

# SCIENCE UNDER SIEGE

*Uncertainty, hostility and irrelevance are part of daily life for scientists at the US Environmental Protection Agency.*

BY JEFF TOLLEFSON

**T**he day Donald Trump took office as US president, the mood was sombre at the main research campus of the Environmental Protection Agency (EPA) in Durham, North Carolina. As scientists arrived for work, they saw pictures of former president Barack Obama and the previous EPA administrator, Gina McCarthy, coming down off the walls. Researchers had reason to be anxious: Trump had threatened many times during his campaign to shutter the EPA, and he had already taken steps along that path. Weeks before he moved into the White House, Trump had nominated Scott Pruitt to head the agency — a man who had spent his career filing lawsuits to block a variety of EPA regulations.

When Trump put his hand on the Bible to take the oath of office on 20 January 2017, many EPA scientists kept their heads down. They wondered who might be fired first, and they warned each other to censor their e-mails, for fear that the new administration would monitor communications for any comments criticizing it.

Dan Costa wasn't so worried. After nearly 32 years working at the EPA, he had seen the agency weather many political storms, and he had not lost sleep over the prospect of working for Pruitt and Trump. When inauguration day came, Costa streamed Trump's speech on his computer and went straight back to work.

"There was a lot of fear and anticipation, but I figured we would push through it," says Costa, who at the time headed the department's air, climate and energy research programme.

Over the next 18 months, however, Costa would grow increasingly concerned about the Trump administration's impact on the agency. Since assuming power, this administration has launched more assaults on the EPA than on any other science agency. The president has sought to slash its budget by nearly one-third, and Pruitt's team has tried to

weaken the part that science plays in setting environmental regulations. He barred some top researchers from participating in EPA advisory panels, and replaced them with scientists who are more friendly to industry. All of this has elevated the power of corporations to influence the rules that govern chemicals and pollutants.

But what is it like for the more than 1,000 scientists working at the EPA itself? To find out, *Nature* has conducted dozens of interviews over the past year and a half with current and former agency staffers.

The interviews show that day-to-day work has changed little for many EPA researchers. They continue their investigations into everything from ecology and toxicology to hydrology and air quality, in an effort to bolster the scientific foundations for health and environmental regulations.

What has damaged researchers' morale is the endless uncertainty about all aspects of their work, and the thinly veiled hostility from the administration. It's the onslaught of media stories about budget cuts, staff lay-offs and efforts to weaken environmental and health regulations. It's the ever-growing scent of scandal as Pruitt came under media fire for lavish spending with government funds, allegedly using his office to find a lucrative job for his wife, among other potential ethical breaches. Pruitt denied any wrongdoing, but ultimately resigned on 5 July.

What most troubles many EPA scientists is the Trump administration's systematic and unprecedented effort to undermine the way in which science is used by the agency. Scientists there say they and their work have been largely ignored by senior EPA leadership. And despite Pruitt's resignation, few expect the administration's overarching EPA strategy to change once Trump appoints a new administrator. For now, the leadership reins fall to Andrew Wheeler, a former coal lobbyist. In a pair of tweets announcing Pruitt's resignation, Trump said that Wheeler would "continue on with our great and lasting EPA agenda".



Dan Costa was a scientist at the Environmental Protection Agency for more than 32 years.

KAVANA SZYMCAK FOR NATURE

Many researchers say that this strategy could subvert the scientific process altogether and put tens of thousands of lives at risk each year, as a result of weakened regulations on pollutants and potentially hazardous chemicals.

The turmoil has affected everyone. Most have kept their heads down, hoping that science will somehow prevail. Many have censored their own language, shunning words such as ‘climate’ or ‘global warming’ to avoid attention. Some have delayed retirement to keep the agency functioning. Others have quit.

“There’s a lot of fear, a lot of angst and anxiety, and employees don’t know what to do,” says Kyla Bennett, director of science policy at the environmental organization Public Employees for Environmental Responsibility (PEER) in North Easton, Massachusetts. PEER works directly with many government whistle-blowers. “This is unlike anything we’ve ever seen,” Bennett says.

Costa has watched the situation deteriorate. As he tried to carry on his own work, his mood grew darker and more philosophical. Eventually, he realized he had to leave. “They are acting with such impunity, and with no accountability,” he says of the administration. “It’s just unfortunate, and scary.”

### THE FIRST 100 DAYS

At the beginning of Trump’s presidency, Costa’s long history with the agency helped him to cope. A toxicologist by training, he joined the EPA in 1985 under president Ronald Reagan, looking at the physiological effects of pollutants. He arrived shortly after the tenure of Anne Gorsuch, a staunchly conservative administrator — much like Pruitt — who had slashed budgets and weakened environmental protections during her time heading the EPA from 1981 to 1983. Yet Costa watched the agency

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slowly bounce back.

That episode served as a reminder that the institution is larger than any individual, Costa told *Nature* in early March 2017, during one of a series of interviews initially conducted off the record because he didn’t have permission to talk to the press. He later agreed to bring the entire series on the record.

At the time, stories were swirling in the media about censorship and looming budget cuts. Costa said that much of it was probably true, but he also stated that such stories can grow out of proportion. “It’s not like there are memos coming down. It’s just rumours,” he said about talk of censorship. “And in the absence of good information, it’s easy for people to create their own demons.” Younger scientists had been coming to him for advice, asking whether they should start looking for jobs, and his advice was simple: don’t panic.

The Trump administration soon made its intentions clear. On 16 March 2017, it released a proposal to slash the EPA’s US\$8.2-billion budget by 31% and eliminate some 3,200 of the agency’s 15,000 positions.

Among the hardest hit in the budget proposal was the division where Costa and some 1,100 other scientists worked: the Office of Research and Development (ORD). As the main science arm of the agency, the ORD has helped to lay the technical foundation for modern environmental regulation in the United States. The Trump administration

had proposed nearly halving its budget from, \$483 million to \$250 million, which left scientists there stunned.

“Management at all levels are trying to reassure employees, but you can’t help but worry,” Lesley Mills told *Nature* at the time. “These are people who are dedicated to public service, and they feel like they are being treated as an enemy,” said Mills, an EPA biologist in Narragansett, Rhode Island, and a union representative.

She and others knew that the planned cuts might never happen. Congress has authority over the budget in the United States and often decides to override presidents’ budget requests. And legislators — including many important Republicans — were unusually sceptical about Trump’s first proposal. Ignoring the administration’s calls for sharp cuts to EPA, on 30 April the Republican-controlled Congress approved a relatively mild reduction of 1% for the remainder of the 2017 fiscal year.

It felt like a triumph for many scientists, but Costa was already beginning to change his tone. When he attended an inaugural March for Science event in April in Raleigh, two EPA scientists with him instinctively ducked and threw their hands up to hide their faces when a news photographer approached. They told him that they didn’t want to encounter questions later from political leadership at the agency.

Costa also found himself encouraging one promising young postdoc to apply for a position elsewhere, because he thought EPA jobs were unlikely to open up in the next few years. He knew of managers who had told younger scientists to take the word ‘climate’ out of document headlines. “That sends all sorts of ripples through the organization,” he said in May 2017.

At the same time, Costa was making his own changes. He was quietly trying to expand the air, climate and energy research programme that he ran to advance a new line of science, protect his team and avoid attention from higher authorities at the agency. As he sat in meetings and drafted reports, he talked increasingly about public health and wildfire smoke rather than just the industrial air pollutants that his programme had historically focused on. Costa described the proposed shift in scientific focus as a positive change that would define a useful agenda for his programme without limiting the science that it could pursue, in part because climate change, air quality and public health are all interrelated.

“I don’t want to sit back and wait” for any restrictions to be imposed by political leaders at the agency, Costa said. “I want to occupy the space before they do, because they are essentially clueless.”

#### A GROWING RIFT: SUMMER 2017

All the while, Pruitt was busy trying to roll back environmental regulations put in place by Obama — including regulations that Pruitt had challenged while serving as Oklahoma attorney-general. On 28 March, Trump authorized Pruitt to repeal landmark regulations intended to curb greenhouse-gas emissions from existing power plants. The next day, Pruitt declined to ban a powerful pesticide called chlorpyrifos, overruling agency scientists who had previously determined that the chemical had negative impacts on brain development in children (see [go.nature.com/2n7pofa](http://go.nature.com/2n7pofa)).

What alarmed scientists about these and other actions was not so much that Pruitt and Trump were moving in a different political direction from the Obama administration; government scientists are used to that. But under previous administrations, regardless of political stripe, there was at least some deference paid to scientists.

That all changed with Trump. Pruitt and his senior political



EPA administrator Scott Pruitt resigned on 5 July.

appointees — often dubbed the “politicals” — rarely consult with career scientists. In many cases, scientists were left dumbfounded, in part because the complete lack of consultation with agency experts could end up hurting Pruitt’s own agenda. By bypassing EPA scientists and ignoring their findings, his team ran the risk of weakening the EPA’s defence in the many lawsuits that states and environmental groups were filing against the agency.

“The politicals literally do not talk to the career people,” says one senior scientist. That researcher and nearly all active EPA staff interviewed for this story sought anonymity because they were not authorized to talk to the press. “They just do what they want, and then they inform us,” says the senior researcher.

In an effort to cope with the new reality, another senior official said, career scientists looked for areas of common ground with the leadership and, in a curious dance, both sides tiptoed around the issue of climate change. “It’s like Voldemort — he who shall not be named,” the official said in mid-2017.

“There are weeks when everyone in the office is just chugging along like normal,” says one mid-level scientist. Inevitably a scandal arises, he continued, “and then for a day or two you feel like you are in a fog”.

Although they carry on with their work, many scientists feel as if their efforts don’t matter to the top of the agency. Within the Office of Research and Development, exchanges with senior EPA leadership nearly always go through an intermediary: Richard Yamada. Yamada, deputy assistant administrator of the office, was willing to communicate ideas up the chain, according to multiple scientists, but he often seemed adrift on technical or scientific issues.

Yamada asked such odd questions during one video conference that researchers in the meeting found themselves looking at each other in confusion. “You go into these briefings, and you have no idea what the questions are going to be.” (The EPA did not grant *Nature*’s request to speak to Yamada and has not responded to multiple requests for comment on the allegations in this article.)

The rift between the scientists and EPA leadership was fully exposed in late July 2017, when news broke that Pruitt’s team was circulating a list of names of climate sceptics. Many assumed the EPA was looking for sceptics to participate in a proposed debate about the validity of

climate science or, potentially, for appointments to science-advisory positions. The proposal came as the EPA was conducting a technical review of a government assessment of current climate science. People from both inside and outside the agency had raised concerns about whether Pruitt — who as recently as four months earlier had questioned the scientific consensus on climate change — and his political appointees would meddle with the document.

Pruitt's team eventually let the scientific assessment move forward. Costa and others gave the agency credit for that decision. "They have the authority to slow these assessments down or stop them, if they want," he said at the time. "In spite of all of the rhetoric, it's going through a reasonably normal process."

For Costa, it was evidence that in many senses, the EPA's leadership doesn't really care about what scientists do — unless and until it gets in the way of Trump's agenda to roll back regulations on industry. But as it turned out, the administration was just getting started.

### TENSIONS GROW: AUTUMN 2017

On 31 October — Halloween, no less — Pruitt dropped a bombshell on the scientific community in the United States. He announced that scientists with active EPA grants would be banned from serving on the agency's main science advisory board (SAB) or on a separate committee focused on air regulations. Such committees provide peer review of the science underlying most EPA regulations; Pruitt's decision prevents some of the nation's top environmental scientists from taking part in that process.

Pruitt justified his action with a damning charge: research grants provided by the EPA, he said, could bias scientists and the advice they give to the agency. Scientists were shocked because this policy stands in sharp contrast to those of other science agencies, such as the National Institutes of Health, and also because researchers with industry support were not similarly barred from EPA advisory boards. The surprises didn't end there. Pruitt also called for limiting the tenure of board members, which would force even more scientists to cycle off the board. Pruitt would thus get to select replacements more quickly.

As a result, 18 of the 44 members of the science advisory board are now Pruitt appointees. By the end of September, Trump's team at the EPA will have appointed roughly two-thirds of the council, says Christopher Zarba, who until his retirement in February managed the board's activities at the EPA. Many fear the board will increasingly hew to the desires of powerful interests involved in everything from chemicals to energy and manufacturing.

Perhaps most significantly, Pruitt selected Michael Honeycutt to chair the SAB. Honeycutt is a toxicologist with the Texas Commission on Environmental Quality in Austin, Texas, who has long opposed stricter air-quality standards. (Honeycutt told *Nature* that he hopes he will be judged on the basis of the job he does as the chair of the board.) And Pruitt appointed Tony Cox, an industry-friendly consultant who has challenged scientific studies linking air pollution and human mortality, to lead the Clean Air Science Advisory Committee (CASAC). By statute, that group must review the science before the agency updates its core air-quality standards.

By the time of those appointments, Costa was already growing weary of the attacks on science, but he still saw room to do some good by reorienting his programme. Costa had long lobbied to focus more research on wildfires because they contribute a large fraction of the fine-particulate pollution across the country, he says. The agency, however, had devoted its resources for decades to tackling industrial air pollution.

With Trump and Pruitt in office, Costa thought the time was right to give his programme a new mission by including a focus on wildfires. In early December, the air-quality regulatory division — the primary customer for the air-research programme — informally endorsed Costa's new research agenda. With that small victory, Costa, who was 69 at the time, decided it was time to leave.

"I certainly didn't want to be a rat jumping ship," he said. But with five children, five grandchildren, a new riding lawnmower and a sudden dedication to science activism, Costa has more than enough to keep

himself busy on the outside. "I just didn't think I would do well in the current atmosphere."

On 5 January, two weeks before Trump celebrated his first year in the White House, Costa went into the EPA one last time. His co-workers had already thrown him a party — complete with a Beatles-themed musical skit. As the end of his final day, Costa packed up the remaining boxes, turned in his parking pass and headed home.

### PRUITT RESIGNS: SPRING 2018

Over the ensuing months, more news emerged about Pruitt's alleged ethical transgressions. There were investigations, congressional hearings and endless speculation about how long the embattled administrator could retain the favour of his mercurial White House boss. In the end, Pruitt would stay on for another six months — and drop yet another bomb on scientists at the agency.

On 24 April, Pruitt announced a proposal that would prevent the EPA from using any research in its regulatory decisions unless the underlying data and methods are publicly available. He did so in the name of transparency, but scientists and other experts immediately fought back.

The problem, they said, is that privacy restrictions — such as ones governing medical records — often limit the data that can be released from epidemiological studies, to protect patients' identities. Pruitt's proposal could therefore eliminate much of the core epidemiological research that the EPA has used to help justify air-quality regulations. It was, in their view, just another effort to prevent the agency from developing meaningful health and environmental regulations. In one analysis released in April, a group of former EPA officials found that Pruitt's policy, if implemented two decades ago, could have precluded regulations that now prevent some 50,000 deaths each year from air pollution (see [go.nature.com/2zmrmgt](http://go.nature.com/2zmrmgt)).

When the news broke, Costa was so incensed that he reached out to *Nature* from retirement. "Keep your eyes on this: it's an IED [improvised

explosive device] designed and set to destroy the agency's ability to do its job," Costa wrote in a text message. Pruitt, he continued, "is a slick bastard".

A day after the rule was announced, a poster of Pruitt signing the rule, with grand proclamations about transparency in science, appeared at the entrance of the ORD's main

building in central Washington DC. For many scientists, it was yet another insult.

"That poster said, 'I've got you, and there's not a damn thing you can do about it,'" says the senior scientist at the EPA. "They are making sure that we understand that there's a new sheriff in town."

For his part, Costa says he doesn't have any regrets. He is enjoying the summer in a remote stretch of coastal Rhode Island, where he used to spend time during his youth. But clearly he hasn't let go — in part, perhaps, because he still doesn't know how the story will end. "The light at the end of the tunnel just doesn't seem to be there," he said in late May.

When the news of Pruitt's departure came down on 5 July, Costa was dawdling in the garage. His wife ran out of the house to tell him and his mobile phone lit up with texts from friends, family and former colleagues at the EPA. Costa was relieved, if not surprised. Looking forward, he hopes that Wheeler — who spent four years at the agency in the early 1990s — will not be so quick to ignore science and scientists, even if he does toe the Trump line.

And after a few recent conversations with former staff members, Costa seems newly encouraged that they will keep the embers burning until the political winds shift again and sweep away Trump's team. "In some senses, I think of it like the locusts," he says. "They come, they wipe out the crops and then they leave." ■

Jeff Tollefson reports for *Nature* from New York.