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Union of Concerned Scientists
U.S. House Committee on Science, Space, and Technology
Subcommittee on Investigations & Oversight Hearing

"Brain Drain: Rebuilding the Federal Scientific Workforce"

March 17, 2021

Thank you, Chairman Foster, Ranking Member Obernolte, and Members of the Subcommittee for holding this important hearing on the loss of scientific capacity in the federal workforce. My name is Dr. Andrew Rosenberg, and I am the Director of the Center for Science and Democracy at the Union of Concerned Scientists. I appreciate the opportunity to testify before you today.

My experience spans more than 30 years in government service, academia, private sector consulting, and nonprofit leadership. I have authored more than 110 peer-reviewed papers and co-authored numerous national and international scientific reports, including the National Climate Assessment, the World Ocean Assessment, and the report of the US Commission on Ocean Policy. Prior to my time at UCS, I served as the Deputy Director of the National Marine Fisheries Service (NMFS) within the National Oceanic and Atmospheric Association (NOAA), a role I held under both Democratic and Republican administrations. Subsequently, I was Dean of Life Sciences and Agriculture and Professor of Natural Resources at the University of New Hampshire.

I am here today on behalf of the Union of Concerned Scientists. UCS is a non-partisan, national nonprofit organization that seeks to advance science-based solutions to our world's most pressing problems. Our staff includes scientists, engineers, economists, analysts, and advocates, and we are backed by a network of more than half-million supporters and our extensive Science Network, comprised of 25,000 scientists and experts across the country. For more than 50 years, UCS has championed the need to ground governmental decisions in the best science available.

Since 2012, I have led UCS's Center for Science and Democracy in its efforts to advance the role of science in public policy. We work to ensure that policymakers and the public have access to the independent science needed to make informed decisions about public health, safety, and the environment. We also train scientists to be engaged in public policy issues, from climate change to environmental justice.

Why Federal Science Matters

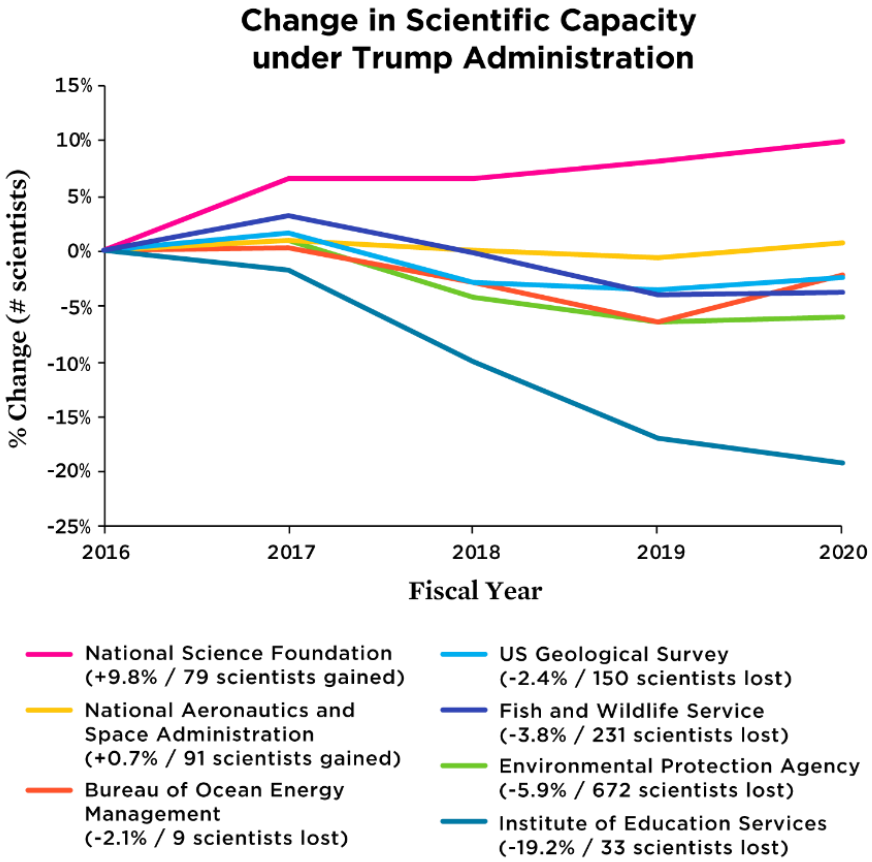
At NOAA, UNH, and at UCS, I have witnessed firsthand how vital U.S. federal agencies and their scientists are to the well-being of Americans and our democracy. Whether they are studying the impact of climate change on the nation's food supply, forecasting and preparing for natural disasters, or fighting the spread of COVID-19, federal scientists are on the cutting edge of our nation's capability to respond to society's needs.

Of course, not all science is done or funded by federal agencies, but federal science and funding undergirds much of the basic research that enables scientific discovery and innovation. With the solid groundwork of federal science, innovation from the federal workforce, academia, state and tribal scientists, and the private sector can flourish.

No matter the science-based agency, from the Defense Department to NASA to the Department of Agriculture, the groundwork depends on a strong, continuously renewed scientific workforce. This will enable these experts to do what they do best: protect public health and safety, strengthen national security, build the economy of the future, and serve the American people.

Scientific Capacity Declines in Federal Agencies

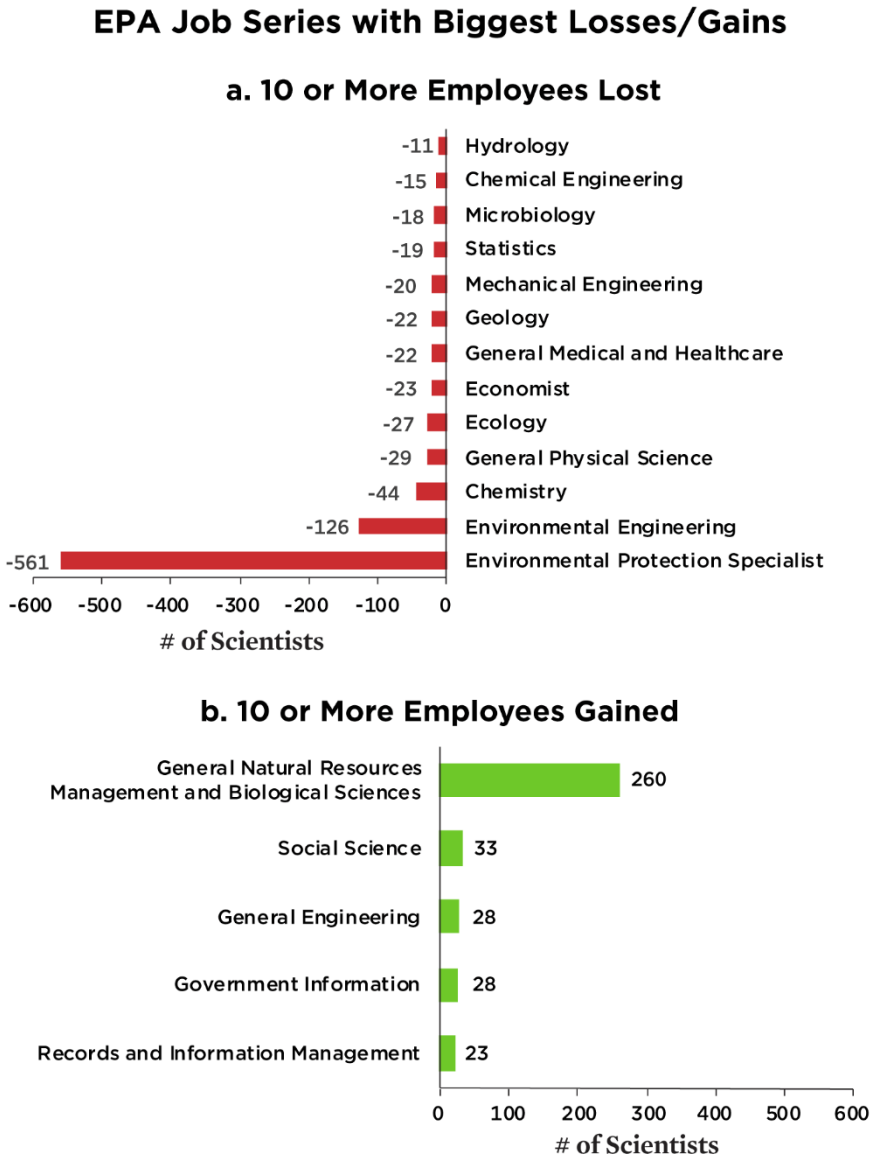
The last four years have seen a significant reduction in the scientific workforce at many federal agencies. Earlier this year, UCS released a report, *The Federal Brain Drain,*[1] that examines changes in scientific capacity during the Trump administration, and the impacts of those changes on federal agencies. This report, led by Dr. Jacob Carter, Taryn MacKinney, and Dr. Gretchen Goldman, found that five of the seven agencies we analyzed collectively lost more than 1,000 scientific staff. For example, the Fish and Wildlife Service lost nearly 4% of its scientists—some 230 staff. Even small agencies saw big losses: The Department of Education's research branch, the Institute of Education Services, lost 33 scientific staff—a staggering 19% decline.



Few agencies fared worse than the Environmental Protection Agency (EPA). Between 2016 and 2020, the EPA lost nearly 6% of its scientific workforce—more than 670 staff. This includes more than 550 environmental protection specialists—1 in 4. These specialists implement air and water quality programs and track environmental law violations, tasks that the last administration spurned.

[1] Carter, J., T. MacKinney, and G. Goldman. 2021. The Federal Brain Drain: Impacts on Science Capacity, 2016-2020. Cambridge, MA: Union of Concerned Scientists. https://www.ucsusa.org/resources/federal-brain-drain.

The EPA lost hundreds of highly specialized scientists, too. For example, environmental engineers work to prevent pollution and protect public health; the EPA lost 126 of them. 11 hydrologists, 22 geologists, and 19 statisticians were also lost—about a third of jobs in each category—as were 1 in 10 chemists, 1 in 5 ecologists, and nearly 1 in 4 microbiologists.



Every single one of the EPA's regional offices lost scientific staff, especially offices in the West, Southwest, Great Plains, and Midwest. At the same time, some fellowship programs, such as the EPA's Science To Achieve Results (STAR) program, were cut. This reduced funding for graduate students and shrank opportunities for early-career scientists to gain experience at federal agencies—both critical to attracting bright young scientists to the federal workforce.

For some agencies, growth stagnated. The Centers for Disease Control (CDC) has consistently gained scientific staff since 1995. In terms of net scientific staff, it saw losses only twice in 25 years, once in 2006, when it lost 63 staff, and once in 2013, when it lost 5. But for the first three years of the Trump

administration, it lost 187 scientific staff, a loss of 2.2%. It grew by a meager 4.4% in 2020, when the pandemic began; by comparison, CDC scientific capacity grew by 31% during President Obama's first term.

The work of scientists across the government, from health experts at the CDC to engineers at the EPA, has direct impacts on the American people, so a loss of scientists means a loss of research, and slower progress on critical health and safety issues. Without the experts, the science we rely on for clean water, breathable air, a livable climate, and safe homes, schools, and communities can erode.

Federal Scientists Survey Results

The numbers from the *Federal Brain Drain* report validate what many civil servants have long witnessed: the decline of federal science. In addition to analyzing the changes in scientific capacity, we also tracked more than 190 instances of attacks on science[2] during the Trump administration, from suppressing reports on climate change to sidelining public health experts during the pandemic. These attacks far outnumber the 22 attacks we tracked during the Obama administration and 98 during the Bush administration. Stories abound of scientists being ignored, defunded, and pushed out of their positions.

Survey data from federal scientists confirm this. Since 2005, UCS has partnered with the Center for Survey Statistics and Methodology (CSSM) at Iowa State University to periodically survey thousands of scientists across federal agencies. In each of our surveys, we ask scientists about workplace morale, scientific integrity policies, and more. When we surveyed more than 4,000 federal scientists in 2018,[3] nearly 80% of respondents said they noticed workforce reductions due to staff departures, hiring freezes, or retirement buyouts. Of these scientists, nearly 90% reported that these losses made it difficult to fulfill their agency's science-based missions.

Many respondents reported decreased job effectiveness and satisfaction, too. Across all agencies, nearly 40% of responding scientists reported that the effectiveness of their division or office had decreased over the past year, while only 15% reported an increase. And at the EPA, fewer than 15% of surveyed scientists reported their morale as excellent or good.

Given the range of problems described by federal scientists—including workforce cuts, censorship and self-censorship, political interference, and undue industry influence—these declines in morale and effectiveness may not be surprising, but they should disturb anyone who believes that government science has a crucial role to play in making the United States a safer, healthier nation. When science is politically manipulated or suppressed, or scientists are censored or sidelined in the policy-making process, senior scientists may leave government and early-career scientists may rethink their careers. This is not just unfortunate, but also dangerous: the public deserves, indeed requires, access to vital scientific information.

When Science and Scientific Leadership are Sidelined

The consequences of undermining science can be serious. One such example, known as "Sharpiegate," took place during a time of national emergency, as a Category 5 hurricane neared the US coast. After then-President Trump made false claims about the path of the hurricane, federal scientists rightly

[2] Union of Concerned Scientists (UCS). 2017a. "Attacks on science." Reports & multimedia: Feature, January 20. www.ucsusa.org/resources/attacks-on-science.

[3] Carter, J. 2018. The good, the bad, and the ugly: The results of our 2018 Federal Scientists Survey. The Equation. Cambridge, MA: Union of Concerned Scientists. Blog, August 14. https://blog.ucsusa.org/jacob-carter/the-good-the-bad-and-the-ugly-theresults-of-our-2018-federal-scientists-survey.

provided the correct information to the public—and were censored by political officials and threatened with losing their jobs for contradicting the president. These political officials' actions were unlawful, diverted resources from hurricane efforts, and caused public confusion and panic. As this incident demonstrates, preventing federal scientists from providing needed scientific information to the public can endanger people's lives in times of crisis.

Scientific leadership matters, too. All modern presidents and their appointees at federal agencies have relied on scientific advice from entities such as the presidential Science Advisor, the White House Office of Science and Technology Policy (OSTP), the President's Council of Advisors on Science and Technology (PCAST), and advisory committees within federal agencies. In its first year, the Trump administration filled only 20 of the 83 government posts that the National Academies of Science designate as "scientist appointees."[4] At the same point in their respective administrations, President Barack Obama had filled 63 such positions and President George W. Bush had filled 51. The Trump administration also left the critical position of presidential science advisor vacant for almost two years.

President Biden named his nominee for presidential Science Advisor and Director of OSTP before his inauguration and, in a historic first, elevated the role to a Cabinet-level position. In doing so, the Biden administration sent a clear signal that scientific expertise matters.

Scientific Integrity and Revitalizing the Federal Scientific Workforce

Science must be at the forefront of decision-making in government agencies, and agencies must have policies that embody this. Federal scientists work for the public, and they need to be able to conduct research on behalf of the public without fearing that they will become political targets. They must be able to communicate openly and honestly—to the scientific community, the press, and the public—about the threats we face and potential solutions. Political appointees must be prevented from altering or suppressing scientific findings. Federal scientists should be able to follow their research wherever it leads, incorporating scientific evidence on pressing issues like climate change and making decisions that help communities, particularly the most vulnerable. Agencies should implement policies designed to build diversity and reduce racial inequities in civil service. The scientific workforce of the country is drawn from and speaks to everyone in the country, and the public must identify with and trust the messengers as well as the message.

Fortunately, we have already seen progress toward achieving this vision. Since 2011, 24 federal agencies have developed scientific integrity policies, many of which provide the protections necessary to foster a culture of scientific integrity at federal agencies.[5]

In January, the Biden administration issued a memorandum on *restoring trust at government agencies through scientific integrity and evidence-based policy making*—reaffirming and building upon steps initially taken by the Obama administration.[6] President Biden's directive helps ensure that the public

[4] Reed, G., S. Shulman, P. Hansel, and G. Goldman. 2018. Abandoning Science Advice: One Year in, the Trump Administration Is Sidelining Science Advisory Committees. Cambridge, MA: Union of Concerned Scientists. https://www.ucsusa.org/sites/default/files/attach/2018/01/abandoning-science-advice-full-report.pdf.
[5] Goldman, G.T., E. Berman, M. Halpern, C. Johnson, Y. Kothari, G. Reed, and A.A. Rosenberg. 2017. Ensuring scientific integrity in the age of Trump. Science, 355(6326): 696-698, March 9. https://science.sciencemag.org/content/355/6326/696.
[6] Biden, J.R. 2021. Memorandum for the Heads of Executive Departments and Agencies, Subject: Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking. Memo, January 27.

benefits from the best independent science and that federal agencies craft smart, effective public health, safety, and environmental protections based on that science.

The presidential memorandum is an important step forward, but there is more that Congress can and should do to protect federal scientists. Last month, Representative Paul Tonko (D-NY) re-introduced the Scientific Integrity Act, which, if passed, would help to ensure that the public benefits from the best available federal science, from food safety to weather monitoring to medical research.

With the support and resources of the Biden administration and champions for scientific integrity in the House and Senate, including Representative Tonko, Senator Schatz (D-HI), and the Members of this committee, the process of revitalizing the federal scientific workforce can be carried out. Agency officials must take further steps to implement policies designed to build diversity and reduce racial inequities in civil service. Having a federal workforce that reflects the diversity of the country is as important now as it ever was—and so is returning science to its essential role across government in service of the public good.

Policy Solutions

The Union of Concerned Scientists has long advocated for a strong and well-resourced federal scientific workforce. It is not enough to just restore the federal scientific workforce of previous administrations; we now have an opportunity to modernize it, as well. Career opportunities, lifestyles and expectations have changed rapidly since I was a civil servant. As a nation, we train hundreds of thousands of young professionals in STEM fields coming from every community in the country. We need their talent and passion, but we need to meet their needs, too.

The Biden administration and Congress should work to build and strengthen scientific capacity beyond pre-2017 levels, diversify the scientific workforce, and revitalize the pipeline that brings early-career scientists into civil service.

UCS recommends that Congress and the Biden administration:

- **Increase the number of early-career scientists entering the federal government by strengthening scientific fellowship programs.** This could include, for example, reinstating the STEM-specific track of the Presidential Management Fellowship program. Early-career fellowships and student grants already exist in some federal programs, (e.g., STAR, Sea Grant, Oak Ridge Institute for Science and Education). The Biden administration should consider funding fellowships that tackle other science-related issues, such as climate change or equity and environmental justice. To diversify the workforce, agencies must also ensure that compensation, resources, and benefits for fellows are sufficient for those with economic challenges, not just the privileged few.

- **Support increases in scientific capacity through the White House science and technology budget, which sets the administration's priorities for federal research and development, and congressional appropriations.** Committees should provide agencies with the funding they need to revitalize their scientific workforces. This needs to be a concerted effort, for recruitment, training, mentorship, fellowships, and other needs.

https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/memorandum-on-restoring-trust-in-government-through-scientific-integrity-and-evidence-based-policymaking/.

- **Strengthen the scientific workforce with both recruitment and rehiring strategies.** Reaching scientific capacity quickly will require not only recruiting and hiring to fill vacancies, but also reengaging with those who have retired from federal service, to regain lost knowledge, experience, and expertise. Rehiring or contracting with some of the federal scientists who left or were forced out of civil service, along with recruiting early-career scientists, will build competency more quickly, restore institutional knowledge, and enable a system of mentorship of early-career staff.

- **Increase public access to information and training on applying for federal positions and modernize the recruitment website USAJobs.gov.** Every effort should be made to provide such information to communities that have historically been underrepresented in federal scientific positions—for example, by hosting events at Historically Black Colleges and Universities (HBCUs) and Tribal Colleges (TCUs). Recruitment for the federal scientific workforce must reach new audiences and counteract the tendency for hiring managers to recruit from a small, known set of institutions again and again. Many federal scientists work all around the country in regional laboratories, national centers of excellence, national laboratories, and field stations. Providing greater understanding of the opportunities available to early-career scientists is as important as simply posting job openings more broadly. The USAJobs website is dated and convoluted, while the private sector has advanced its recruiting tools substantially. The Biden administration can and should learn from the private and nonprofit sector about recruiting tools.

- **Make diversifying the federal scientific workforce a priority.** Efforts should be made to ensure that scientific career opportunities throughout the federal government, including in agencies and scientific advisory committees, are accessible to experts from various backgrounds and particularly for those that have historically been underrepresented in federal scientific positions. Recruitment, including job fairs and other techniques, must target at a wider array of institutions than in the past and account for historical disparities in recruitment and hiring. Agencies must learn to work effectively with institutions unaccustomed to steering students towards civil service.

- **Train mid-career and senior-level scientists to effectively mentor early-career staff.** Federal agencies should implement and increase such trainings if they already exist and develop them if they do not. Effective leadership and mentoring is not necessarily accomplished by the scientists who publish the most papers or have been in service the longest. These are learned skills critical for the effectiveness of any enterprise and must be approached that way.

- **Allow scientists to work with government in new ways.** More extensively utilize programs for rotating assignments or remote work, allowing scientists to work for government in many ways. Young scientists today are used to changing jobs or even career paths more frequently than my generation, so the civil service of the future must evolve accordingly.

- **Codify scientific integrity policies in law and require that all agencies implement and enforce them.** This will help restore independent science to its rightful place at the heart of government decision-making.

Conclusion

It is critical that Congress and the Biden administration work to strengthen the scientific capacity of our federal agencies. We must ensure that scientific agencies have the capacity needed to meet their missions, that federal scientists are protected from intimidation and political interference, and that science opportunities in government are accessible to the public—especially members of communities that have historically been underrepresented in federal scientific positions. Bringing the experts back to government will ensure that science can protect our environment, keep the public safe, and foster a healthier future for all.

Chairman Foster, Ranking Member Obernolte, and Members of the Committee, I appreciate the opportunity to testify before this Committee to share my views and I am happy to answer any questions.