science held a post-election webinar to discuss the future of science funding and policy. Thousands of scientists, academics, students and journalists from around the world registered for it.

Based in Washington, AAAS is the largest general scientific society in the world and publishes the journal *Science*.

AAAS executive officer Rush Holt said Trump is uninformed on "many things" about climate science, and it's still unclear where he stands on climate change.

"It may well be that if it's presented to him as a matter of dollars and cents," Holt said, "then he would think about it differently than if it is presented as a matter of domestic politics or international politics."

Meanwhile, he said, a Trump administration also poses an "excellent opportunity."

"For young scientists and engineers to engage now in public and with many different audiences to explain what you do," Holt said. "Why it's important for expanding human knowledge and expanding people's lives."

"It's not going to be easy," said Wells at VIMS. "One thing we absolutely must do more of is connecting with the public. We need to make sure the public knows and understands the value of science in their lives. We need their voices. We need all public voices in the conversation going forward."

In terms of restoring the Chesapeake Bay, Chambers said it could be that the progress made so far may have been put on hold for a while.

But, he added, "I am not someone who's just going to give up and say, well, I'm going to move to New Zealand or something."

"I think after we get past this short breathing period," said Chambers, "that resolve will come back and say, 'OK, this is a fight we have to fight again.' And I think a lot of people will take up the charge."