

Getting Science Back on Track

Voices of Scientists across Six Federal Agencies

HIGHLIGHTS

To protect the public's safety and health, the US government should base policies on the best available evidence—and that requires keeping the work of federal scientists free from political interference. Fortunately, the latest Union of Concerned Scientists survey of federal scientists shows the powerful, positive effects of strengthening scientific integrity policies under President Biden. While challenges remain, the survey found improvements in scientific integrity over previous administrations, and scientists say morale and working conditions are better. A majority of those surveyed feel that their agencies have protected scientific staff from COVID-19 in the workplace, and that the agencies frequently consider the impact of their work on historically marginalized communities. Scientists report feeling mostly positive about efforts to incorporate considerations of justice, equity, diversity, and inclusion into research and policy, although perceptions are mixed about the efforts' long-lasting effectiveness.

Immediately upon becoming president in January 2021, Joseph Biden stated that “science will always be at the forefront of my administration,” pledging to do better than his predecessor (Berger 2021). Since then, the Biden administration has made progress on this pledge, particularly when it comes to protecting scientists and their work from undue political interference.

President Biden quickly signed a memorandum to restore trust in evidence-based decisionmaking through strengthening scientific integrity (Executive Office of the President 2021a). The memo required all agencies to appoint scientific integrity officers, established a taskforce to review scientific integrity progress and problems at agencies, and charged the taskforce with developing a framework to serve as a basis for agencies to update existing scientific integrity policies. Moreover, the administration has pledged to address long-standing injustices facing underserved communities across the nation, with commitments that surpass those of any prior administration in modern history (Executive Office of the President 2021b; 2021c).

Strengthening scientific integrity can lead to better outcomes for communities, including stronger health and safety protections, better-managed natural resources, and stronger action in response to climate change. Science-based decisionmaking can also help counteract the implicit bias and systemic racism in policymaking decisions that have unjustly burdened historically marginalized communities. For decades, Black, Indigenous, people of color (BIPOC), low-income, and rural communities have borne the disproportionate effects of air pollution, hazardous chemicals, contaminated drinking water, and other environmental hazards.

As the COVID-19 pandemic has made clear, people's very lives depend on the ability of federal agencies to use the best available science to inform decisionmaking. Therefore, protecting public health and the environment requires federal agencies to maintain a high standard of scientific integrity. Yet political officials can—and do—inappropriately interfere with federal science and science-based decisionmaking. At least since Dwight Eisenhower, the administrations of every president—Democratic and Republican—have sidelined science and violated scientific integrity to advance political agendas (Berman and Carter 2018). While the details vary, every administration has used a remarkably consistent set of tactics to attack science: halting, editing, or suppressing scientific studies; rolling back the collection or accessibility of data; issuing rules, regulations, or orders that fail to consider science in processes that would normally require it; politicizing grantmaking and funding; restricting federal scientists from attending scientific conferences; and sidelining scientific advisory committees.

That said, attacks on science often differ in frequency, scope, and impact. The Union of Concerned Scientists (UCS) documented 98 attacks on science during the eight years of the George W. Bush administration and 19 under the Obama administration (UCS 2022). During President Trump’s four years in office, UCS documented 206 attacks on science (Desikan et al. 2023; UCS 2022).

Has the Biden administration lived up to its promise to always follow the science? It can be difficult to assess in real time the commitment of federal agencies to a high standard of scientific integrity. Scores of reports and articles address the administration’s efforts on scientific integrity, evidence-based decisionmaking, and justice, equity, diversity, and inclusion (JEDI). Yet those reports do not address two key questions. How do scientists working for the federal government perceive this administration’s record on these issues? And how do their views mesh with or contradict the findings of investigators and journalists?

Since 2004, UCS has surveyed federal scientists periodically on issues related to scientific integrity, workplace morale, staff capacity, whistleblower protections, and the like (Goldman et al. 2020). In September and October 2022, we distributed the tenth survey to more than 46,000 scientists at six agencies: the Centers for Disease Control and Prevention (CDC), Environmental Protection Agency (EPA), Food and Drug Administration (FDA), US Fish and Wildlife Service (FWS), National Oceanic and Atmospheric Administration (NOAA), and US Department of Agriculture (USDA).

The results indicate that federal scientists had mostly positive perceptions both of their agencies and of the Biden administration’s efforts to restore science in decisionmaking processes. They reported much higher levels of morale, effectiveness of their offices, and job satisfaction than scientists did during the George W. Bush, Obama, or Trump administrations. A majority of the scientists responding to the new survey also felt that their agencies protected scientific staff from COVID-19, and that the agencies frequently considered the impacts of their scientific and policy activities on historically marginalized communities.

Nevertheless, a number of challenges persist. A lack of staff capacity was a major concern: federal scientists identified limited staff as the main cause of burnout among their colleagues and as one of the greatest barriers to science-based decisionmaking at their agencies. While survey respondents felt mostly positive about the Biden administration’s efforts to incorporate JEDI considerations into scientific research and policy actions, perceptions were mixed about the long-lasting effectiveness of such efforts. A fair number of scientists perceived a continuing lack of diversity in their workforces, leadership, and advisory committees. And survey respondents held mixed perceptions about

the degree of censorship, the ability to communicate their scientific work, and interference from political or business interests in science-based decisionmaking.

Comparing Perceptions of Scientific Integrity across Four Presidential Administrations

The previous UCS survey, conducted in 2018, yielded startling results (Carter, Goldman, and Johnson 2018). Reports of political interference were widespread and constant. Under the Trump administration, federal scientists reported that political appointees and the White House stood as the greatest barriers to both protecting public health and responding to environmental threats. Many scientists feared speaking up when they witnessed scientific integrity violations, felt the need to censor themselves from expressing science-based terms such as climate change, and reported that their work environments were not conducive to fulfilling agencies’ science-based missions.

In 2022, many federal scientists, in their responses to the survey’s open-ended questions, reflected further on the four years of the Trump administration. Several scientists painted harrowing pictures of an administration openly hostile to science, and many feared that a future administration would do the same. One FWS scientist wrote, “There was a lot of damage done by the Trump administration . . . gutting programs, thwarting or removing scientists, and subverting missions. It will take many years to just get back to where we were, and there is a constant fear that it can all be demolished again if a similarly bent administration comes to power.”

The 2018 respondents had also reported a loss of critical expertise and capacity due to early retirements, sustained hiring freezes, and other reasons scientists left the federal workforce. A follow-up UCS analysis of staffing data in January 2021 confirmed the reports of enormous workforce reductions at agencies (Carter, MacKinney, and Goldman 2021). For instance, the EPA lost an average of about 219 scientists per year between 2016 and 2020. The EPA’s Office of Research and Development, the agency’s scientific research arm, was hit particularly hard, losing 12 percent of its workforce during that timeframe.

Against that background, one of the most prominent trends to emerge in 2022 was how positively respondents perceived scientific integrity and their workplace culture at the six agencies—the CDC, the EPA, the FDA, the FWS, NOAA, and the USDA—compared with how scientists responded in earlier UCS surveys. The scientists reported increases in morale, personal job satisfaction, and the effectiveness of their offices and divisions under the Biden administration compared with those of the George W. Bush, Obama, and Trump administrations.

This was particularly the case when we compared results from the 2018 survey, conducted just over a year into the Trump administration, with results from the 2022 survey,

conducted just over a year and a half into the Biden administration. Between 2018 and 2022, the largest reported increases in morale, job satisfaction, and effectiveness occurred at the EPA, the FWS, and the USDA. For example, only 5 percent of those surveyed in 2018 (22 respondents) at the EPA perceived that the effectiveness of their office or division had increased compared to the prior two years; 51 percent (150 respondents) surveyed in 2022 perceived an increase (Figure 1).

Also between 2018 and 2022, CDC respondents reported modest improvements; little changed in the results from the FDA and NOAA. In 2018, UCS had observed that, when scientists perceived that political leaders supported an agency’s mission, such as at the CDC, the FDA, and NOAA, they reported increased job satisfaction and decreased political interference in science; these findings were also reflected in 2022. Scientists in 2022 perceived a more positive workplace environment, exceeding any other time we have administered the survey in the last 18 years.

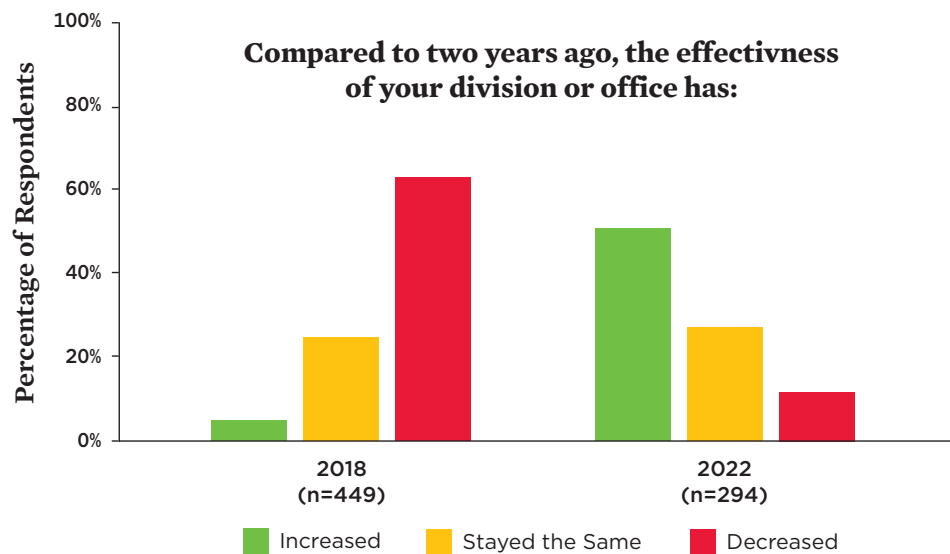
Across all six agencies, the largest positive changes involved issues related to scientific integrity. Compared with either 2015 or 2018, more scientists under the Biden administration felt that they had received adequate training on their agencies’ scientific integrity policies and that they could openly express concerns about their agencies’ mission-driven work without fear of retaliation. At the FWS, for example, 72 percent of scientists surveyed (140 respondents) reported being adequately trained on the agency’s scientific integrity policy (Figure 2, p. 4).

This was a sharp increase over 32 percent in agreement in 2015 (250 respondents) and 56 percent in agreement in 2018 (189 respondents).

Scientists surveyed in 2022 perceived less political interference in science-based decisionmaking than did scientists in 2015 or 2018. For example, most scientists surveyed under the Trump administration felt that resources (such as funding and staff time) were being distributed away from offices viewed as doing politically contentious work; most scientists surveyed under the Biden administration felt that this was not occurring. More scientists in 2022 reported lower levels of inappropriate influence from senior decisionmakers who had conflicts of interest (e.g., they came from regulated industries or had financial interests in regulatory outcomes) than did scientists in 2015 or 2018. However, the FDA presented a different profile. In 2022, 21 to 26 percent of FDA scientists (50 to 346 respondents) surveyed in 2010, 2015, 2018, and 2022 reported inappropriate influence from senior decisionmakers with conflicts of interest.

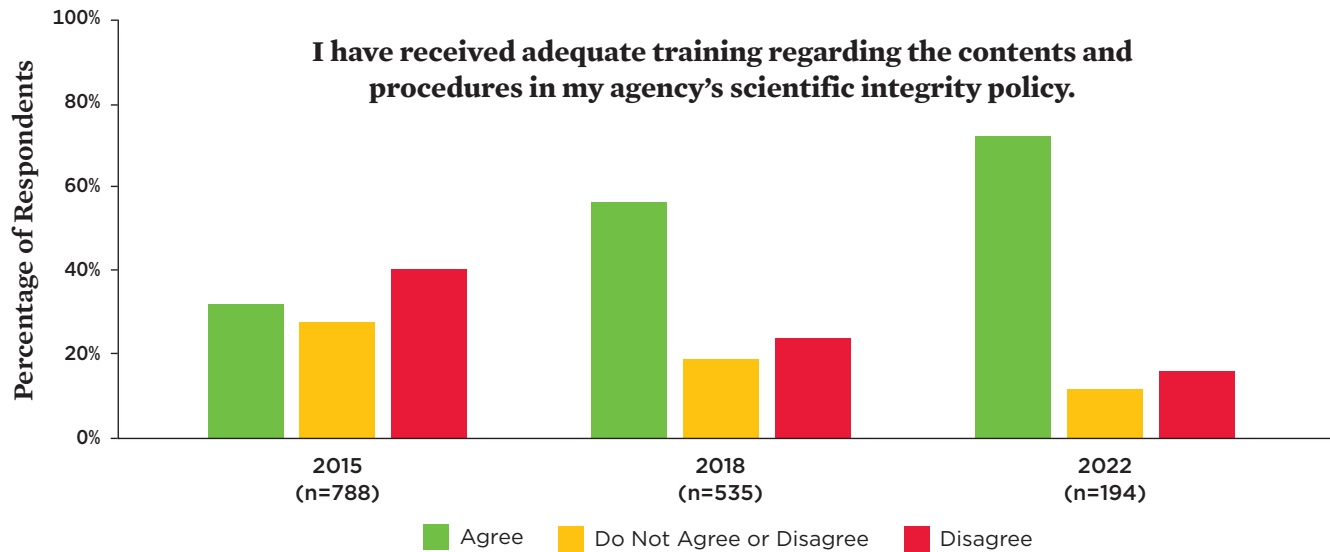
Despite the overall improving picture, censorship remains a challenge, according to some scientists (Table 1, p. 4). While most respondents said they had not experienced censorship in either 2018 or 2022, similar percentages in the two surveys stated that they had been directly censored (e.g., asked or told to omit certain politically contentious words from their scientific work products) and reported indirect censorship of their work (e.g., asked or told to avoid work on specific topics perceived as

FIGURE 1. Perception of Agency Effectiveness at the Environmental Protection Agency



Over half of 294 EPA scientists surveyed in 2022 perceived that their office’s effectiveness had increased in the past two years. This result contrasts starkly with responses to the 2018 survey, when 63 percent of 449 respondents reported decreased effectiveness.

FIGURE 2. Scientific Integrity Policy Training at the Fish and Wildlife Service



More FWS scientists surveyed in 2022 reported being adequately trained on the contents and processes within the agency's scientific integrity policy than did scientists surveyed in 2015 and 2018.

Note: The graphed results of "Agree" includes both "Strongly Agree" and "Agree" response categories; the graphed results of "Disagree" includes "Strongly Disagree" and "Disagree" responses.

politically contentious). This was the case for all agencies, suggesting that censorship, while uncommon, remains a persistent issue.

Examining Perceptions of Scientific Integrity in the 2022 Survey

When looking across the years, the Biden administration appeared to fare better in the eyes of federal scientists surveyed than any other administration since 2004. One FDA scientist reported, "Policy changes instituted by the Biden administration

have drastically created a condition where scientists at my agency feel protected; they do their work without worrying about political repercussions."

While the 2022 results largely pointed toward stronger scientific integrity protections, better workplace culture for scientists, and progress on diversity, equity, inclusion, and accessibility, some results indicated that work remains to be done. There also was variability across agencies in how scientists perceived progress on many science-based issues, suggesting opportunities for agency-specific actions.

TABLE 1. Scientists Surveyed Reported Similar Levels of Censorship in 2018 and 2022

I have been asked or told to omit certain words in my scientific work products because they are politically contentious.

	CDC	EPA	FDA	FWS	NOAA	USDA
2018	30% (168)	37% (160)	14% (47)	29% (101)	16% (185)	23% (67)
2022	36% (128)	31% (89)	25% (65)	25% (54)	21% (79)	15% (38)

In 2018 and 2022, similar percentages of scientists strongly agreed or agreed that they had been asked or told to omit politically contentious words in their scientific work products. The numbers of respondents appear in the parentheses.

Perceptions of the Biden Administration's Actions on Science Policy

The Biden administration has made historic strides on the front of scientific integrity. President Biden's 2021 memorandum to restore public trust in evidence-based decisionmaking through strengthening scientific integrity has charged agencies to take more action on the issue than ever before (Executive Office of the President 2021a). In addition to requiring *all* federal agencies to enlist a scientific integrity officer, the memorandum led to the creation of a scientific integrity taskforce made up of agency representatives, and a scientific integrity framework providing guidance to agencies on strengthening their scientific integrity policies (OSTP 2023). These are the strongest efforts ever seen on progressing scientific integrity for federal scientists.

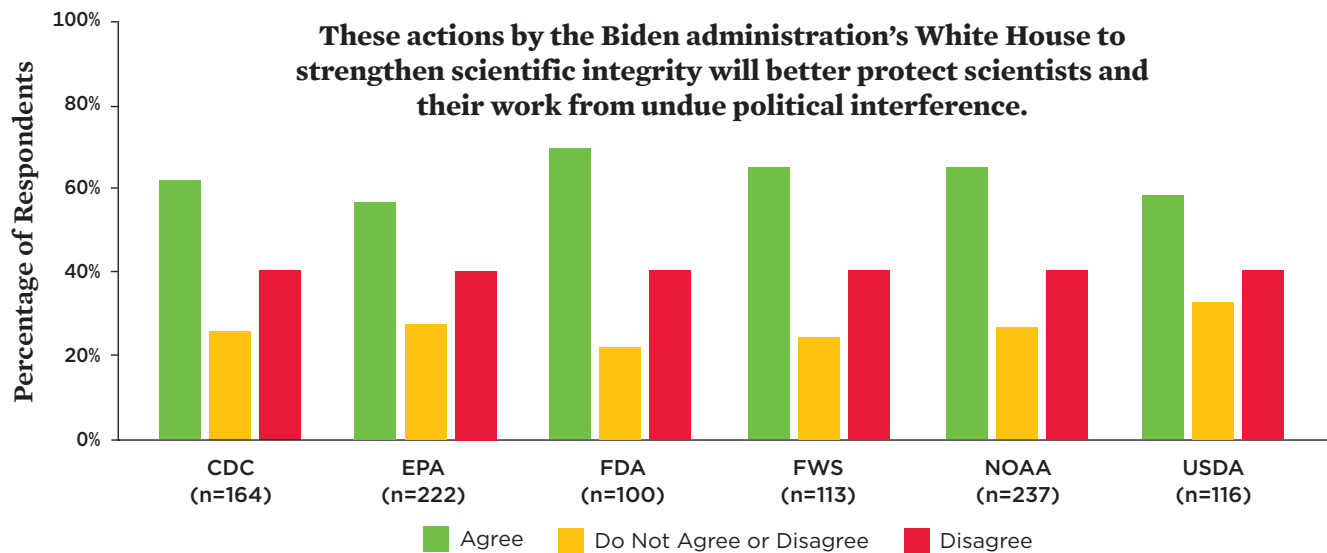
Survey results indicated that an overwhelming percentage of federal scientists had positive perceptions of their agencies' scientific integrity actions. Seventy-nine percent of scientists (1,266 respondents) reported that their agency had adhered to its scientific integrity policy, and 73 percent (1,170 respondents) felt they had received adequate training on that policy. Of scientists surveyed who were aware of the Biden administration's actions to strengthen scientific integrity, 63 percent (600 respondents) felt that those actions will better protect scientists and their work from undue political interference (Figure 3).

Responses to open-ended questions echoed this optimism. For instance, an FWS scientist wrote, "The Biden administration appears to have restored prior, generally bipartisan norms on scientific integrity and use of scientific information, even if science is only one component of decisionmaking. This is a positive change." Still, several respondents felt that efforts had not gone far enough. One NOAA scientist wrote, "I have definitely seen a tone from the Biden Administration that is in stronger support of scientific integrity. What I have not seen is concrete action or results that support it."

In addition to reports of adherence to scientific integrity, scientists reported that the agencies by and large utilized their scientific work in decisionmaking. Seventy-three percent of scientists surveyed (1,204 respondents) reported that their agency's determinations and actions were always or frequently consistent with the scientific findings contained in agency documents and reports. Additionally, 58 percent of scientists surveyed (956 respondents) reported that agency decisionmaking heeded and incorporated expert advice from scientific advisory committees.

While most respondents perceived that science-based decisions were adequately informed by scientific evidence, some perceived that consideration of political or business interests still hindered the ability of agencies to make science-based

FIGURE 3. Perceptions of the Biden Administration's Actions to Strengthen Scientific Integrity



Over 60 percent of scientists surveyed (600 respondents) perceived that current efforts to strengthen scientific integrity across federal agencies will better protect scientists and their work from undue political interference, helping ensure that science-based decisions protect our environment and public health. The respondents who answered this question agreed with the statement in a prior question, "I am aware of the Biden administration's White House's actions to strengthen scientific integrity across the federal government."

Note: The graphed results of "Agree" includes both "Strongly Agree" and "Agree" response categories; the graphed results of "Disagree" includes "Strongly Disagree" and "Disagree" responses.

“The transition from the Trump to the Biden administration has been remarkable. I feel the difference every day in my work and am beyond grateful to have [a] President that believes in science, climate change and the EPA.”

— EPA scientist

decisions. Thirty-five percent of scientists surveyed (572 respondents) reported that considerations of political interests hindered the ability of the agency to make science-based decisions; 30 percent (489 respondents) said the same of business interests. More scientists at the CDC (44 percent, 142 respondents), the EPA (48 percent, 131 respondents), and the FWS (43 percent, 86 respondents) reported undue consideration of political interests, and more scientists at the EPA (45 percent, 122 respondents), the FDA (35 percent, 83 respondents), and the FWS (36 percent, 72 respondents) reported undue consideration of business interests.

The Workplace Culture Is Improving, but Capacity Remains a Barrier to Effectiveness

UCS asked scientists to compare their current working conditions with those two years ago; the vast majority of respondents at all six agencies reported higher morale, better working conditions, and increased job effectiveness. According to the scientists, their direct supervisors supported them, they received enough time and resources to carry out professional development activities like attending conferences, and they could openly and without fear of retaliation express concerns about their agencies’ mission-driven work. In addition, across all agencies surveyed in 2022, more than 60 percent of scientists (140 respondents) who had been at their agencies for two years or less stated that their agencies offered mentorship opportunities and that these were helpful. Federal scientists generally felt positive about their work environments, which prior research has associated with a host of beneficial effects, including less stress, more engagement, and even better health outcomes (Sappälä and Cameron 2015). EPA scientists had especially positive perceptions of their workplaces. Fifty-three percent of those surveyed (144 respondents) in 2022 reported their agency can better recruit new scientific staff, and 63 percent (181 respondents) reported feeling they can openly express concerns about the EPA’s mission-driven work without fear of retaliation. This was especially noteworthy considering that EPA scientists had some of the most negative workplace perceptions in our 2018 survey. During the Trump administration, a barrage of scientific integrity violations culminated in the perception by staff that the EPA faced regulatory capture by industry and that multiple barriers prevented effective science-based decisionmaking (Dillon et al. 2018).

The Biden administration has made a commitment to reversing that perception (Friedman 2021). According to one EPA scientist, “The transition from the Trump to the Biden administration has been remarkable. I feel the difference every day in my work and am beyond grateful to have [a] President that believes in science, climate change and the EPA.”

The survey results indicate that agencies are better protecting scientific staff from undue political interference and ensuring that decisionmaking processes incorporate science. This likely improves how scientists perceive and feel about their workplace environments.

Nevertheless, government scientists reported at least one worrying trend: insufficient staff capacity. Fifty-nine percent of surveyed scientists (982 respondents) reported noticing staff departures, retirements, or hiring freezes in the past two years. Of these respondents, 88 percent (868 respondents) agreed that a lack of capacity made it difficult for them to fulfill their agencies’ science-based missions (Figure 4, p. 7). In five out of the six agencies, respondents chose limited staff capacity as the greatest barrier to science-based decisionmaking, selecting it over 15 other possible answers. The exception was the FDA, where limited staff capacity ranked as the second greatest barrier.

Sixty-two percent of scientists surveyed (1,030 respondents) reported experiencing burnout in the last two years. Seventy percent (715 respondents) of those who reported burnout said it was due to lack of staff capacity.

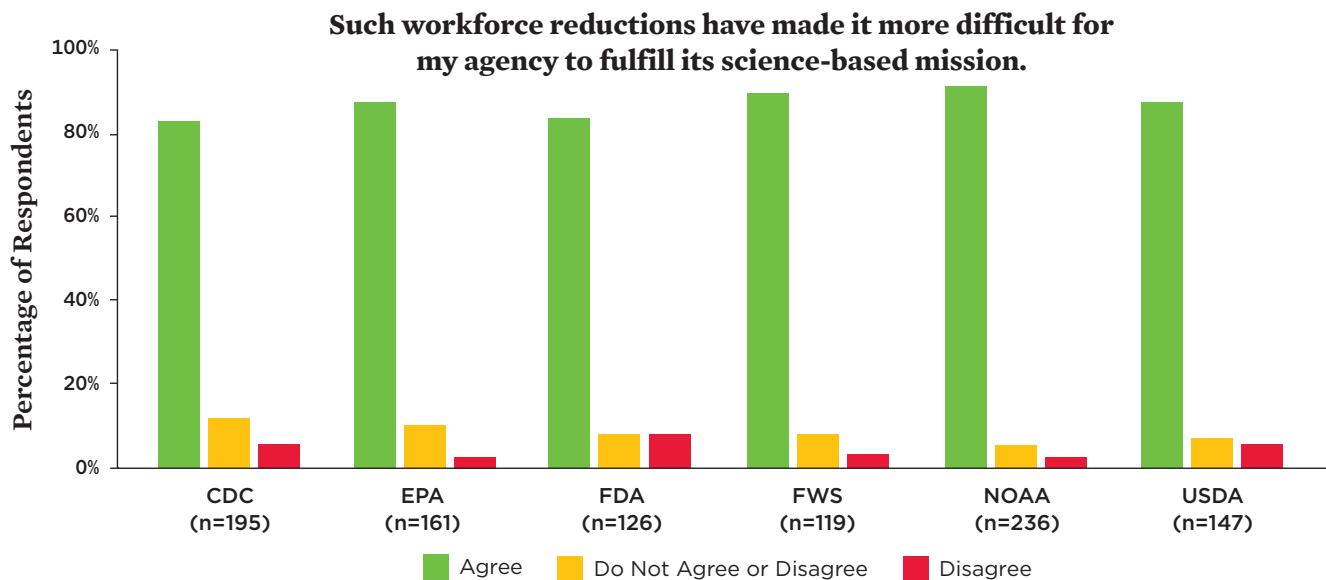
Several open-ended responses commented on the lack of staff capacity. A NOAA scientist wrote, “The most significant limiting factor for my agency’s ability to maintain scientific integrity is its staffing level. We are consistently being asked to do more with either less or the current level of staffing.” A USDA scientist wrote, “My location is woefully understaffed, and the scientific support staffed is stretched too thin trying to pick up the slack for numerous vacant positions.”

A lack of staff capacity can hinder the ability of agency scientists to carry out their mission-driven work. For instance, an FDA scientist wrote, “One worry is that because we are understaffed and overworked, scientific mistakes might happen.”

Censorship Still Poses Problems

The censorship of agency science is deeply troubling on a number of levels. Fundamental processes that govern the scientific process—formulating and testing hypotheses, gathering

FIGURE 4. Workforce Reductions Make It More Difficult for Agencies to Fulfill Their Science-Based Missions



Of those agreeing that scientific staff departures are occurring at federal agencies, 88 percent of scientists in 2022 (868 respondents) reported that staff departures made it difficult for them to fulfill their agencies' science-based missions.

Note: The graphed results of "Agree" includes both "Strongly Agree" and "Agree" response categories; the graphed results of "Disagree" includes "Strongly Disagree" and "Disagree" responses.

data, documenting and replicating results, publishing results through a peer-review process—depend upon a free exchange of knowledge and ideas and therefore censorship can impede the advancement of science. Censorship at science-based agencies can have a chilling effect, hindering the incorporation of science into decisionmaking processes. And it can prevent dissemination of accurate scientific findings to the public.

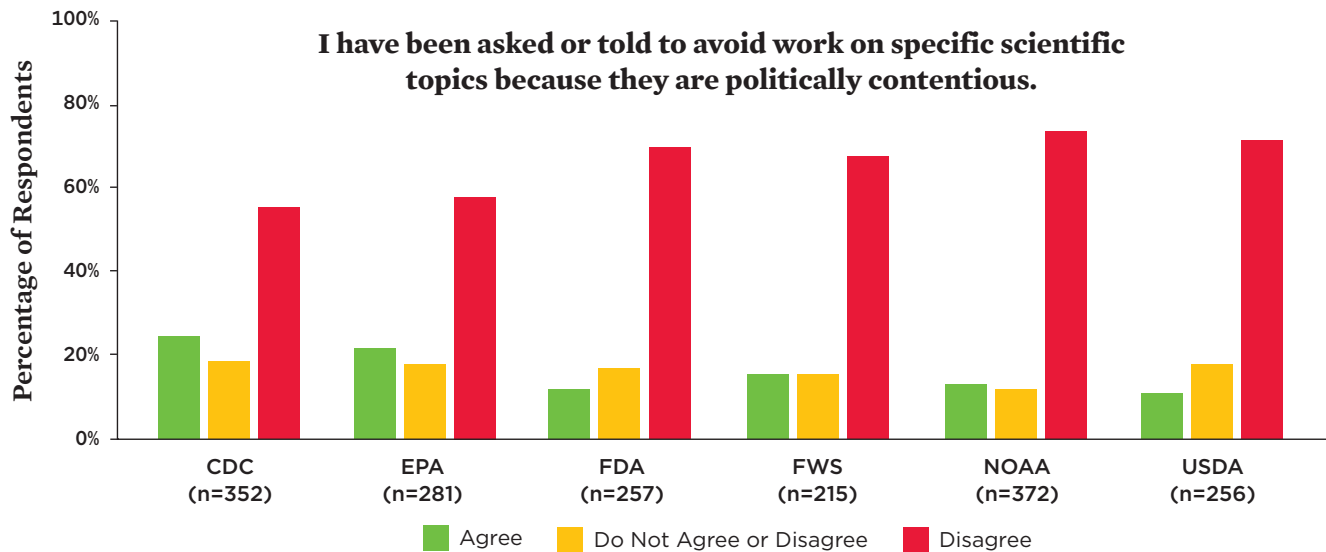
Under the Biden administration, censorship still poses a challenge for agency scientists, according to our survey results. Some scientists reported feeling their scientific work was censored at times (Figure 5, p. 8). While most scientists did not feel that they had experienced censorship, 26 percent of those surveyed (456 respondents) reported having been asked to omit from scientific products words that could be viewed as politically contentious. Additionally, 16 percent of scientists (280 respondents) reported being asked or told to avoid work on some science-based topics that could be viewed as politically contentious. Twenty-three percent (401 respondents) reported self-censoring themselves; while they were not explicitly told to avoid working on politically contentious scientific topics or terms, the scientists decided to do so. Additionally, 21 percent (356 respondents) feared repercussions if they exercised their rights to engage in advocacy and self-expression. Such censorship concerns were most serious at the CDC, which had the highest or second-highest percentages on the survey's four censorship measures.

Communicating Federal Science to the Public

Federal scientific experts play a critical role in informing the public of the latest developments in science. For example, health and safety protections depend on information from federal scientists about the spread of diseases, contamination in food supplies and drinking water, and approaching natural disasters like hurricanes, tornados, and wildfires. The public readily uses agency science to better understand science-based topics and take better-informed actions—by making plans after examining weather reports from the National Weather Service (part of NOAA) and campaigning for safer neighborhoods based on the EPA's studies of local environmental hazards. When federal scientists cannot disseminate such information to the public, it promotes uncertainty in the public's understanding—uncertainty that widens the space for misinformation and disinformation. This was disastrously the case when CDC scientists were censored from informing the public on COVID-19 throughout 2020 (Desikan, MacKinney, and Goldman 2020).

Survey responses indicate continuing challenges in the ability of federal scientists to communicate with the public and media about their work. A CDC scientist reported, "The Biden Administration and the White House continue to interfere with the CDC appropriately communicating the scientific basis of our decision making with the public, particularly for COVID-19 and Monkeypox. We are prevented from communicating with

FIGURE 5. Censorship of Scientific Work at Federal Agencies



Across the six agencies in the UCS study, 280 scientists reported being asked or told to avoid work on specific scientific topics that were considered to be politically contentious.

Note: The graphed results of "Agree" includes both "Strongly Agree" and "Agree" response categories; the graphed results of "Disagree" includes "Strongly Disagree" and "Disagree" responses.

the press or the public at the time of release, holding briefings or tele-briefings when we change scientific recommendations, or otherwise engaging in what in the past (pre-pandemic) had been the routine communications practices of the agency.”

Sixty-three percent of scientists surveyed (1,023 respondents) felt able to review pre-publication drafts of agency communications that substantially relied on their work. However, 71 percent (1,159 respondents) reported that their agencies still required them to obtain preapproval before speaking to media. This has long been a UCS concern, especially given the repercussions when scientists cannot communicate with the public during emergencies like chemical spills or when the safety of drinking water is in question (Goldman et al. 2015). One agency, NOAA, allows scientists to speak to media without preapproval; our survey results reflected this: 34 percent of NOAA scientists surveyed (121 respondents) reported that they did not have to seek preapproval before speaking with media.

Incorporating Community Voices in Science-Based Decisionmaking

All communities benefit when federal agencies commit to scientific integrity principles. Such commitments help ensure that strong, evidence-based safeguards protect the public from natural disasters, pollution, occupational hazards, and other public health and environmental stressors. And it is historically

marginalized communities that reap the greatest benefits when federal agencies strongly commit to robust, equitable scientific practices. Residents of marginalized communities are exposed to greater health hazards in their homes, workplaces, and neighborhoods than are people living in Whiter and more affluent communities, a long-standing injustice that stems in part from such governmental actions as redlining practices that lead to residential segregation (Bullard, Johnson, and Torres 2011). Underserved communities are more likely to be located near sources of environmental hazards, such as sewage systems, mines, landfills, industrial facilities, major roads, and fossil fuel extraction operations, all of which increase the risk of adverse health outcomes, including cardiovascular and respiratory diseases, cancer, and death (Johnston and Cushing 2020; Chakraborty 2012).

Given this history, UCS designed the 2022 survey to gain information about how scientists perceived the efforts of the Biden administration and their agencies on justice, equity, diversity, and inclusion (JEDI). Within his first few days in office, President Biden signed an executive order to advance racial equity and support for underserved communities. Since then, agencies have moved to implement this executive order, such as through the Justice40 initiative requiring that 40 percent of the overall benefits of certain federal investments flow to disadvantaged communities that are marginalized, underserved,

“An increased focus on health equity has improved focus on historically marginalized and underserved communities. However, much more work is needed to counteract generations of inequality.”

— CDC scientist

and overburdened by pollution (Executive Office of the President 2021b; 2022). Scientists felt that the scientific and policy work of their agencies regularly considered the impacts on, and incorporated the viewpoints of, underserved communities and historically marginalized groups. Thirty-nine percent of scientists surveyed (646 respondents) reported that their agencies regularly incorporated viewpoints and perspectives of people from underserved communities or historically marginalized groups in their scientific work.

Furthermore, federal scientists felt that their direct supervisors, management, or senior leadership encouraged them to consider the equity implications of their work. CDC and EPA scientists had especially positive viewpoints. Over 70 percent of CDC and EPA scientists at these two agencies (199 to 255 respondents) reported that their agencies regularly considered impacts on underserved communities in their scientific work. However, 43 percent of all scientists surveyed (712 respondents) did not know if their agencies incorporated these viewpoints in their scientific work, highlighting that significant gaps continue to hinder the meaningful incorporation of JEDI principles into federal scientific work.

Open-ended responses reflected an increased focus on underserved communities and historically marginalized groups in agencies’ scientific and policy work, yet many responses included doubts about implementation. A CDC scientist said, “An increased focus on health equity has improved focus on historically marginalized and underserved communities. However, much more work is needed to counteract generations of inequality.” An EPA scientist said, “The Biden Administration, in particular through our EPA administrator, has done a fabulous job of reaching out to marginalized groups and underserved communities. The hard part is that it is very time-consuming and expensive to work with these groups and communities because we have to take time to build trust and do the right outreach.” According to an FDA respondent, “Generally, I feel there are efforts, discussions, and some movements to address marginalized groups and communities. However, there still is resistance among majority populations which leads to obstacles and barriers preventing positive change from happening.”

Science-based decisionmaking affects communities as well as the agency personnel involved. Who decisionmaking processes involve, along with their lived experiences, makes

a difference in ultimate policy outcomes. That is why federal decisionmaking processes often include opportunities for public comment (even given persisting issues with these processes and their accessibility). Indeed, environmental justice advocates, scientists, and members of underserved communities have long advocated public health strategies that use scientific evidence to identify threats to underserved communities (Bullard, Johnson, and Torres 2011). Implicit in such a framework is the role of robust, independent science to identify health disparities, along with ways for policymakers to utilize the best available science to decide on and implement policy actions equitably.

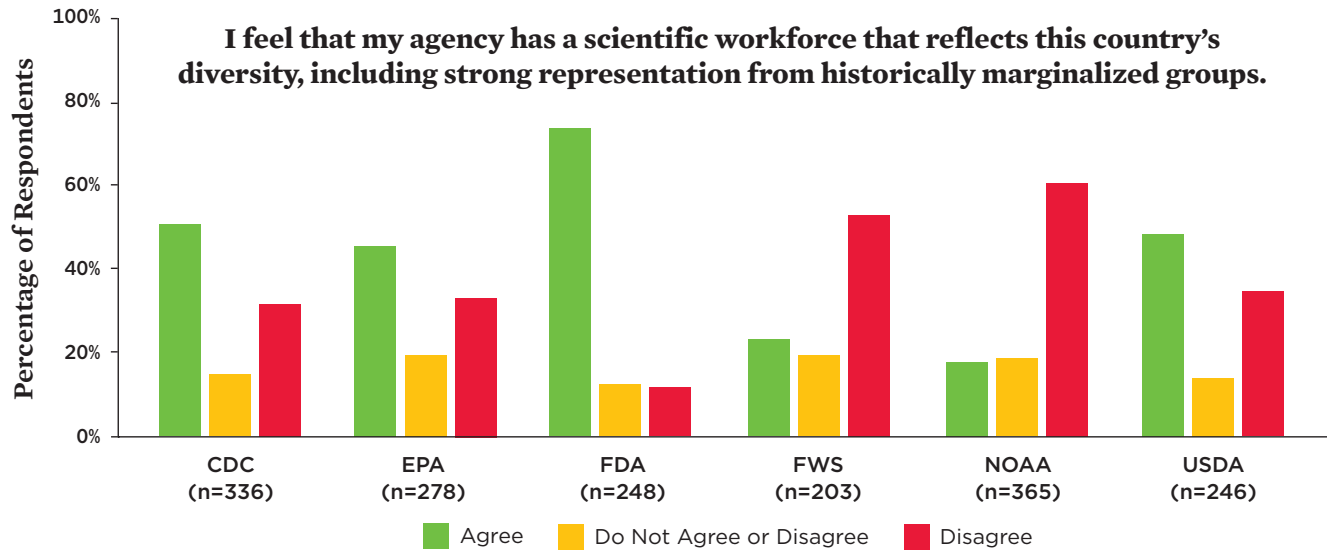
Diversity, Equity, Inclusion, and Accessibility in the Federal Scientific Workforce

Evidence suggests that federal agencies, to varying degrees, lack representation of staff who identify as Black, Indigenous, people of color (BIPOC), and other historically marginalized groups. In 2020, a letter signed by 1,200 CDC employees to their director called for the agency to address “ongoing and recurring acts of racism and discrimination” against Black employees, including the lack of hiring and promotion of Black employees (Simmons-Duffin and Huang 2020). Other federal agencies, such as the National Park Service, face similar inequities within their agencies. Some agencies have taken steps to improve recruitment. For example, NOAA has increased the number of Black scientists at the agency by nearly a third (Jacobs and Hotakainen 2020; Hotakainen 2022).

Diverse work environments can improve productivity, decisionmaking, and the ability to serve the public. However, efforts to diversify workforces face a variety of challenges (Saxena 2014; Rock and Grant 2016; Coronado et al. 2020). For instance, an organization’s workforce may be diverse only for low-level jobs but not upper management (Wilbur et al. 2020). Also, decisionmakers may hire additional diverse employees but fail to address deep-seated inequities in the organization’s structure; this can make it less likely diverse employees will feel welcome and be willing to continue working in such an environment.

In June 2021, President Biden issued an executive order on promoting diversity, equity, inclusion, and accessibility (DEIA) in the federal workforce to better reflect the country’s diversity, including representation of people who come from

FIGURE 6. Perceptions of Diversity in the Scientific Workforce



At the FDA, 74 percent of scientists reported that the agency's workforce reflected the country's diversity, including strong representation from historically marginalized groups. However, 65 percent of NOAA scientists (241 respondents) perceived that its workforce did not reflect the country's diversity.

Note: The graphed results of "Agree" includes both "Strongly Agree" and "Agree" response categories; the graphed results of "Disagree" includes "Strongly Disagree" and "Disagree" responses.

historically marginalized groups or underserved communities (Executive Office of the President 2021c). DEIA efforts at federal agencies can have a strong impact. For instance, evidence suggests that they would help shift the EPA away from an older, inequitable environmental model and toward one that more readily incorporates environmental justice concerns into science-based decisionmaking (Simms 2012).

Survey responses suggest that scientists had mixed perceptions of the success of DEIA efforts to date, with several scientists reporting a lack of diversity in the scientific workforce, senior leadership, and scientific advisory committees. Specifically:

- Thirty-nine percent of scientists surveyed (665 respondents) did not perceive that their agencies' workforces reflected the country's diversity (Figure 6); 45 percent (765 respondents) perceived a lack of diversity within senior leadership.
- At the FDA, 74 percent of scientists (185 respondents) felt their scientific workforce was diverse, with only a small percentage disagreeing (12 percent, 30 respondents); however, only 43 percent of FDA respondents (107 scientists) perceived that senior leadership reflected the country's diversity.
- The responses of CDC scientists were similar to FDA scientists, with the percentage of those who felt that senior

leadership was diverse (29 percent, 99 respondents) dwarfed by the percentage who disagreed (53 percent, 181 respondents).

- Perhaps the most salient finding from these questions was that a majority of FWS and NOAA scientists felt their agencies lacked diversity at every level. Around half of FWS scientists surveyed felt that their scientific workforces (53 percent, 111 respondents) and senior leadership (48 percent, 101 respondents) did not reflect the country's diversity; over 60 percent of NOAA scientists felt the same for their scientific workforces (61 percent, 227 respondents) and senior leadership (63 percent, 233 respondents).

Open-ended responses reaffirmed these opinions. An FDA scientist described a positive change: "Equity and inclusion programs were restricted during [the] previous administration. Now they are prevalent and we receive regular opportunities to participate in webinars, book clubs, trainings, etc." However, NOAA and FWS scientists described challenges to DEIA initiatives. One NOAA scientist wrote, "My agency's DEI [diversity, equity, and inclusion] initiatives are woefully underdone and do not address many of the underlying problems that cause the lack of representation of historically marginalized groups. Retention is a big problem, because bad supervisors that foster poor work environments are rarely held to account." One FWS scientist said,

“FWS is a white agency that has difficulty recruiting from many marginalized cultures.”

These perceptions on workforce diversity match official numbers released by the Office of Personnel Management (OPM). In the latest OPM dataset available, from September 2022 (OPM 2022), White staff members working in science, technology, engineering, and mathematics (STEM) fields far outnumbered BIPOC staff members in these professions at both the FWS (86 percent White) and NOAA (85 percent White). The US 2020 census adds a point of comparison: White individuals who did not identify in any other racial/ethnic category made up 64 percent of the adult population (18 years old and older) (Jones et al. 2021). In other words, the perceptions of FWS and NOAA respondents matched the reality of the situation: the FWS and NOAA were staffed by over 20 percent more White-identifying scientific staff members than census data would predict.

The UCS survey also explored the perceptions of federal scientists regarding employment barriers for agency scientists from historically marginalized groups. Twenty-one percent of scientists surveyed (356 respondents) reported that agency staff from historically marginalized groups faced additional barriers during hiring, promotion, and career development processes. However, scientists did feel that their agencies regularly included the perspectives of staff from historically marginalized groups in scientific, programmatic, and policy work (61 percent, 1,033 respondents) and that their agencies trained staff well to work respectfully and productively with people from a variety of cultures and backgrounds (81 percent, 1,377 respondents).

These trends held up across all questions when we compared the responses of White-identifying scientists with those of BIPOC-identifying scientists, suggesting that White and BIPOC scientists had similar perspectives on DEIA issues. However, BIPOC scientists (50 percent, 182 respondents) were slightly more likely to feel that their scientific workforce was diverse than did White scientists (40 percent, 483 respondents). Additionally, 48 percent of White scientists (577 respondents) felt that staff from historically marginalized groups did not face additional barriers during hiring, promotion, and career development processes; only 34 percent of BIPOC scientists (125 respondents) felt that.

Being a Federal Scientist During a Pandemic

The survey explored two particularly important issues that agencies have faced during the COVID-19 pandemic.

First, several of the agencies where UCS conducted our survey have been on the front lines in guiding the nation’s, and often the world’s, response to COVID-19, developing vaccines, and responding to various other ways that the pandemic has

affected people’s lives. Agency actions, particularly efforts to limit the spread of the disease and provide and distribute vaccines, have had enormous consequences on the health and safety of people in the United States and the world.

Second, federal agencies, like other employers, are tasked by law with providing safe working conditions for their employees. This has required agencies to have policies and strategies that protect staff from COVID-19 throughout the pandemic’s changing nature.

Has science guided agencies’ response to the pandemic? Forty-nine percent of scientists surveyed (842 respondents) said that they did not know or felt the question did not apply to their workplaces. Of those who expressed an opinion, 39 percent (670 respondents) reported that, since the start of the Biden administration, their agency’s scientific work on COVID-19 had consistently informed policy decisions.

However, the situation at the CDC differs. There, the state of science and decisionmaking under the Biden administration has continued to face challenges, particularly on the issue of COVID-19 and other public health emergencies. According to an April 2022 Government Accountability Office report, public health agencies, including the CDC, lacked procedures defining political interference in scientific decisionmaking and how it should be reported and addressed (GAO 2022). Additionally, the CDC under the Biden administration has faced frequent criticism that its public health messaging on COVID-19 is confusing (Sun and Pager 2022). In response, CDC director Rochelle Walensky laid out major plans in August 2022 to overhaul the CDC to restore public trust. Her plans included remaking the agency’s culture to be nimbler in responding to public health crises and streamlining the CDC website to remove overlapping and contradictory public health guidance (Goodman 2022).

The UCS survey results suggest that a sizable portion of CDC scientists still felt negatively about the agency’s COVID-19 response, an indication that the agency still had work to do in rebuilding public trust and strengthening scientific integrity during COVID-19 and beyond. Twenty-seven percent (93 CDC respondents) reported that, since January 2021, political pressure had influenced COVID-19 policymaking inappropriately about half the time or more. In one open-ended response, a CDC scientist wrote, “The COVID-19 communication from the White House does not follow the science. Over and over, the President himself and others in his administration have declared the pandemic to be over or that we should return to ‘normal,’ when that is not the case. Little has changed from the Trump to Biden administration in terms of scientific integrity and policy.”

Regarding safety in federal workplaces during the pandemic, a clear, mostly positive, image emerged from the survey about perceptions of agency efforts to protect staff under the Biden administration. Seventy-one percent of scientists

surveyed (1,217 respondents) believed that their agencies had made transparent, science-based decisions that protected staff from COVID-19; 79 percent (1,351 respondents) reported that their agencies had provided the support and resources they needed to do their job effectively during the pandemic.

Federal Scientists Need More Protection from Harassment and Bullying

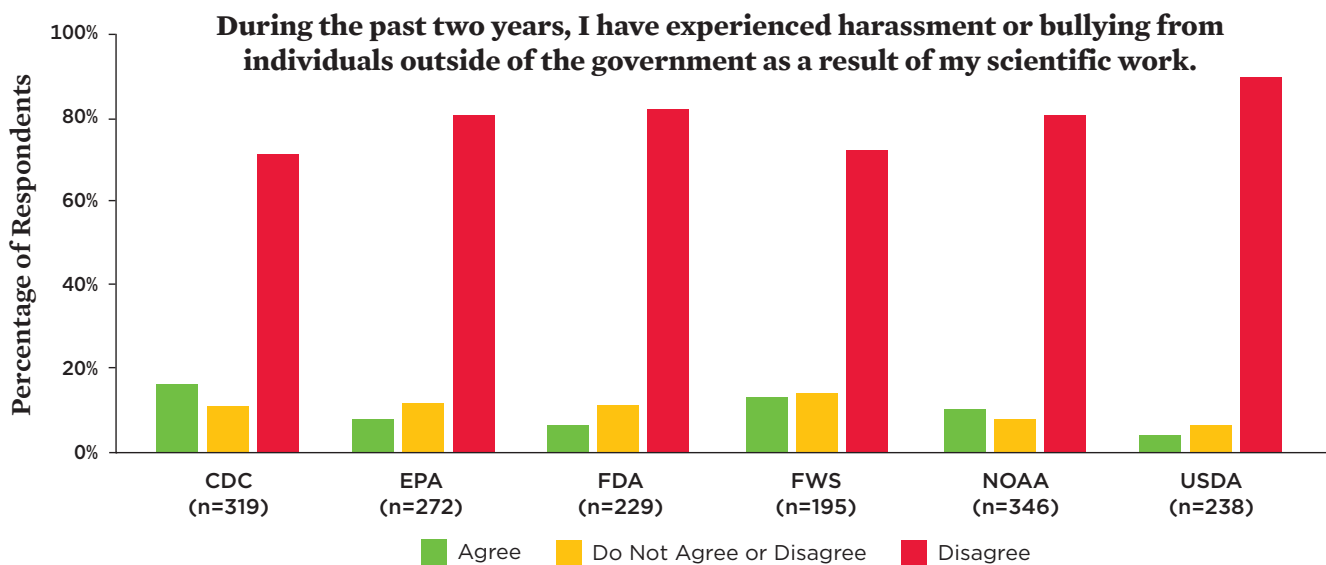
Online harassment and bullying against academic and federal scientists represent ongoing threats that have increased in recent years (Economist Impact 2022). Scientists in certain fields, such as social scientists and climate scientists, appear to be especially vulnerable to online harassment; more recently, this harassment has expanded to COVID-19 scientists (Stein and Appel 2021; Milman 2017). In a March 2022 survey conducted by the journal *Science*, 38 percent of COVID-19 researchers reported experiencing at least one type of attack, ranging from personal insults to death threats (O’Grady 2022). Other studies suggest that scientists from marginalized backgrounds—women, BIPOC, and LGBTQ+ scientists—experience higher levels of workplace harassment, which may translate to more online harassment (Clancy et al. 2017; Cech and Waidzunus 2021; Ahmed 2022).

Even one scientist experiencing bullying or harassment is too many, yet the UCS survey elicited such reports across all

six agencies in 2022 (Figure 7). We asked scientists if they had experienced harassment or bullying as a result of their scientific work from individuals outside the government. On a positive note, 79 percent of scientists (1,283 respondents) reported that they had not experienced such harassment in the last two years; nevertheless, 10 percent of scientists (162 respondents) reported the opposite. CDC scientists reported the most troubling results, with 16 percent (52 respondents) reporting that they had experienced harassment in the last two years. One FDA scientist said, “As far as bullying and harassment from outside sources due to scientific activities or opinions, I have not experienced this myself at my current agency, but I do know people that have. Also, I have experienced this at a previous federal agency and received little to no protection from the retaliatory actions and repercussions of trying to do what is right.”

We also asked scientists if they were aware of the process for reporting external harassment in their agency and if they felt that their agency would protect them sufficiently from harm. While 45 percent (725 respondents) reported being aware of these procedures and feeling their agency would protect them, 28 percent (451 respondents) disagreed—they either lacked awareness of the reporting process or, despite being aware of the process, they did not feel their agencies could protect them.

FIGURE 7. Harassment and Bullying of Scientists from External Entities



Over 160 federal scientists reported experiencing some form of bullying or harassment in the past two years from individuals outside their work as a result of the scientific work they do.

Note: The graphed results of “Agree” includes both “Strongly Agree” and “Agree” response categories; the graphed results of “Disagree” includes “Strongly Disagree” and “Disagree” responses.

Codifying Scientific Integrity Principles

For decades, UCS has advocated for strengthening scientific integrity within the federal government. We are heartened by the plethora of positive responses from scientists surveyed in 2022—and with the progress over the almost two decades that we have conducted such research. Federal scientists perceive that the current administration’s actions have worked well—and far better than the actions of any other administration in the years when UCS has conducted these surveys. More than ever, federal scientists feel adequately trained on scientific integrity policies, that their agencies adhere to them, and that their agencies can incorporate science into decisionmaking. This is welcome news for the public: when science is at the decisionmaking table, safeguards are more effective.

The Biden administration should continue to enshrine scientific integrity principles in federal agencies, ensuring that federal scientists can do their best work to protect and advance public health and safety. These principles include:

- Demonstrating respect for the value that science instills in decisionmaking processes by transparently allowing independent expertise to inform agency decisionmaking and by publicly supporting agency science;
- Preserving the integrity of scientific research, and the policies based on this research, from undue political, ideological, and financial influences by improving conflicts of interest disclosures and recusal requirements;
- Fully utilizing agencies’ peer-review processes for quality control and assurance rather than censoring results or terminology that are legitimate products of the scientific process;
- Actively encouraging scientists to speak to the public about their scientific research; and
- Removing barriers to the timely dissemination of scientific information to the public as much as possible, particularly the dissemination of information related to public health and safety.

To address some of the remaining barriers and challenges that scientists illuminated in our survey results, agencies should:

- Build and strengthen scientific capacity, particularly by strengthening scientific fellowship programs as a strategy for increasing the number of early-career scientists entering the federal government. For example, the Biden administration could reinstate the STEM-specific track of the Presidential Management Fellowship program.
- Promote DEIA in the federal scientific workforce. This includes not only hiring scientists from more diverse backgrounds but also identifying and addressing the structural

inequities that undermine the hiring, promoting, and retention of diverse staff. Agencies should also work to ensure that scientific, programmatic, and policy work incorporates the perspectives of staff from historically marginalized populations.

- Develop and widely communicate a set of specific steps that will protect staff who experience harassment or bullying from external entities.
- Increase training opportunities that provide agency scientists with clear guidance on:
 - Talking to media and the public about their findings;
 - Incorporating JEDI principles into scientific work; and
 - Reporting external or internal harassment, potential scientific integrity violations, and other workplace concerns.

This administration and future ones must build on recent progress in protecting federal scientists and their work. In our 2022 survey, hundreds of federal scientists still reported censorship of their work, and scientists at some agencies perceived that political and business interests hindered their agencies’ ability to fulfill their science-based missions. While most survey respondents felt a positive impact from the Biden administration’s efforts to strengthen scientific integrity, others feared that a future administration could easily slash those efforts.

Congress, too, has an essential role in protecting scientific integrity and improving upon the progress thus far. It should pass legislation codifying scientific integrity principles. In particular, it is essential for Congress to continue working on the Scientific Integrity Act, last introduced in 2021 with bipartisan support (US Congress 2021). This legislation would require federal science agencies to create and implement strong scientific integrity principles, including both scientists’ ability to speak openly to the public about their work and the importance of protecting science from political interference.

Methodology Details

In September and October of 2022, UCS and the University of New Hampshire Survey Center administered a survey to over 46,000 federal scientists across six government agencies: the Centers for Disease Control and Prevention, Environmental Protection Agency, Food and Drug Administration, US Fish and Wildlife Service, National Oceanic and Atmospheric Administration, and US Department of Agriculture.

We chose these agencies, all of which are influential in setting science-based public policy, based on their science-based missions, history of a commitment to scientific integrity, and history of past scientific integrity challenges. We considered

including three other federal agencies—the Department of Energy, the Department of Transportation, and the Federal Emergency Management Agency—but time and capacity constraints limited the scope of this study. In some cases, we did not receive complete staff directories in time to survey agency scientists; in the case of the Department of Transportation, technical difficulties prevented scientists from receiving the email with links to the survey.

For the USDA, we only surveyed scientists in four sub-agencies that had a “Research, Education, and Economics” mission area: the Agricultural Research Service, Economic Research Service, National Agricultural Statistics Service, and National Institute of Food and Agriculture.

The University of New Hampshire Survey Center administered the survey using Qualtrics software. The survey received Institutional Review Board (IRB) approval from the University of New Hampshire (IRB approval #IRB-FY2023-24).

We obtained lists of federal agency staff through publicly available online staff directories and Freedom of Information Act requests. We filed those requests for government agencies that had incomplete online employee directories or no directories at all.

From the staff lists, we identified employees holding scientific or nonscientific positions based on job titles, office/departments, and OPM’s occupational series. For the purposes of the survey, we considered a scientist a person whose job involved a significant level of science, including but not limited to research, operations, modeling, inspection and oversight, and science policy. The survey included full-time federal employees, contractors, associates, fellows, and students. When the specific office in which the employee worked was available, we used that to exclude large numbers of people who were unlikely to perform the above scientific functions. Common non-scientific offices usually excluded from lists were administration, finance, information technology, and facility maintenance.

As an additional check on job type, the first survey question asked respondents to indicate the percentage of time spent on science. The survey results exclude respondents answering zero.

Potential survey respondents received invitations to fill out the survey via their work email addresses. Participants could complete the survey via a link in the email or by clicking another link to download a PDF survey instrument that they could complete and mail in. Each email to a potential respondent included a unique identifier associated with the online survey link. For quality control purposes, participants completing paper surveys were prompted to supply this code.

The survey was open for responses between September 14, 2022, and October 28, 2022. Potential respondents received email reminders every one to two weeks. The survey went to 46,616 potential respondents; we received 1,828 responses for an overall response rate of 3.92 percent. Response rates ranged

from 748 percent for the FWS to 2.11 percent for the FDA. Survey items included 57 multiple-choice questions and four open-ended response types. Agency leadership at all six agencies were informed about the survey prior to its distribution.

We compared the 2022 survey results with past UCS surveys for questions that had been preserved across surveys. For questions that asked respondents their level of agreement or disagreement with a statement, the results presented here combine the categories “strongly agree” with “agree” and “strongly disagree” with “disagree.” Results for all six agencies were compared with those in 2018. For the CDC, the FDA, the FWS, and NOAA, the results were also compared with those in 2015. The EPA results were compared with those in 2007; the FDA results were compared with those in 2006, 2010, and 2012.

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