

POLICY ANALYSIS: Scientific Integrity in Federal Policymaking Under Past and Present Administrations

Emily Berman, Jacob Carter

Center for Science and Democracy, Union of Concerned Scientists

Corresponding authors: EBerman@ucsusa.org, JCarter@ucsusa.org

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Executive Summary: Many critical federal government policies in the United States rely on scientific evidence. Due to the widespread use of science in policymaking, stakeholders on all sides of scientific issues attempt to manipulate scientific information and/or scientists to achieve their own goals. Such practices introduce political and ideological bias into the science policy process and threaten to undermine protections for both public health and the environment. In recent years, scientists and science advocates have adapted the term “scientific integrity” to describe the proper process through which science informs policy. As such, a “violation of scientific integrity” has become the descriptor for any subversion of that process. Initially, scientific integrity provided a critical framework through which the scientific community could hold the George W. Bush administration accountable for its actions in the realm of science and science policy. This framework was subsequently used to examine both the scientific integrity violations of the Barack Obama administration as well as to judge the administration’s implementation of scientific integrity policies at federal agencies. Currently, observers of the executive branch are again using this framework to measure the record of Donald Trump’s administration on science policy thus far.

While observers have occasionally assumed that the Trump administration is unprecedented in its violations of scientific integrity, no analysis has been conducted to-date examining how the Trump administration’s actions stem from—or are different from—the science policy actions of prior administrations. As such, in this study, we documented scientific integrity records under presidential administrations dating back to the 1950s. The findings of this study provide context on the evolution of patterns in scientific integrity violations, as well as to the “unprecedentedness” of the Trump administration’s actions.

I. Introduction

Throughout the 2000s, “scientific integrity” transformed from a research term to a policy term and, finally, to a policy itself. Initially, the definition of a violation of “scientific integrity” appears to have been analogous with that of “research misconduct.” Both described improper actions, such as plagiarism and fabrication, that could take place throughout the research process. After the turn of the century, a violation of “scientific integrity” evolved into a term

used by the media, non-profit organizations, and members of Congress to describe actions taken by the George W. Bush administration that constituted political interference within the science and science policy apparatuses of the federal government (Grifo et al. 2008; U.S. House of Representatives 2003).

Following the 2008 election, “scientific integrity” furthered its journey by becoming official government policy. In his inauguration speech, President Barack Obama pointedly promised to

“restore science to its rightful place,” and his subsequent March 2009 memorandum labeled “Scientific Integrity” instructed his science advisor to create a plan for “ensuring the highest level of integrity in all aspects of the executive branch’s involvement with scientific and technologic processes” (Obama 2009a; Obama 2009c). By the end of the Obama administration, 28 agencies adopted specific scientific integrity policies (Carter et al. 2017, 6). While these policies range in scope and effectiveness, they generally address the principles of scientific integrity as formally laid out in Obama’s 2009 memorandum:

The public must be able to trust the science and scientific process informing public policy decisions. Political officials should not suppress or alter scientific or technological findings and conclusions. If scientific and technological information is developed and used by the Federal Government, it should ordinarily be made available to the public. To the extent permitted by law, there should be transparency in the preparation, identification, and use of scientific and technological information in policymaking. The selection of scientists and technology professionals for positions in the executive branch should be based on their scientific and technological knowledge, credentials, experience, and integrity (Obama 2009c).

While the Obama administration did not put a stop to all political interference in the government’s science policy apparatus, both the principles and policies regarding scientific integrity have fared notably worse since his successor, President Donald J. Trump, has taken office. The Trump administration’s widely documented disdain for science, science policy, and the principles of the science-based regulatory process has led multiple organizations, analysts, and members of Congress to criticize the administration’s actions as violations of the principles and/or policies of scientific integrity (Carter et al. 2017; NRDC 2017; Eilperin 2017; Green 2017b). In this time, some observers have compared the Trump administration’s actions to moves made during the Bush administration (Aton 2018). Other observers have traced these actions back to the Reagan era (Frederickson et al. 2018; Sellers et al. 2017; Waldman 2018b). Still others have labeled the Trump

administration’s violations of scientific integrity as entirely “unprecedented” in their breadth and agenda (Hand 2017; Kimmel 2017; Roberts 2017; Green 2017a).

This paper seeks to evaluate and expand upon these initial analyses of the Trump administration’s scientific integrity violations by examining the longer history of political interference in science in the United States. While assessing such a topic generally requires comparative data, few institutions have collected data on scientific integrity violations across administrations over time, and such information is necessarily subject to personal interpretations of politicization of science. As such, taking a piecemeal historical approach—examining key instances of political interference in science within the executive branch and how these instances built into patterns—provides the best examination of how the Trump administration’s antagonistic relationship to federal science relates to that of previous administrations.

Overall, we find that the Trump administration’s violations of scientific integrity are largely a continuation and escalation of patterns built up over the past seven decades as science and the growing federal science apparatus increasingly came into conflict with political, economic, and ideological interests. While many of the Trump administration’s actions have origins in the work of prior administrations, others fit with the “unprecedented” narrative, including the uniquely open disregard for the conclusions of its own scientists. At the conclusion of this paper, we include recommendations for restoring the proper place of science in government, including how to strengthen existing scientific integrity policies.

II. Definitions and Patterns

As the notion of “political interference in science” implies impropriety, it is worth examining how this paper assesses scientific integrity itself as well as violations of scientific integrity. Most recently, in 2018, scientific integrity was formally defined as the “processes through which independent science fully and transparently informs policy decisions, free from inappropriate political, ideological, financial, or other undue influence” (Goldman, Reed, and Carter 2018, 269). While Obama’s 2009 memorandum captured many of the key principles of scientific integrity, this

newer definition allows for broader consideration of issues across more areas of the executive branch.

As the definition of scientific integrity used in this paper is broad, clarifying the exact contours of a *violation* of scientific integrity can be difficult. In some cases, a violation of scientific integrity has clear legal boundaries; when a political appointee tampers with species science that affects a listing under the Endangered Species Act (ESA), this breaks the law's mandate that the decision be made based only on the best available science. In other cases, such as times in which administrations have purposely skewed federal science advisory committees—which are intended to provide independent science advice to agencies and are required to be “fairly balanced in terms of the points of view represented”—the actions are legally and ethically gray (GSA n.d.). And in some cases, an action is legally valid but ethically problematic; for example, while it is legal to route a press call away from a scientist who is working on a contentious issue, it is an instance of politics undercutting science.

Outside of laws like the ESA and the Prescription Drug User Fee Act that require decisions to be based only on the best available science, science is rarely the only factor in the policymaking process (Grifo 2011, 345; Goldman et al 2017, 4; Branscomb 2004, 54). Policy decisions are informed in various degrees by scientific factors, social judgments, and political sentiment. Indeed, the tendency among watchdogs to overemphasize the role that science should play in the federal policymaking process has created its own strand of criticism. As argued by former Bush “regulatory czar” Susan Dudley, “In thinking about reforms to improve how science is used in developing regulations, clarifying which aspects of the decision are matters of science and which are matters of policy is essential to avoid both the politicization of science and the scientization of policy” (Dudley 2015, 30). Dudley's work built on a 2009 Bipartisan Policy Center report, which itself noted that “some disputes over the ‘politicization’ of science actually arise about policy choices that science can inform, but not determine” (BPC 2009, 4). This critique is not new or even partisan; as far back as 1965 a report by the American Association for the Advancement of Sciences noted that “The growing interaction between science and public policy requires considerable attention to the problem of

distinguishing scientific problems from those issues which ought to be decided by social processes” (*American Scientist* 1965, 194).

Defining a scientific integrity violation is therefore a complicated, somewhat subjective process, as it involves ethical as well as legal considerations. What one analyst may see as clear political interference in science, another may dismiss as a valid action in line with executive powers. Examining this debate and its contours is important not only due to the critical role scientific integrity plays in decisions that affect public health and the environment, but also democracy more broadly. As former presidential advisory committee member Lewis Branscomb once argued, “If we fail in the attempt to preserve the integrity of science in democratic governance, a strong source of unity in the electorate, based on common interest in the actual performance of government, will be eroded” (Branscomb 2004, 59). Figuring where the United States has clearly and not-so-clearly failed to uphold scientific integrity is integral toward upholding and even improving the quality and stability of government.

Overall, this paper builds off previous discussions of categories of political interference as well as historical analysis to determine the following patterns of scientific integrity violations:

Insufficiently filling executive branch positions that manage, conduct, or disseminate science or science-based regulations (appointing unqualified or conflicted people to agencies or science advisory boards; leaving scientist positions empty; hollowing out agencies)

Undermining science-based regulations (weakening, disregarding, revoking, or failing to enforce safeguards; shutting down monitoring and enforcement systems)

Tampering with science or scientific reports (editing, misrepresenting, or deleting scientific reports, data, or websites containing scientific information)

Creating a hostile environment for scientific staff (unjustly firing, transferring, or demoting scientific staff; restricting staff communications)

III. Government Growth and Postwar Problems: Dwight Eisenhower (1953-1961), John F. Kennedy (1961-1963), and Lyndon Johnson (1963-1969)

Political interference in science is inextricably tied to the size and strength of the federal science apparatus. In the years after World War II, the government's role in conducting science, incorporating independent science advice, and regulating based on science grew dramatically. Yet even in this period, which is generally regarded as the high point in the relationship between the federal government and science as well as the high point for bipartisan support of science, modern patterns of scientific integrity violations began to appear.

Post-war growth in federal science came in waves. Directly following World War II, the federal government—buoyed by the success of wartime collaborations between the government and science community—quickly established or expanded several science-based agencies, including the Atomic Energy Commission, the Office of Naval Research, and the National Science Foundation (Burger, Jr. 1980, 7). In 1957, government science changed again following the unexpected success of the Soviet launch of the satellite *Sputnik*. The *Sputnik* crisis led to the government's involvement in broader types of scientific research as well as caused Dwight Eisenhower to create both the position of science advisor and to create the President's Science Advisory Committee (PSAC), which provided advice to the president on a variety of scientific and technological matters (Wang 2008, 74; Mooney 2005, 27-8). This period was generally a booming time for science; federal support for research grew as much as 14 percent annually between 1953 and 1961 (Jasanoff 1992, 195).

Arguably most important to the history of scientific integrity was the 1962 publication of Rachel Carson's *Silent Spring*. By rigorously but poetically detailing the dangers of America's use of pesticides, Carson's book sparked a sea change in the way Americans thought about chemicals. Her book spurred much of the modern environmental movement, which itself then spawned massive growth in the government's science-based regulatory apparatus (Griswold 2012). Johnson's Great Society, as the historian Rick Perlstein wrote, included "a whole new category for

the liberal agenda, environmentalism: a Highway Beautification Act, a Water Quality Act, a Clean Air Act, bulldozed through as if the opposition from the Big Three Automakers, the advertising industry, and the chemical industry weren't even there" (Perlstein 2008, 13). While the 1970s churned out much stronger versions of this initial legislation, these earlier laws served as the basis of a regulatory apparatus that relies on science for public health and environmental protections. These science-based regulations—both because of their economic impact upon industries and their portrayal by opponents as symbols of federal government overreach—have faced significant political pushback over time. While it is possible to reduce regulations without committing scientific integrity violations, the way political actors have tried to undercut these Congressionally-mandated regulations has often led to such violations.

Even before the rise of much of this science-based regulatory state, several key patterns of scientific integrity violations emerged. An incident involving Allen Astin, who from 1951 to 1969 served as head of the National Bureau of Standards (NBS), a non-regulatory agency in the Department of Commerce now known as the National Institute of Standards and Technology, provides an early example of unjustly firing a scientific agency head for political reasons. In the late 1940s, a California businessman who manufactured AD-X2, a popular additive intended to prolong battery life, pressured the NBS to test the value of his product (Schooly 2006). After reluctantly conducting years of tests, the NBS found no benefits from the additive, and the Post Office followed up on the NBS's findings by issuing a postal fraud order banning the use of mail to advertise the product (Sullivan 1984). This outcome did not sit well with Eisenhower's new administration, as the president had recently campaigned in part on a pledge to protect small businesses from the federal government (Schooly 2006). As a result, in 1953, incoming Secretary of Commerce Sinclair Weeks fired Astin, in doing so acknowledging that he himself was not "a man of science" but that Astin should have considered "the play of the marketplace" (Greenberg 1997). Outcry from media and scientific institutions quickly followed; a *Science* editorial argued that "great concern has been evinced over the possibility that scientific objectivity has been subjected to political interference," while the *New York Times*

opined that “the Secretary seems to be bent on having the bureau treat commercial products submitted for testing in a way that will satisfy business men rather than objective scientists” (*Science* 1953; *New York Times* 1953). The pressure worked; following the public pushback, Astin was reinstated.

Under Lyndon Johnson, politics also wormed its way into the new presidential science advising process. While supporting Johnson against the deeply conservative Barry Goldwater in the election of 1964 was the first time many scientists had entered the political arena at all, Johnson somewhat betrayed their trust by politicizing PSAC. Under Eisenhower and his successor, President John F. Kennedy, members of PSAC had been considered on scientific merit only; as historian Zuoyue Wang argued, during those administrations, “the ideal of science as an objective pursuit of truth and scientists as a source of disinterested technical advice on public policy, although increasingly challenged, largely held” (Wang 2008, 198). In 1967, however, Johnson became so enraged by criticism of the Vietnam War from the scientific community that, as Wang described, “the White House, if not Johnson himself, began to impose, for the first time in PSAC’s history, an explicit political test in the selection of its panel members based on their attitudes toward the Vietnam War” (Wang 2008, 262). While the Johnson administration was technically within its right to reduce the independent nature of PSAC, the episode served as a turning point in the broader history of the interaction between science and political interests and foreshadowed future issues with agency-level scientific advisory committees.

IV. Regulations to Restrictions: Richard Nixon (1969-1974) and Jimmy Carter (1977-1981)

By the mid-1970s, the expansion of government science began to face significant pushback within the political portion of the executive branch. As the economic and political atmospheres grew increasingly unstable, the presidents of the decade struggled to balance implementation of new public health and environmental safeguards with other demands.

The science-based regulatory state grew significantly in the early years of Richard Nixon’s presidency, especially with regards to environmental regulation.

Nixon may not have much cared about the issues at hand—his second science advisor, Edward David, Jr., once quoted a friend’s sentiment that “Ed David was bartender to a teetotaler”—but he was an astute reader of public sentiment (David, Jr. 1987, 39). Already powerful by the late 1960s, the environmental movement gained even more momentum in Nixon’s first year following the Santa Barbara oil spill and the Cuyahoga river catching fire (again) soon after (Graham 2015, 224). The movement’s power was such that Nixon’s 1970 New Year’s speech mentioned environmental protection so fervently that his line “it is now or never” even got placed on the latest edition of *Silent Spring* (Perlstein 2008, 461). Consequently, during Nixon’s presidency, a pro-environment Democratic Congress enacted important pieces of legislation such as the National Environmental Policy Act, the Endangered Species Act, and the Clean Air Act of 1970. Meanwhile, Nixon himself gave the 1970 order reorganizing several existing entities into the new Environmental Protection Agency (EPA).

Even as Nixon and his successors Gerald Ford (1974-1977) and Jimmy Carter continued to sign science-based legislation, the political environment was beginning to turn against public health and environmental protections. As historian Judith Layzer noted, “the sweeping health, safety, and environmental regulations of the late 1960s and early 1970s galvanized an already disenchanting business community” (Layzer 2012, 50). Industry anger at these regulations helped accelerate the rise of conservative think tanks such as the Heritage Foundation, which helped spread antiregulatory ideas and would become known for their strident denials of climate change. (Dunlap and McCright 2015, 304). The rise of extreme forms of neoliberalism was aided by the political and economic unrest of the decade. Crises including Watergate, the international monetary jolts, the combination of inflation and stagnant growth, and the oil shocks all helped create a receptive public audience in which these reborn conservative ideas could take hold (Layzer 2012, 47). While scientific integrity violations have continued under both parties, the factors playing a role in the rebirth of the conservative movement in this era tipped the scales toward the Republican Party as the side more likely to commit broad scientific integrity violations in the 1980s and beyond.

As the Nixon administration turned away from science-based safeguards and toward the economy, his administration made several attempts to insert industry into the science-based regulatory process in ways that went outside the business community's legal role. By 1970, Nixon—already critical of the regulations pouring out of his administration—created the National Industrial Pollution Control Council (NIPCC), an advisory committee within the Department of Commerce that was made up exclusively of industry executives (Layzer 2012, 29; Rodgers Jr. 1972, 720). Ostensibly an outlet to “provide a direct opportunity for business and industry leaders to actively and visibly support the drive to abate pollution from industrial sources,” (Nixon 1970) NIPCC more often served as a mechanism for industry to repel science-based regulations (Rodgers Jr. 1972, 720-1). A contemporary analysis published in a law review reported that in at least two situations where the government backtracked—with air pollution standards for smelters and with the use of phosphorous in detergents—“there is evidence that NIPCC has supplied invaluable inside-track opportunities for those who would redirect government policy” (Rodgers Jr., 720, 743). Nixon was eventually forced to disband the council after Congress declined to appropriate funding in 1974 following “fox in the henhouse” concerns (Layzer 2012, 40). Nixon's first EPA administrator William Ruckelshaus, however, did note that “NIPCC did get some pledges of compliance from industries and some agreement on clean-up steps they were willing to take” (EPA 1993).

The Nixon administration pioneered the modern iteration of targeting science-based regulations—and even scientists themselves—using the budget process. Through its “Quality of Life Review,” the administration used the new Office of Management and Budget (OMB) to improperly delay or weaken regulations. While this review theoretically served as a legitimate interagency review system, in practice, the Nixon administration used it almost exclusively to target EPA regulations (Burger 1980, 92). As historian J. Brooks Flippen wrote, “However sensible it appeared, the White House intended the Quality of Life Review as further restraint on the environmentalists in its midst” (Flippen 2000, 146). Almost all administrations since Nixon's have been

accused of improperly using OMB to stall or edit science-based regulations. In another notable budget incident, Nixon tried to target Kennedy's science advisor (and Nixon “enemies list” member) Jerome Weisner, then serving as president of MIT. Angered by Weisner's comments criticizing anti-ballistic missiles, a technology Nixon supported, Nixon attempted to retaliate (Layzer 2012, 47). *Science* reported that “In the last 2 years, highly placed White House staffers and perhaps the President himself, apparently considered cutting off federal research funds to the Massachusetts Institute of Technology as a political reprisal against its president” (*Science* 1973, 244). One OMB employee later noted that the *Science* story “didn't tell it all” and recalled how after being ordered to cut MIT's federal support by 50 percent—with no explanation—he and other staff merely pretended to “show that funds to MIT were in fact being cut. I was lying through my teeth, but what could I do?” (Loweth 1987, 51).

While the Weisner incident is a case of a president targeting a scientist who is outside the government, both the Nixon administration and the Carter administration used their political power to undermine federal scientists as well. In one of the more well-known cases from the Nixon years, Nixon strongly supported federal funding of the Supersonic Transport System, an aircraft meant to carry passengers farther distances at dramatically higher speeds. While supporters of the system pointed to its transportation benefits, its detractors noted its soaring budget, loud noise, and effect on the environment (*Time* 1970). Many members of PSAC were in the detractor camp, most notably PSAC member Richard Garwin, who eventually testified for Congress against the plane (Lydon 1970). In retaliation, Nixon eliminated the science advisor's office and dissolved PSAC (both of which would be revived by subsequent administrations) (Mooney 2005, 34). Journalist Chris Mooney has argued that Nixon's disbanding of PSAC was “a landmark moment in the relationship between scientists and government, and one that laid the groundwork for much of the politicization that came later” (Mooney 2005, 34). Meanwhile, in a slightly lesser-known incident, in 1969, partisanship led Nixon to withdraw his nomination for longtime PSAC member Franklin Long to lead the National Science Foundation, a position that had always been apolitical. While the Nixon administration claimed that the decision was

based on Long's opposition to anti-ballistic missiles—which would have already been an unprecedented political consideration—further investigation in the ensuing weeks found that “opposition from the Republican side of Congress seems to have been a major factor in persuading the White House that the Long nomination should be dropped” (*Science* 1969, 406). As *Science* reported at the time, “the Long affair provoked quick cries of indignation from the scientific community” and “all four previous science advisers, in response to queries from *Science*, said that they were upset over the implications of the Long incident” (*Science* 1969, 406). While Nixon was within his legal right to replace Long, it marked another instance of political intrusion into previously apolitical science positions.

This specific trend continued under the Carter administration. By the time Carter took office in 1977, the economy was struggling, with the ongoing energy crisis contributing significantly to the economic issues and related social malaise. Arguably, the oil crisis led to Carter's two most notable instances of targeting scientists. In 1977, Carter's team pulled a surprise move by replacing Vincent McKelvey, the director of the United States Geological Survey (USGS). McKelvey's firing was the first time in the agency's history that a director had been replaced by an incoming administration, and McKelvey's supporters at the time charged that Carter's actions unjustifiably politicized a science-based agency (Lyons 1977). By 1977, tensions over political interference in science were high; after his firing, McKelvey received four different telephone calls from Capitol Hill. The two Democrats wanted to know if his ouster meant that the White House wanted more political control over the USGS; the two Republicans wanted to know if he was fired because he believed there to be more oil and gas in the ground that the Carter administration's position on the subject declared (O'Toole 1977). A *Washington Post* investigation into McKelvey's firing found that while there were no clear answers, McKelvey's lack of ability to read politics—and his lack of friends in the White House and Capitol Hill—played a role (O'Toole 1977). As with the Long incident, Carter was within his right to fire McKelvey, but the incident notably added politics to a previously apolitical position.

The question of oil and gas reserves led to the Carter administration's other instance of targeting

scientists. Also in 1977, Carter's team assigned government chemical engineer Christian Knudsen to head a task force within the Market Oriented Program Planning Study that would examine the supply and production costs of natural gas for the next few decades. Knudsen's optimistic calculations, however, displeased the administration, whose National Energy plan projected a dire forecast. Knudsen's work was subsequently buried by the administration and Knudsen himself was fired as chairman of the task force. The *Washington Post* found after conversations with other government employees that the issue “was not the eternally arguable validity of Knudsen's curves, but the existence of slippery slopes awaiting those in the energy bureaucracy who may somehow be tainted by heresy” (Mintz 1977). After his firing from the task force, Knudsen returned to his previous government position, but the story of his buried economic data would play out for months.

V. Rollback and Recovery: Ronald Reagan (1981-1989)

The final two decades of the century consisted of a quick, sharp increase in scientific integrity violations followed by a long period of reduced conflict. That early increase—which occurred in the first few years of Ronald Reagan's administration—is notable for the precedents it set in destabilizing the scientific apparatuses of the executive branch. While issues with scientific integrity had, as already noted, occurred for decades, they bloomed under the first three years of the Reagan administration.

The Reagan administration came into such conflict with science and scientific agencies in part because it was the first administration to truly challenge the growth in government science and science-based regulations that had occurred since World War II. As academics Michael Kraft and Norman Vig summarized, “Both the Carter administration and Congress had shown increasing interest in the use of cost-benefit analysis to improve the efficiency of environmental programs, but neither had questioned the basic premises and goals of the ‘environmental decade’ of the 1970s. By 1980 progressive environmental administration appeared to have matured into a permanently institutionalized and publicly accepted function of government” (Kraft and Vig 1984, 416). Reagan, however, challenged this

seemingly accepted status quo, and in many ways his confrontation with these institutions reflected the changing public mood. As sociologists Riley Dunlap and Aaron McCright noted, “The Reagan administration rode the crest of antigovernment sentiment by implementing a neoliberal program of reducing governmental regulations, especially environmental ones” (Dunlap and McCright 2015, 305). The zeal with which the administration attempted to rapidly cut government science, science-based regulations, and advance its ideological agenda directly led to many of the relevant conflicts of this era.

One pattern pioneered by the Reagan administration in its efforts to dismantle public health and environmental safeguards was to nominate agency heads openly hostile to the science-based mission of their agencies. The administration made its position clear that “the common thread is of less regulation on business enterprises” by hiring administrators such as lawyer James Watt and former Colorado legislator Anne Gorsuch to run the Department of Interior (DOI) and EPA, respectively (Raines 1981). Prior to their federal government tenures, both Watt and Gorsuch—allies from their time together in Colorado—had repeatedly challenged federal environmental regulations (Lash, Gillman, and Sheridan 1984, 6-9). The administration’s explicit goal was to put that antagonism into action; Gorsuch’s deputy John Hernandez recalled that when interviewed for the EPA by two of Reagan’s deeply anti-regulatory OMB selections, he was asked if he “would be willing to bring EPA to its knees” (Burford and Greenya 1986, 84). Additionally, conflicts of interest abounded among the lower-level political hires. Such employees included Kathleen Bennett, a former paper industry lobbyist tapped to run EPA’s air program, and James McAvoy, an appointee to the Council on Environmental Quality (CEQ) who as chief pollution officer in Ohio had fought for relaxed air quality standards that would have allowed for the burning of soft coal (Raines 1981; Lash, Gillman, and Sheridan 1984, 31). Rita Lavelle, who was hired to run the new Superfund program cleaning up hazardous waste sites, was a former Aerojet public relationships employee who eventually brought down both herself as well as Gorsuch in a broad investigation relating to her failure to immediately recuse herself from a toxic dumping case involving her former employer (Shabecoff 1984). While

newspapers did critique these hires and their actions, Ruckelshaus—who took over the EPA again in 1983 after Gorsuch’s resignation—argued what Gorsuch’s “political appointees had done was terrible [...] If anything, the press underplayed its seriousness” (EPA 1993).

Indeed, as one move, these political hires escalated the existing pattern of targeting career scientists and science policy staff whose work conflicted with the administration’s agenda. At the administration’s start, new EPA staffer and former Heritage Foundation employee Louis Cordia created “hit lists” (based on comments almost entirely from industry or conservative groups) of EPA staff and science advisory board members he wanted fired (Lash, Gillman, and Sheridan, 1984, 37). Comments on the list included statements like “clean air extremist” and “reported to be liberal and environmentalist” (*Science* 1983, 1303). Gorsuch’s team reportedly took action against several of these staffers, including firing the Chicago regional enforcement chief after she refused an unjustified transfer and transferring the director of the Office of Air Policy to keep him from working on acid rain (Lash, Gillman, and Sheridan 1984, 38-9). Ruckelshaus later noted that EPA career staff were aware of the hit lists and that “There were a lot of antics; it was almost *juvenile*. *Very clear* signals were sent out to the people of the agency which said, *we don’t trust you. We don’t trust you to do what we want done*. It generated enormous morale problems” (EPA 1993). This morale problem—combined with steep budget cuts—ultimately led to the hollowing out of the agency. By the end of fiscal year 1982, EPA staff had dropped by nearly 20 percent, more than three times the average for non-defense agencies, and 89 percent of EPA regulations were delayed, postponed, or behind schedule (Lash, Gillman, and Sheridan, 45-7, 62, 71). One result was that the agency’s data and analysis lost credibility (Kraft and Vig 1984, 428). Enforcement also dropped precipitously; a comparative analysis found that in Gorsuch’s first year as compared to Carter’s final months plus the transitional period, the number of enforcement cases the EPA referred to the Justice Department dropped from 198 to 31, and the number of cases the EPA filed in court dropped from 175 to 38 (Kurtz 1983c).

Across agencies, the Reagan administration dramatically increased the politicization of federal

science advisory committees and peer review panels. While Cordia's hit lists arguably impacted EPA advisory boards (more than 50 scientists were dismissed from EPA technical advisory boards in Reagan's first two years), issues arose for DOI, Department of Agriculture (USDA), and Food and Drug Administration (FDA) boards as well (Ruskauff 1983). At DOI, Watt dismissed scientists who were not card-carrying Republicans. Oceanographer Donald Boesch recalled how in 1983, he was one of seven scientists not reappointed to a DOI advisory committee on offshore oil and gas after the Republican National Committee (RNC) checked—and was displeased by—their voter registration (Boesch 2017). Watt's office had sent the list of names to the RNC, with a space next to each name for "yes" and "no," and the Department subsequently based their picks for advisors based on who the RNC checked off for "yes" (Ruskauff and Kurtz 1983). Scientists from both sides of the aisle attested that the panel had been non-partisan under Carter's administration (Ruskauff and Kurtz 1983). Meanwhile, at the FDA, news broke in 1982 that the administration was using political referrals to fill vacancies in the agency's advisory panel of experts (Reinhold 1982). One anonymous FDA scientist commented at the time that the administration was "trying to stack an obviously sensitive committee," and that for some of the candidates, their "main claim to fame is that they belong to certain groups or are with the Republicans" (Cohn 1982). At USDA, to fill peer review panels, the Reagan administration attempted to use the practice of loyalty checks that favored scientists who were "philosophically compatible" with the administration (*Science* 1982). Most of these attempts to skew advice and reviews did not pan out. The USDA loyalty checks were quickly scrapped after bad publicity, and after Watt's resignation in 1983, his successor reversed the hiring policy for that committee and reinstated some of the former scientists while excluding the RNC-approved choices (*New York Times* 1982; Boesch 2017).

The case of the chemical formaldehyde at the EPA demonstrates two more trends escalated by the Reagan administration: inappropriately allowing conflicts of interest into the science-based decision-making process and misrepresenting the best available science. In the final year of the Carter administration, following confirmation that formaldehyde caused a statistically significant

increase of nasal cancers in rats, EPA staff recommended top priority review for the chemical (Lash, Gillman, and Sheridan 1984, 151). Further steps were derailed, however, after Hernandez created a "Science Court" to debate the science on formaldehyde and another industrial chemical, DEHP. Of the nearly 100 people who attended the six "Science Court" meetings in which outsiders came to question the EPA staffers who conducted the technical analyses on the chemicals, "not one represented environmental or public interest groups and all but five were from EPA industries concerned with the two chemicals" (Omang 1981). Following the meetings, government action on the chemical was scrapped. Subsequently, political hire John Todhunter (who was questioned by House Democrats in 1982 for meeting with chemical industry officials prior to making decisions favorable to the industry) wrote the supposedly science-based decision justifying the administration's inaction on formaldehyde (Kurtz 1983a). His justification, however, differed from the established scientific policy supported by the top scientists in the field (Lash, Gillman, and Sheridan 1984, 153). At House hearings on the subject, one prominent toxicologist noted that "The document is remarkable in the sense that in each issue an extreme position is taken relating to the probable non-significance of the data on formaldehyde. It would perhaps be understandable for such an analysis to be prepared by industry...To be put forward as a dispassionate examination of evidence...must be viewed as irresponsible" (Lash, Gillman, and Sheridan 1984, 155). The head of the EPA scientific advisory committee on Carcinogenic Risk Assessment added "The exposition of the science was clearly tailored to fit the decision" (Lash, Gillman, and Sheridan 1984, 155). Todhunter acted similarly over the carcinogenic pesticide ethylene dibromide (EDB); a senior science advisor recalled Todhunter proposing that she alter her risk assessment with a scientific theory she had never heard of in order to obtain a smaller risk figure, and when she refused to conduct such an assessment, the press release on the pesticide ran with the assessment that came from Todhunter's method (Lash, Gillman, and Sheridan 1984, 173). Misrepresenting science went far beyond mid-tier political hires at agencies. In several well-documented cases—most notably on the effects of acid rain, the health risks of abortion, and the feasibility of the Strategic Defense initiative—

members of the White House and even sometimes the president himself pushed or attempted to push scientific misinformation to the public (Oreskes and Conway 2010, 98; Mooney 2005, 42-7).

The Reagan administration also built on the Nixon-pioneered idea of using the budget to delay or weaken regulations outside of the legal ability of that office. The Reagan administration utilized the new OMB-based Office of Information and Regulatory Affairs (OIRA), established in 1980 through the Carter-signed Paperwork Reduction Act, to undercut many science-based regulations. Under Reagan's Executive Order 12291, agencies were required to submit to OIRA a regulatory impact analyses that quantified the costs and benefits of each rule. In practice, the order let OMB "review agency actions on the basis of gut instincts and industry complaints" (Lash, Gillman, and Sheridan 1984, 24). A 1985 Congressional investigation reported "instances of arbitrary delays in the OMB review process," "the modification or complete displacement of technical, scientific, and policy judgments of agency officials as a result of OMB pressure," and "secret meetings between OMB officials and affected industry representatives" (Shanley 1992, 66). John Daniel, Gorsuch's former chief of staff, had testified before Congress in 1983 that after industry input, OMB used "tremendous pressure" and "veiled threats" to prevent the EPA from issuing particular rules (Kurtz 1983b). Daniel charged that OMB, as Layzer summarized, "tried to dictate regulations to the agency, threatened reprisals, and urged that cost factors be built into health rules even when the law prohibited doing so" (Layzer 2012, 100). While legally and ethically questionable uses of the budget had been growing for administrations, the Reagan administration ensured that OMB became a truly potent force for blocking science-based regulations that conflicted with the administration's ideology.

VI. The Rise of "Scientific Integrity": George W. Bush (2001-2009) and Barack Obama (2009-2017)

While science was not entirely restored to federal policymaking under the administrations of George H.W. Bush (1989-1993) and William Clinton (1993-2001), there was notably less contention over science in the executive branch in that period as compared to the 1980s. Between 2001 and 2016, political

interference in science and the science policy process of the federal government again became significant news. While political interference on environmental issues were increasingly tracked across agencies since the Reagan administration, the George W. Bush era marked a change as Congress, journalists, and non-profits followed and connected issues across science more broadly.

Until the current Trump administration, the Bush administration was widely regarded as the most antagonistic toward science and science policy in modern history (Branscomb 2004, 54; Grifo et al. 2008 5, 26; Mooney 2005, 5). By the end of Bush's second term, a collection of case studies put together by the non-profit Union of Concerned Scientists (UCS) documented nearly 100 instances between 2001 and 2009 of what it considered political attacks on the federal science apparatus (UCS n.d. a). Only three years into Bush's first term, the widespread nature of these attacks prompted a group of senior scientists who had advised every Republican and Democratic administration dating to Eisenhower to pen a letter entitled "Scientist Statement on Restoring Scientific Integrity to Federal Policymaking." The statement accumulated signatures by nearly 15,000 scientists, including 20 Nobel laureates, over the next four years. The letter read:

When scientific knowledge has been found to be in conflict with its political goals, the administration has often manipulated the process through which science enters in its decisions. This has been done by placing people who are professional unqualified or who have clear conflicts of interest in official posts and on scientific advisory committees; by disbanding existing advisory committees; by censoring and suppressing reports by the government's own scientists; and by simply not seeking independent scientific advice. Other administrations have, on occasion, engaged in such practices, but not so systematically nor on so wide a front (UCS 2004).

In many cases, the Bush administration was carrying out both more extreme versions and simply *more* of the scientific integrity violations seen under former administrations. Scientific advisory committees had been skewed many times before, but the Bush administration politicized them further. In the case of

an advisory committee at the Centers for Disease Control (CDC), the secretary of the Department of Health and Human Services took the unprecedented step of rejecting CDC scientist-selected experts for a lead advisory committee and instead replaced them with appointments more likely to oppose tightening the federal lead poisoning standard. A congressional review found that at least two of the new appointments had financial ties to the lead industry, and one—who held what other researchers considered “fringe” views on lead poisoning—had previously testified on behalf of Sherwin-Williams paint company in a lead poisoning case (UCS n.d. d). In another case, in 2002, the State Department successfully opposed the re-appointment of Dr. Robert Watson, a top climatologist, to chair the Intergovernmental Panel on Climate Change. ExxonMobil had apparently lobbied against Dr. Watson’s reappointment soon after Bush took office, with a February 6, 2001 memo from Exxon to a CEQ employee reading, “Can Watson be replaced now at the request of the U.S.?” (U.S. House of Representatives 2003, 17-8). The Bush administration also rejected or dismissed scientists for political reasons from advisory boards at the National Institute of Health, National Institute on Drug Abuse, and the President’s Council on Bioethics (Grifo et al. 2008, 33).

The Bush administration also escalated the targeting of career staff at science agencies, most notably in the case involving James Hansen, NASA’s top climate scientist. As the *New York Times* reported in its initial Hansen story in 2006, the agency’s public affairs officials were ordered to review Hansen’s upcoming papers, lectures, and posters, and had told him that there would be “dire consequences” if he continued to speak out about global warming (Revkin 2006). While much of the blame for NASA’s suppression of scientists initially fell on a low-level political hire, a later investigation revealed that the orders for silencing Hansen and other scientists came from much higher, including from Dean Acosta, Bush’s hire for the second-in-command role in NASA’s public affairs office (Bowen 2008, 43). The issue partly was, as investigation concluded, “the political appointees in public affairs seemed to believe that they had some sort of executive authority” (Bowen 2008, 43). As with the skewing of advisory committees, targeting scientists was not limited to one agency; similar

stories appeared across the executive branch (UCS n.d. b).

Particularly notable within the Bush administration’s violations of scientific integrity was the editing of scientific documents. In one case, Julie MacDonald, the deputy assistant for Fish and Wildlife at the Department of Interior, resigned after documents released in 2006 revealed that she had edited scientific reports to limit protections for potentially endangered species. As the *Washington Post* described, “The documents show that MacDonald has repeatedly refused to go along with staff reports concluding that species such as the white-tailed prairie dog and the Gunnison sage grouse are at risk of extinction,” and that “staff complaints that their scientific findings were overruled or disparaged at the behest of landowners or industry have led the agency’s inspector general” to become involved (Eilperin 2006). The inspector general reports themselves revealed both the breadth of MacDonald’s interference as well as issues of conflicts of interest; one of the reports noted that in the case of the Sacramento splittail fish, McDonald owned a farm near the fish’s habitat but that “Despite this potential conflict, MacDonald significantly participated in the editing process for the splittail” (DOI OIG 2008). Additionally, Phil Cooney, a former oil industry lobbyist tapped to head CEQ, was found to have significantly downplayed a discussion of global warming risks from an EPA draft report on the environment (Revkin 2005). Cooney’s actions prompted second-ever administrator of the EPA Russell Train to pen a letter to the *New York Times* in which he wrote that “I can categorically state that there was never such White House intrusion into the business of the E.P.A. during my tenure” (Train 2003). Overall, a 2006 survey of federal climate scientists at five agencies found that 73 percent of respondents reported having perceived inappropriate interference with climate science research in the past five years, while 43 percent of respondents had personally perceived or experienced changes or edits to documents during review that changed the meaning of the scientific findings (UCS 2006).

In addition to outright editing science, the administration more subtly spread disinformation. Early in Bush’s first term, a group of anti-abortion activists complained to the Secretary of Health and Human Services that the National Cancer Institute’s

(NCI) fact sheet stating that there is no association between abortion and breast cancer was “scientifically inaccurate and misleading” (*New York Times* 2003). As a result, in mid-2002, NCI replaced the sheet with a statement that said some studies found an increased cancer risk while others did not. The *New York Times* opined that “That statement, while technically accurate, is such an egregious distortion of the evidence that one can only hope it is an interim statement, as some staff members suggest, not a final surrender” (*New York Times* 2003). After members of Congress protested, NCI held a conference of experts to discuss the scientific data, and in March 2003 the NCI website was updated to reflect the conclusion that abortion is not associated with breast cancer (U.S. House of Representatives 2003, 11). Similar editing occurred with both CDC and State Department fact sheets and pages on condom use, which removed information of condom effectiveness (Clymer 2002; U.S. House of Representatives 2003, 12).

The Bush administration also engaged in what UCS labeled “changing the rules” (Grifo et al. 2008, 34). Part of this category involved another evolution of OMB interference. While OIRA had typically been the haunt of economists and policy analysts, in 2003 it hired a small cadre of scientists in an attempt to create in-house expertise. OMB used its science to force changes or withdrawals of many EPA rules and procedures, including decisions on formaldehyde, particulate matter air pollution, ozone air pollution, and the climate endangerment finding (UCS n.d. e). Under Bush, OMB also proposed a peer review policy that several members of Congress decried as “a wolf in sheep’s clothing” (Waxman et al. 2003). As UCS described, the original peer review proposal—the final version was somewhat revised—would have “created an imbalance towards the selection of industry-funded peer reviewers” as well as been costlier and more time-consuming than existing peer review systems (UCS n.d. e). OMB used the Data Quality Act—a two-liner rider in an appropriations bill that has primarily been used by industry to derail science-based regulation—to justify the peer review guidelines (Mooney 2005, 103-4). In another incident, OMB withdrew a proposal for measuring risks to human health—co-written by then-OMB employee and current EPA Deputy Assistant Administrator Nancy Beck—after the National Academy of Scientists called it “fundamentally

flawed” (Lipton 2017b). Inside and outside of OMB, however, political interference was again not limited to lower level political appointees. In several cases, Vice President Dick Cheney was found to be have personally intervened in science-based environmental decisions to benefit businesses (Becker and Gellman 2007).

The 2008 election appeared to usher in a new era for scientific integrity. The Obama administration quickly made scientific integrity explicitly central to its mission; in addition to promising in his inaugural speech to “restore science to its rightful place,” in an April 2009 speech before the National Academies of Science, Obama noted that “we have watched as scientific integrity has been undermined and scientific research politicized in an effort to advance predetermined ideological agendas” (Obama 2009a; Obama 2009b). While these speeches emphasized Obama’s commitment to upholding scientific integrity in the federal government and his administration’s records on science policy show that scientific evidence was often considered in the formation of science-based policies, the administration did not always adhere to its own established values.

Indeed, an early issue came with the delay in the administration’s own timeline for restoring scientific integrity to federal agencies. While the White House quickly appointed John Holdren as science advisor and re-promoted this position to Assistant to the President (it had been demoted under the Bush administration), it was less swift in its promised creation of scientific integrity policies. Although Obama’s March 2009 directive called for the science advisor to create recommendations within 120 days for presidential action on scientific integrity, Holdren did not release his memorandum on scientific integrity policies until December 2010 (Obama 2009c; Holdren 2010). The administration was so late in releasing its guidance that a non-profit organization sued for Freedom of Information Act (FOIA) documents explaining the delay (SEJ 2010). Some departments did not wait for the administration’s lead; in September 2010, the Secretary of the Interior issued his own Secretarial Order to create a Department-wide scientific integrity policy (DOI 2010). Eventually, Holdren issued his memorandum, and by the end of the

Obama administration, 28 agencies had created integrity policies.

These scientific integrity policies vary in strength and scope. Some agencies created internal infrastructure to protect science and agency scientists, and many also devoted resources to their new scientific integrity policies and appointed scientific integrity officers to oversee implementation of the policies. For example, the EPA's scientific integrity policy established a Scientific Integrity Official whose role is to "champion scientific integrity throughout the Agency" (EPA 2012, 1). Furthermore, the policy states that this lead official "chairs a standing committee of Deputy Scientific Integrity Officials representing each EPA Program Office and Region" (EPA 2012, 1-2). Issues of scientific integrity were also woven into other policies at agencies. For example, the communications policy at the Department of Commerce (DOC) "allows scientists to engage in oral fundamental research communications (based on their official work) with the media and the public without notification or prior approval to their supervisor or to the Office of Public Affairs" (DOC 2008, 2). However, the Department of Defense (DOD) scientific and engineering integrity policy requires agency pre-approval for federal scientists to speak to the media (DOD 2012, 2). Some policies also give scientists a right of last review on documents (e.g., press releases) dealing with their work; some promote the professional development of scientists; others detail a process by which the agency keeps track of scientific integrity violations filed.

Despite these policies, the Obama administration occasionally fell short of its own published standards. In the case of emergency contraception, the administration consistently undercut the FDA's attempts to move forward on a drug science had shown was safe. Critically, the FDA is legally bound to only consider evidence when making drug approval decisions (Junod 2013). The Plan B controversy began under the Bush administration, which rejected the advice of FDA's science advisory board and the agency's own staff scientists when turning down the application by the manufacturer of Plan B to become an over-the-counter (as opposed to prescription-only) product (Goldman et al. 2017, 15). After years of wrangling over age limits for the medication's over-the-counter accessibility, in 2011, Plan B's manufacturer submitted an application to remove the

age limit altogether for over-the-counter access (Melnick 2011). While Obama's FDA commissioner and science advisors supported the application, the Secretary of Health and Human Services overruled the FDA, stating concerns about potential health effects of the drug on 10- and 11-year-old girls (Harris 2011). Obama publicly supported this rejection despite scientific evidence showing that the drug did not have negative health effects on young women (Belluck 2013). In April 2013, a judge ordered the FDA to make emergency contraception available to women of all ages, arguing that the Secretary's action was "politically motivated, scientifically unjustified, and contrary to agency precedent" (Belluck 2013). The Obama administration initially appealed the decision, but dropped the appeal in June 2013 (Dennis and Kliff 2013).

The Obama administration also had some missteps regarding a report on the effects of hydraulic fracturing on water quality. The EPA released a draft report in June 2015 suggesting the agency had found hydraulic fracturing could present risks for drinking water contamination and lamenting a lack of access to data to determine the safety of the process. Yet the executive summary and associated press materials distorted the report's findings, claiming that the agency did not find "wide-spread, systemic impacts" (Lott 2015). The EPA's Science Advisory Board (SAB), its primary federal science advisory board, determined the EPA did not provide quantitative evidence to support its claim that hydraulic fracturing did not have wide-spread, systemic impacts on drinking water (Scheck and Tong 2016). Following this report, the EPA deleted the language from the executive summary.

The Obama administration did make significant gains in returning science to policymaking. The administration recognized climate science, acknowledged the risks associated with climate change, and allowed federal climate science to communicate their expertise publicly and to inform policy. In 2009, the EPA was permitted to issue an endangerment finding that greenhouse gas emissions from motor vehicles endangered public health and welfare in the US (Freeman and Vermeule 2007). The endangerment finding had been sequestered under the George W. Bush administration, even though it was court-mandated. The Obama administration also took steps toward better disclosure to investors of

public companies' carbon footprints and efforts to reduce them with the release of the Securities and Exchange Commission guidance on climate change disclosure (SEC 2010).

VII. The Current Administration: Donald Trump (2017–present)

The Trump administration has been widely and sharply criticized for its subversion of the mandated role of science (and scientists) in the federal policymaking process. As this paper has shown, many of these patterns of scientific integrity violations undertaken by the Trump administration have existed for decades. Yet the Trump administration is notable both for the scale of its scientific integrity violations as well as the unique spin it has added to existing patterns. In some cases, the Trump administration has indeed pioneered new types of attacks on science. In the most notable echo of the Reagan administration, the Trump administration has hired a plethora of administrators and appointees that are antagonistic to the science-based mission of their agencies and with problematic ties to the industries they now oversee. Secretary of Energy Rick Perry previously led the boards of Energy Transfer Partners LP and Sunoco Logistics Partner LP, which together developed the Dakota Access Pipeline Project, now overseen by Perry (Braun 2016). Perry is additionally on record calling for the abolition of the federal agency that he now leads—though he reversed his stance after learning of its “vital functions”—and dismisses the science on climate change (Plumer 2016, Davenport 2017). Arguably most newsworthy, however, was former EPA administrator Scott Pruitt. A 2017 *New York Times* investigation found that in his previous job as Attorney General of Oklahoma, Pruitt “closely coordinated with major oil and gas producers, electric utilities and political groups with ties to the libertarian billionaire brother Charles G. and David H. Koch to roll back environmental regulations” (Davenport and Lipton 2017). A 2014 investigation by the paper had already found an instance in which Pruitt submitted a letter to the EPA on behalf of Oklahoma but failed to mention that the letter was drafted by Devon Energy, a major Oklahoma oil and gas company (Lipton 2014). As Attorney General, Pruitt sued the EPA 13 times and stated he does not think carbon dioxide is a major contributor to global warming (Mosbergen 2017). In July 2018, Pruitt

resigned and his deputy, former coal lobbyist Andrew Wheeler, took his place (Zhou 2018).

As had happened under the Reagan administration, both these appointees and similarly conflicted lower-level political hires have worked to undermine science-based processes and policies at their agencies. Nancy Beck, who joined the EPA after a five-year stint at the industry chemical group the American Chemistry Council, has been involved in several decisions at EPA that ultimately benefit her former employer (Lipton 2017b). Dr. Beck's revision of a rule dealing in part with perfluorooctanoic acid, commonly known as PFOA, worried the top official in the agency's Office of Water, who wrote that Dr. Beck's rewrites may result in an “underestimation of the potential risks to human health and the environment” caused by PFOA and related chemicals (Lipton 2017b). Beck, along with several other EPA employees who came either with backgrounds in industry or from Congressional offices long antagonistic to EPA's mission, also worked on a rule proposed in April 2018 that would significantly hinder the agency's ability to create public health safeguards by requiring all scientific information (data, models, methods) informing regulation at the agency to be publicly disclosed (Waldman 2018a). While ostensibly reasonable, this proposal is in fact a new version of long-failed “secret science” legislation inspired by tobacco industry tactics. As *The Intercept* noted about the 2017 version of the legislation, the “small group of lawyers and PR strategists orchestrating the secret science effort are closely tied to those attacking the EPA from within. All have connections to either big tobacco, oil, or both” (Lerner 2017). As information such as medical history cannot be made public, under the proposed rule (and previously under the failed legislation) the EPA would be prevented from using public important health studies. For example, Harvard's landmark Six Cities study, which strongly influenced government pollution standards, could no longer be considered (Dockery et al. 1993). Additionally, the transparency of scientific data and information already forms part of a strong foundation for research ethics and scientific integrity; scientists in academia are required to make all data and methodology publicly available if they receive grant funding from the NSF (NSF 2005).

The Trump administration is also undermining science advisory boards in similar fashion to the Reagan and Bush administrations. A January 2018 UCS report analyzed the record of scientific federal advisory committees under the Trump administration; the analysis included meeting and membership data from 73 advisory committees designated as “scientific and technical” across 24 departments, agencies, and subagencies within the DOI, EPA, FDA, CDC, DOC, and the Department of Energy (DOE), as well as interviews from 33 current and former committee members. This report provided evidence that science advisory boards at the EPA, DOE, and DOI met less often during 2017 than at any time since 1997 (the year the government started collecting such data) (Reed et al. 2018, 2). Additionally, fewer experts are serving on these committees than at any time since 1997, and the analysis found that the low numbers were not a product of 2017 being an administration’s transition year (Reed et al. 2, 4). At the EPA in particular, further changes ensured that boards would be tilted toward industry. In October 2017, Pruitt announced that scientists currently receiving grants could not serve on any agency advisory committee. As the 2018 UCS report noted, the policy, “issued with little justification and without precedent, creates a double standard: it forces out scientists who receive EPA funding, while tribal and state entities receiving EPA funding and industry scientists face no such restriction” (Reed et al. 4-5). This policy has significantly changed the makeup of the EPA’s main advisory committee, the SAB; between 2017 and 2018, the representation of academic advisors decreased 40 percent, while industry representation tripled (Reed et al. 6).

The Trump administration also has dictated what scientists can say in their work. In March 2017, a supervisor within the DOE’s International Climate Office asked staff to not use the terms “climate change,” “emissions reduction,” or “Paris Agreement” in any form of communication (Wolff 2017). In December 2017, staff at the CDC were told to not use seven words—diversity, entitlement, evidence-based, fetus, science-based, transgender, and vulnerable—in connection with a budget document they were submitting to the administration (Cohen 2017). Such word bans often lead to issues of self-censorship in which government scientists use different terminology that is not seen as politically

contentious in their work products in an attempt to push their science forward (Bar-Tal 2017). Self-censorship can be problematic as these alterations in language may distort scientific meaning and misinform public understanding of science and create additional burdens on government scientists that make their jobs difficult and stressful. These working conditions may decrease productivity, making it less likely that up-to-date scientific information is produced to inform science policy.

The Trump administration also has placed barriers on the professional development of government scientists. Most notably, many scientists have been barred from attending professional meetings that they would generally otherwise attend. In February 2017, the Trump administration pulled EPA staff from the Alaska Forum on the Environment, an annual conference on climate change and other environmental issues affecting the state (Waldholz 2017). The administration claimed that too much money had been spent in prior years on staff travel; however, some staff pulled from the forum could have walked to the meeting center from their homes or workplaces (Waldholz and Chappell 2017). In June 2017, the Trump administration barred technical experts from the United States from delivering scheduled talks at the International Conference on Fast Reactors and Related Fuel Cycles, a forum to discuss national and international nuclear energy programs (Negin 2017). In October 2017, three scientists slated to present on the effects of climate change on the Narragansett Bay ecosystem at a scientific conference were instructed by EPA officials not to speak. A group of New England members of Congress issued a letter to Pruitt demanding an explanation (Whitehouse 2017). Scientific integrity officials at the agency found that this act was in violation of the agency’s scientific integrity policy, and in response to the congressional letter, Pruitt promised to not let such actions re-occur (Friedman 2017).

While the Trump administration’s actions on scientific integrity are often extensions of patterns pioneered by previous administration even as the administration increases the scope and scale of these patterns, this administration’s actions are occasionally new. For example, the Trump administration has not manipulated scientific documents in the manner of the Bush administration.

Instead, reports show the Trump administration instead disregards the scientific information outright, even when produced by its own employees (Carter et al. 2017). In March 2017, Pruitt announced that the EPA would decline to ban the insecticide chlorpyrifos despite years of scientific study and deliberation indicating that it poses a clear risk to the health of children, farmworkers, and users of rural drinking water (Lipton 2017b). This decision conflicted with a finding from experts in the EPA's Office of Chemical Safety and Pollution Prevention that chlorpyrifos has harmful effects on children's brain development. The agency had recommended that any and all uses of chlorpyrifos be discontinued based on their scientific assessment (EPA 2017). Similarly, the Department of the Treasury ignored multiple economic studies that showed that Congress's proposed \$1.5 trillion tax reform would not grow the economy enough to meet the costs of the plan. While Treasury Secretary Steve Mnuchin promised that the Department had more than 100 people "working around the clock" on the issue, relevant staff in the department claimed they had been shut out of the process (Rappeport 2017). Other examples in which the Trump administration quashed scientific information included its halting of multiple cooperative studies with the National Academies of Science, Engineering, and Medicine (UCS n.d. c).

The Trump administration's scientific integrity violations are also set apart from other administrations in that the administration seems more willing to openly violate scientific integrity. For example, a superintendent for the Joshua Tree National Park was flown from California to Washington D.C. to be reprimanded for publicly commenting on the social media platform Twitter about how the impending effects of climate change would affect the park (Cama 2017). The administration made no effort to hide this reprimanding. Additionally, many alterations and deletions of scientific information have been made to public-facing agency web pages. The Environmental Data and Governance Initiative, an organization comprised of academics and non-profit employees that promotes open and accessible government data and information along with evidence-based policy making, documented in a report the exact changes the Trump administration made to government web content (Rinberg et al. 2018). A major finding of this report is that language about climate change has been

systematically changed across multiple agency and program websites. In many cases, explicit mentions of "climate change" and "greenhouse gases" have been replaced by "sustainability" and "emissions." This open content deletion received significant media coverage (Barron 2018; Davenport 2018; Geiling 2018; Wallace 2018). Christine Todd Whitman, George W. Bush's first EPA administration, said that the extent of changes to EPA's website was "to such an extreme degree that [it] undermines the credibility of the site" (Barron 2018).

Critically, the Trump administration also openly disregards the cost-benefit analysis model set by previous administrations. While even the Reagan administration acknowledged the potential economic advantages of regulations, the Trump administration refuses to make such an admission. In January 2017, Trump issued Executive Order 13771, on "Reducing Regulations and Controlling Regulatory Costs" (Trump 2017). As pointed out by Clinton OIRA administrator Sally Katzen, this executive order mentions "costs" 17 times while not mentioning "benefits" a single time (Clark 2018). Reagan's Executive Order 12291, in contrast, mentioned "cost" eight times and "benefit" eight times, including in the direction that for non-major rules agencies submit a "description of the potential benefits of the rule, including any beneficial effects that cannot be quantified in monetary terms, and the identification of those likely to receive the benefits" (Reagan 1981). Clinton's Executive Order 12866, which updated Executive Order 12291, mentioned both "cost" and "benefit" three times apiece (Clinton 1993). Rather than extend updates to cost-benefit analysis along the lines of previous administrations, the Trump administration takes an unprecedented approach in its presentation of the economics of regulations, including those based on science.

VIII. Conclusion and Recommendations

The Trump administration's actions toward science, science policy, and federal science agencies are deeply rooted in the past. Indeed, violations of scientific integrity have a long history in this country. Over the past 70 years, various forms of political interference in science and science policy have evolved consistently, with administrations across both parties drawing primarily from the same set of tactics. These patterns include skewing advisory

Table 1: Scientific Integrity Violations Past and Present¹

Types of Scientific Integrity Violations	Description of Violation	Historical Example of Violation	Trump Administration Use of Tactic	Preventative Mechanisms
Selectively editing documents, data, or websites	Political appointees have deleted evidence from scientific documents to reveal partial truths or exaggerate uncertainty	Bush administration (2001-2009): White House officials heavily edited a series of government reports to create the impression of uncertainty on climate change	Language on climate change has been systematically edited across government websites, with "climate change" and "greenhouse gases" often replaced by "sustainability" and "emissions"	Archive Data, FOIA, Media Investigation, Legal Recourse, File Allegation of Scientific Integrity, Inspector General Investigation, Congressional Oversight
Intentionally misrepresenting or tampering with the best-available science	Federal officials have intentionally misrepresented scientific data and employed flawed methodologies biased toward predetermined results	Reagan administration (1981-1989): An EPA political appointee's scientific justification for the administration's inaction on formaldehyde was later criticized as "irresponsible" and "clearly tailored"	An EPA political hire's revision of a rule on chemicals may lead to an underestimation of the potential risks of the relevant chemicals	FOIA, Media Investigation, Legal Recourse, File Allegation of Scientific Integrity, Inspector General Investigation, Government Accountability Office Report, Congressional Oversight
Unjustly firing, transferring, coercing, or demoting scientific staff	Federal officials have pressured scientists to change results and threatened, demoted, defunded, transferred those who do not comply	Carter administration (1977-1981): Displeased with a study that contradicted their energy policy, officials fired the study's author from his role on a task force and buried his work	Political appointees at DOI involuntarily reassigned about 50 senior department employees, with many of them—including those working on climate change and conservation—believing their transfer was politically motivated	Effective Use of Employees' Whistleblower Rights & Protections, FOIA, Media Investigation, Legal Recourse, Inspector General Investigation
Restricting staff communications	Federal officials have prevented scientists from communicating with the media, their colleagues, and the public	Bush administration (2001-2009): Public affairs officials told climate scientist James Hansen that there would be "dire consequences" if he continued speaking about global warming and they began to review his papers, lectures, and posters	CDC staff were instructed not to use words including "science-based" and "evidence-based" in a budget document	Media Investigation, File Allegation of Scientific Integrity and/or Agency Communication Policy; Congressional Oversight
Improperly weakening, disregarding, or revoking science-based regulations	Federal officials have subverted Congressional intent in the attempt to roll back science-based regulations	Nixon administration (1969-1974): OMB officials used the new interagency "Quality of Life" review to target proposed environmental regulations	The EPA ignored its own scientists' evidence on the dangers of the insecticide chlorpyrifos to avoid promulgating a science-based regulation	Legal Recourse, Media Investigation, Government Accountability Office Report
Shutting down or reducing enforcement systems with the goal of under cutting science-based regulations	Federal officials have intentionally reduced the ability of agencies to enforce science-based regulations	Reagan administration (1981-1989): During first Reagan EPA administrator Anne Gorsuch's first year, the number of cases the EPA referred to the Justice Department dropped from 175 to 38	Under the first year of the Trump administration, EPA fines dropped to \$1.6 billion, one-fifth of the total collected in the final year of the Obama administration	Legal Recourse, Media Investigation
Appointing unqualified or conflicted people for agency positions or advisory board roles	Federal officials have appointed or hired employees whose significant conflicts of interest or lack of qualifications impact their ability to make decisions based on the best-available science	Reagan administration (1981-1989): Conflicts of interest and antagonism to agency mission were rampant across agencies, most well-known in the cases of EPA administrator Anne Gorsuch and Secretary of the Interior James Watt	Scott Pruitt, Trump's first EPA administrator, earned comparisons to Anne Gorsuch for his antagonism to EPA's mission; he also maintained close ties to industries his agency regulated	Push for more Transparency on Conflicts of Interests and Recusal Documents for Political Appointees; Congressional Oversight, Media Investigation, FOIA
Hollowing out agencies	Incoming administrations have gutted the workforce at science-based agencies to undercut their ability to collect data or create science-based regulations	Reagan administration (1981-1989): By the end of fiscal year 1982, EPA staff dropped by nearly 20 percent, more than three times the average for non-defense agencies	By December 2017, more than 700 employees had left EPA, including more than 200 scientists	Push Congress to Increase Agency Budget, Ensure Congress Maintains Onboarding Mechanisms for Scientists at Agencies (grants, fellowships, scientific positions)

¹ Table adapted from source material in this paper as well as the additional sources: Doyle 2018; Friedman, Affo, and Kravitz 2017. Descriptions of the violations are adapted from Grifo et al. 2008.

committees; targeting individual scientists; appointing administrators with significant conflicts of interest; misrepresenting the best-available science; improperly editing scientific documents; reducing scientist communications; hollowing out agencies; and undercutting science-based policies using the budget process. While this paper is not meant to describe all scientific integrity violations in the United States since World War II, it is meant to contain enough detail to show that in many cases, the Trump administration's actions reflect a new evolution and escalation of patterns we have already seen. In some cases, the administration's actions can be considered unprecedented.

Scientific integrity violations have increased dramatically over time both because of changes in the federal government as well as changes to the political atmosphere in the United States. At a basic level, the growth of the science-based regulatory system means that there are simply more opportunities for political interests to improperly involve themselves in science and science-based regulations. Additionally, as federal science has increasingly tackled the public health and environmental problems stemming from industrial output—from the health effects of chemicals like dioxin to the climate change wrought by fossil fuel use—industrial interests have increasingly used their political might to undercut science-based regulations. The split in American political parties in recent years—with Republicans becoming increasingly antiregulatory and increasingly skeptical of credible science on issues like climate change—has additionally led to a preponderance of scientific integrity violations when the Republican party obtains office. While it is possible to reduce science-based regulations without violating scientific integrity, the speed at which recent Republican presidents have worked to roll back regulations has led to a preponderance of clear instances of improperly undercutting the federal regulatory process.

The breadth of scientific integrity violations is also affected by the political balance of the federal government. Critically, the Reagan administration was hamstrung by a Democratic House of Representatives that wielded oversight power. A recent paper comparing the EPA under Reagan, Bush, and Trump found through interviews with former Reagan-era EPA staff that these employees “pointed

to the key role of a Congress partly controlled by Democrats in investigating, halting, and ultimately toppling the Gorsuch regime” (Fredrickson 2018). Nixon too faced Congressional pushback, as demonstrated by Congress's refusal to fund NIPCC after members of Congress grew concerned about industry interference in science-based policymaking. Nixon also faced pushback from the courts; after Congress passed the Clean Water Act of 1972 over Nixon's veto, he impounded half the funds appropriated by Congress for the law. The Supreme Court subsequently found that “the president cannot frustrate the will of Congress by killing a program through impoundment” (Snider 2012).

These factors are all inextricably linked to the political environment of each era and the increasing polarization on scientific issues that has occurred over the last 40 years. Public outrage helped turn back some of the egregious scientific violations that occurred under previous generations. Yet, as the recent historical analysis on the EPA noted, “when Republicans have become so likely to mistrust science, when their rates of belief in anthropogenic climate change lie 35% below Democrats', when entire news outlets strive so devoutly to mirror the ideology of their audience, common touchstones that could stir broader outrage are missing” (Fredrickson 2018). Indeed, today's political environment makes restoring scientific integrity to federal policymaking a formidable challenge. Still, unlike under previous administrations, federal employees now operate with scientific integrity policies (and scientific integrity officers) in place, as well as with stronger whistleblower protections.

The actions of the current administration, however, make it clear that more reforms and oversight are needed. The following recommendations—primarily drawn from a July 2017 report by UCS—both fill the historical procedural loopholes highlighted by this paper as well as address modern iterations of scientific integrity violations. (Carter et al. 2017, 32-5).

Employees within the executive branch who witness abuses of science should report such abuses. Through both scientific integrity policies and inspector general offices, federal employees have tools to help them become whistleblowers. Meanwhile, members of Congress should bolster and protect the use of

science in decision-making. Congress can accomplish this goal by using its oversight authority to investigate potential abuses of science, conflicts of interest, and other ethical concerns. While the current political environment makes Congressional oversight unlikely under a Republican-controlled Congress, a flip in one or both of the houses makes oversight a potentially significant tool for combatting scientific integrity violations, as it was under the Reagan administration in particular.

Additionally, Congress should request a Government Accountability Office report on the effectiveness of scientific integrity policies that includes recommendations for enhancing existing policies. Congress should also close loopholes in the Federal Advisory Committee Act (FACA) as well as strengthen the Whistleblower Protection Act. Improving these laws would help keep advisory committees free of conflicts of interest and protect federal employees from retaliation. The Reagan and Bush administrations showed the potential for skewing federal advisory committees, a situation of which the Trump administration took advantage. Congress should strengthen FACA by requiring Committee members—both voting and nonvoting—to provide complete information on affiliations and conflicts of interest. In addition, Congress should hold hearings on the status of science advisory committees throughout the government to investigate whether they are serving the public interest by functioning as directed by law.

Meanwhile, as outside observers, the media have a responsibility to objectively report the truth. To combat the Trump administration's actions and

misinformation, reporters should objectively report science, hold the federal government accountable for attacks on science, and promote communications with federal scientists. This role is even more critical in an age where misinformation is spread quickly and widely over social media and in which the executive branch constantly attacks credible media outlets as “fake news.” The media played a significant role in documenting abuses of science during particularly the Reagan and Bush administrations, helping to create public outrage about such illegal activities.

Administrations are more than the sum of their controversies. Even the Reagan administration, among the most documented for scientific integrity violations, took such science-informed actions as signing the Montreal Protocol to ban ozone-depleting substances. Reagan stated upon joining the agreement that “the protocol is the result of an extraordinary process of scientific study, negotiations among representatives of the business and environmental communities, and international diplomacy. It is a monumental achievement” (Reagan 1988). But by examining how past controversies have transformed and re-emerged from administration to administration, we can better understand how current and future administrations may approach politically prominent science policy issues. Ensuring scientific integrity in federal policymaking requires vigilant watchdogging on the part of the media, Congress, and non-governmental organizations. By better understanding how political interference has historically undercut science, observers can better protect this critical part of democracy.

References

- American Scientist*. 1965. “The Integrity of Science: A Report by the AAAS Committee on Science in the Promotion of Human Welfare.” *American Scientist* 53, no. 2 (June): 174-198.
- Aton, Adam. 2018. “‘Bullied’ and ‘Harassed’—Zinke Foes Recall Past Scandals.” *E&E News*, May 15, 2018. <https://www.eenews.net/stories/1060081671>
- Barron, Laignee. 2018. “Here’s What the EPA’s Website Looks like After a Year of Climate Change Censorship.” *Time*, March 1, 2018. <http://time.com/5075265/epa-website-climate-change-censorship/>.
- Bar-Tal, Daniel. 2017. “Self-Censorship as a Socio-Political-Psychological Phenomenon: Conception and Research.” *Political Psychology* 38, no. 1.
- Becker, Jo and Barton Gellman. 2007. “Leaving No Tracks.” *Washington Post*, June 27, 2007. http://voices.washingtonpost.com/chenev/chapters/leaving_no_tracks/.
- Belluck, Pam. 2013. “Judge Strikes Down Age Limits on Morning-After Pill.” *New York Times*, April 5, 2013. <https://www.nytimes.com/2013/04/06/health/judge-orders-fda-to-make-morning-after-pill-available-over-the-counter-for-all-ages.html>.
- Boesch, Donald. 2017. “History Shows that Stacking Federal Science Advisory Committees Doesn’t

- Work." *Government Executive*, July 30, 2017. <http://www.govexec.com/oversight/2017/07/history-shows-stacking-federal-science-advisory-committees-doesnt-work/139682/>.
- Bowen, Mark. 2008. *Censoring Science*. New York: Penguin Group.
- BPC (Bipartisan Policy Center). 2009. *Improving the Use of Science in Regulatory Policy*. Washington, DC: Bipartisan Policy Center.
- Branscomb, Lewis M. 2004. "Science, Politics, and U.S. Democracy," *Issues in Science and Technology* 21, no. 1 (Fall): 53-59.
- Braun, Stephen. 2016. "Perry Brings Oil Industry Ties to Energy Department." *Associated Press*, December 14, 2016. <https://www.pbs.org/newshour/politics/perry-oil-industry-energy-department>.
- Burford, Anne M. and John Greenya. 1986. *Are You Tough Enough?* New York: McGraw-Hill.
- Burger, Jr., Ed. 1980. *Science at the White House: A Political Liability*. Baltimore: Johns Hopkins University Press.
- Cama, Timothy. 2017. "Zinke Reprimanded Park Head after Climate Tweets." *The Hill*, December 15, 2017. <http://thehill.com/policy/energy-environment/364994-zinke-reprimanded-park-head-after-climate-tweets>.
- Carter, Jacob, Gretchen Goldman, Genna Reed, Peter Hansel, Michael Halpern, and Andrew Rosenberg. 2017. *Sideline Science Since Day One: How the Trump Administration Has Harmed Public Health and Safety in Its First Six Months*. Cambridge, MA: Union of Concerned Scientists.
- Clark, Charles. N.d. "The Trump Administration's War on Regulations." *Government Executive*. Accessed June 2, 2018. <https://m.govexec.com/feature/trump-administrations-war-regulations/>.
- Clymer, Adam. 2002. "U.S. Revises Sex Information, and a Fight Goes On." *New York Times*, December 27, 2002. <https://www.nytimes.com/2002/12/27/us/us-revises-sex-information-and-a-fight-goes-on.html>.
- Cohen, Jon. 2017. "CDC Word Ban? The Fight over Seven Health-Related Words in the President's Next Budget," *Science*, December 17, 2017, <http://www.sciencemag.org/news/2017/12/fight-over-seven-health-related-words-president-s-next-budget>.
- Cohn, D'Vera. 1982. "The Reagan Administration Tuesday Denies as 'Totally Without Foundation.'" *UPI*, June 8, 1982. <https://www.upi.com/Archives/1982/06/08/The-Reagan-administration-Tuesday-denied-as-totally-without-foundation/5418392356800/>.
- Davenport, Coral. 2017. "Rick Perry Regrets Call to Close Energy Department." *New York Times*, January 19, 2017. <https://www.nytimes.com/2017/01/19/us/politics/rick-perry-energy-department.html>.
- Davenport, Coral. 2018. "How Much Has 'Climate Change' Been Scrubbed From Federal Websites? A Lot." *New York Times*, January 10, 2018. <https://www.nytimes.com/2018/01/10/climate/climate-change-trump.html>.
- Davenport, Coral and Eric Lipton. 2017. "The Pruitt Emails: EPA Chief Was Arm in Arm With Industry." *New York Times*, February 22, 2017. <https://www.nytimes.com/2017/02/22/us/politics/scott-pruitt-environmental-protection-agency.html>.
- David, Jr., Edward E. 1987. "Science Advising and the Nixon Presidency." In *The Presidency & Science Advising*, edited by Kenneth W. Thompson. Lanham: University Press of America.
- Dennis, Brady and Sarah Kliff. 2013. "Obama Administration Drops Fight to Keep Age Restrictions on Plan B Sales." *Washington Post*, June 10, 2013. https://www.washingtonpost.com/national/health-science/obama-administration-drops-fight-to-keep-age-restrictions-on-plan-b-sales/2013/06/10/a296406e-d22a-11e2-a73e-826d299ff459_story.html?utm_term=.569ef17d980d.
- DiChristopher, Tom. 2017. "Scott Pruitt Says Carbon Dioxide is Not a Primary Contributor to Global Warming." *CNBC*, March 9, 2017. <https://www.cnbc.com/2017/03/09/epa-chief-scott-pruitt.html>.
- DOC (U.S. Department of Commerce). 2008. "Public Communications." Edited by the Office of the Secretary. Washington, D.C.: Department of Commerce.
- Dockery, Douglas W., C. Arden Pope, Xiping Xi, Jack D. Spengler, James H. Ware, Martha E. Fay, Benjamin G. Ferris, and Frank H. Speizer. "An Association between Air Pollution and Mortality in Six U.S. Cities." 1993. *New England Journal of Medicine* 329, no. 24.
- DOD (U.S. Department of Defense). 2012. "Scientific and Engineering Integrity." Washington, D.C.: Department of Defense.
- DOI (U.S. Department of Interior). 2010. "Salazar Issues Secretarial Order to Ensure Integrity of Scientific Process in Departmental Decision-Making." September 29, 2010. <https://www.doi.gov/news/pressreleases/Salazar-Issues-Secretarial-Order-to-Ensure-Integrity-of-Scientific-Process-in-Departmental-Decision-Making>.

- DOI OIG (U.S. Department of Interior Office of Inspector General). 2008. "Investigative Report: The Endangered Species Act and the Conflict Between Science and Policy." December 10, 2008. <https://doioig.gov/sites/doioig.gov/files/EndangeredSpeciesFINAL.pdf>.
- Doyle, Michael. 2018. "IG Finds Problems with Senior Executive Moves." *E&E News*, April 11, 2018. <https://www.eenews.net/stories/1060078761>.
- Dudley, Susan E. 2015 "Regulatory Science and Policy: A Case Study of the National Ambient Air Quality Standards." Working paper, George Washington University Regulatory Center, George Washington University. Washington, D.C., September.
- Dunlap, Riley E. and Aaron M. McCright. 2015 "Challenging Climate Change: The Denial Countermovement." In *Climate Change and Society: Sociological Perspectives*, edited by Riley E. Dunlap and Robert Bruelle. New York: Oxford University Press.
- Eilperin, Juliet. 2006. "Bush Appointee Said to Reject Advice on Endangered Species." *Washington Post*, October 30, 2006. <http://www.washingtonpost.com/wp-dyn/content/article/2006/10/29/AR2006102900776.html>.
- Eilperin, Juliet. 2017. "GAO to Probe Whether Trump Administration is Protecting Agencies' Scientific Integrity." *Washington Post*, October 11, 2017. https://www.washingtonpost.com/news/energy-environment/wp/2017/10/11/gao-to-probe-whether-trump-administration-is-protecting-agencies-scientific-integrity/?utm_term=.3a95a34be262.
- EPA (U.S. Environmental Protection Agency). 1993. "William D. Ruckelshaus: Oral History Interview." January 1993. <https://archive.epa.gov/epa/aboutepa/william-d-ruckelshaus-oral-history-interview.html>.
- EPA (U.S. Environmental Protection Agency). 2012. "Scientific Integrity Policy." Washington, D.C.: U.S. Environmental Protection Agency.
- EPA (U.S. Environmental Protection Agency). 2017. *Revised Human Health Risk Assessment on Chlorpyrifos*. Washington, DC: US Environmental Protection Agency.
- Flippen, J. Brooks. 2000. *Nixon and the Environment*. Albuquerque: University of New Mexico Press.
- Fredrickson, Leif and Christopher Sellers, Lindsey Dillon, Jennifer Liss Ohayon, Nicholas Shapiro, Marianne Sullivan, Stephen Bocking, Phil Brown, Vanessa de la Rosa, Jill Harrison, Sara Johns, Katherine Kulik, Rebecca Lave, Michelle Murphy, Liza Piper, Lauren Richter, and Sara Wylie. 2018. "History of US Presidential Assaults on Modern Environmental Health Protection." *American Journal of Public Health* 108, no. S2 (April 1): S95-S103. <https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2018.304396>.
- Freeman, Jody and Adrian Vermeule. 2007. "Massachusetts v. EPA: From Politics to Expertise," *The Supreme Court Review* 2007, no. 1.
- Friedman, Lisa. 2017. "Scott Pruitt, E.P.A. Chief, Says Agency Scientists Are Free to Discuss Their Work." *New York Times*, December 6, 2017. <https://www.nytimes.com/2017/12/06/climate/scott-pruitt-epa.html>.
- Friedman, Lisa, Marina Affo, and Derek Kravitz. 2017. "EPA Officials, Disheartened by Agency's Direction, are Leaving in Droves." *New York Times*, December 22, 2017. <https://www.nytimes.com/2017/12/22/climate/epa-buyouts-pruitt.html>.
- Geiling, Natasha. 2018. "Trump administration has quietly changes government's sharing of climate data in unprecedented ways." *ThinkProgress*, January 10, 2018. <https://thinkprogress.org/year-in-trump-climate-government-websites-fc32d497c4c1/>.
- Goldman, Gretchen, Genna Reed, and Jacob Carter. "Risks to Science-Based Policy Under the Trump Administration." 2018. *Stetson Law Review* 47, no. 2 (Winter): 267-293.
- Goldman, Gretchen, Genna Reed, Michael Halpern, Charise Johnson, Emily Berman, Yogin Kothari, and Andrew Rosenberg. 2017. *Preserving Scientific Integrity in Federal Policymaking*. Cambridge, MA: Union of Concerned Scientists.
- Graham, Otis L. 2015. *Presidents and the American Environment*. Lawrence: University Press of Kansas.
- Green, Miranda. 2017. "More Questions About a Trump Admin War on Science." *CNN*, August 24, 2017. <http://www.cnn.com/2017/08/24/politics/trump-environmental-changes/index.html>.
- Green, Miranda. 2017. "The Battle Over Science in the Trump Administration." *CNN*, August 9, 2017. <http://www.cnn.com/2017/08/05/politics/trump-battle-science-epa-energy-climate/index.html>.
- Greenberg, Daniel S. 1997. "Where are the Lions of Science?" *Washington Post*, May 6, 1997. https://www.washingtonpost.com/archive/opinions/1997/05/06/where-are-the-lions-of-science/98aae80b-b1c3-4402-be3a-208a75cf0877/?utm_term=.6bb40a585960.
- Grifo, Francesca. 2011. "Scientific Integrity: The Way Forward." *BioScience* 61, no. 5 (May): 345-346.
- Grifo, Francesca, Tim Donaghy, Patrick Baur, Michael Halpern, Karly Kaufman, Meredith McCarthy,

- and Celia Wexler. 2008. *Federal Science and the Public Good: Securing the Integrity of Science in Policy Making*. Cambridge, MA: Union of Concerned Scientists.
- Griswold, Eliza. 2012. "How Silent Spring Ignited the Environmental Movement." *New York Times*, September 21, 2012. <https://www.nytimes.com/2012/09/23/magazine/how-silent-spring-ignited-the-environmental-movement.html>.
- GSA (U.S. General Services Administration). 2018. "The Federal Advisory Committee Act (FACA) Brochure." Accessed May 16, 2018. <https://www.gsa.gov/policy-regulations/policy/federal-advisory-committee-management/advice-and-guidance/the-federal-advisory-committee-act-faca-brochure>.
- Hand, Mark. 2017. "Repeal of Obama-era Environmental Rules Dominates Trump's Regulatory Agenda." *ThinkProgress*, July 20, 2017. <https://thinkprogress.org/trump-releases-deregulatory-agenda-6ad07b7dd28a/>.
- Harris, Gardiner. 2011. "Plan to Widen Availability of Morning-after Pill Is Rejected." *New York Times*, December 7, 2011. <https://www.nytimes.com/2011/12/08/health/policy/sebelius-overrules-fda-on-freer-sale-of-emergency-contraceptives.html>.
- Holdren, John P. 2010. "Scientific Integrity." Memorandum for the Heads of Executive Departments and Agencies. December 17, 2010. <https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/scientific-integrity-memo-12172010.pdf>.
- Jasanoff, Sheila. 1992. "Science, Politics, and the Renegotiation of Expertise at EPA." *Osiris* 7: 194-217.
- Junod, Suzanne White. 2013. "FDA and Clinical Drug Trials: A Short History." Washington, D.C.: US Food and Drug Administration.
- Kimmel, Kenneth. 2017. "Why Scientists Are Fighting Back. We've Had Enough of Trump's War on Facts." *The Guardian*, April 15, 2017. <https://www.theguardian.com/commentisfree/2017/apr/15/why-scientists-are-fighting-back-we-have-had-enough-of-trump-war-on-facts>.
- Kraft, Michael E. and Norman J. Vig. 1984. "Environmental Policy in the Reagan Presidency." *Political Science Quarterly* 99, no. 3 (Autumn): 415-439.
- Kurtz, Howard. 1983a. "House Panel Probing Chemical Industry Influence on Todhunter." *Washington Post*, March 12, 1983. https://www.washingtonpost.com/archive/politics/1983/03/12/house-panel-probing-chemical-industry-influence-on-todhunter/20f0649c-375d-40c5-9b8f-ee662f480c9e/?utm_term=.e530ba1c88c2.
- Kurtz, Howard. 1983b. "OMB's Rule in Reviewing Federal Rules Under Debate." *Washington Post*, October 9, 1983. https://www.washingtonpost.com/archive/politics/1983/10/09/ombs-role-in-reviewing-federal-rules-under-debate/ed568b88-15ac-48ce-bbc0-d6357e0b8dcb/?utm_term=.255213a56d83.
- Kurtz, Howard. 1983c. "Since Reagan Took Office, EPA Enforcement Actions Have Fallen." *Washington Post*, March 1, 1983. https://www.washingtonpost.com/archive/politics/1983/03/01/since-reagan-took-office-epa-enforcement-actions-have-fallen/c9dc5a4e-9b0d-4af0-9c41-76b0f74823c0/?utm_term=.c5e15866dfdf.
- Lartey, Jamiles. 2017. "US Federal Communications Crackdown: What We Know and What We Don't." *The Guardian*, January 26, 2017. <https://www.theguardian.com/us-news/2017/jan/26/us-federal-agency-crackdown-epa-sean-spicer>.
- Lash, Jonathan, Katherine Gillman, and David Sheridan. 1984. *A Season of Spoils: The Story of the Reagan Administration's Attack on the Environment*. New York: Pantheon Books.
- Layzer, Judith A. 2012. *Open for Business: Conservatives' Opposition to Environmental Regulation*. Cambridge: MIT Press.
- Lerner, Sharon. 2017. "Republicans are Using Big Tobacco's Playbook to Gut Health Rules." *The Intercept*, February 5, 2017. <https://theintercept.com/2017/02/05/republicans-want-to-make-the-epa-great-again-by-gutting-health-regulations/>.
- Lipton, Eric. 2014. "Energy Firms in Secretive Alliance with Attorneys General." *New York Times*, December 6, 2014. https://www.nytimes.com/2014/12/07/us/politics/energy-firms-in-secretive-alliance-with-attorneys-general.html?_r=0.
- Lipton, Eric. 2017a. "E.P.A. Chief, Rejecting Agency's Science, Chooses Not to Ban Insecticide." *New York Times*, March 29, 2017. <https://www.nytimes.com/2017/03/29/us/politics/epa-insecticide-chlorpyrifos.html>.
- Lipton, Eric. 2017b. "Why Has the EPA Shifted on Toxic Chemicals? An Industry Insider Helps Call the Shots." *New York Times*, October 21, 2017. <https://www.nytimes.com/2017/10/21/us/trump-epa-chemicals-regulations.html>.
- Lott, Melissa C. 2015. "EPA: Fracking Has 'Not Led to Widespread, Systemic Impacts on Drinking Water Resources.'" *Scientific American*, June 4, 2015.

- <https://blogs.scientificamerican.com/plugged-in/epa-fracking-has-not-led-to-widespread-systemic-impacts-on-drinking-water-resources/>.
- Loweth, Hugh F. 1987. "Science Advising and OMB." In *The Presidency & Science Advising*, edited by Kenneth W. Thompson. Lanham: University Press of America.
- Lydon, Christopher. 1970. "Nixon Aide Score SST Test Design." *New York Times*, August 29, 1970. <https://www.nytimes.com/1970/08/29/archives/nixon-aide-scores-sst-test-design-says-environment-issues-will-not.html>.
- Lyons, Richard. 1977. "Interior Secretary Will Replace Head of U.S. Geological Survey." *New York Times*, September 7, 1977. <https://www.nytimes.com/1977/09/07/archives/interior-secretary-will-replace-head-of-us-geological-survey.html>.
- Melnick, Meredith. 2011. "FDA May Remove Age Restrictions from Morning-after Pill Plan B." *Time*, December 6, 2011. <http://healthland.time.com/2011/12/06/fda-may-remove-age-restrictions-from-morning-after-pill-plan-b/>.
- Mintz, Morton. 1977. "Energy Aide's Controversial Findings Lead to Downfall in Bureaucracy." *Washington Post*, June 4, 1977. https://www.washingtonpost.com/archive/politics/1977/06/04/energy-aides-controversial-findings-lead-to-downfall-in-bureaucracy/191e1c64-66b7-4560-be80-d3bb3230cd03/?utm_term=.5045be1dd0aa.
- Mooney, Chris. 2005. *The Republican War on Science*. New York: Basic Books.
- Mosbergen, Dominique. 2017. "Scott Pruitt Has Sued the Environmental Protection Agency 13 Times. Now He Wants to Lead It." *Huffington Post*, January 17, 2017. https://www.huffingtonpost.com/entry/scott-pruitt-environmental-protection-agency_us_5878ad15e4b0b3c7a7b0c29c.
- New York Times*. 1953. "The Case of Dr. Astin." August 25, 1953. <https://www.nytimes.com/1953/08/25/archives/the-case-of-dr-astin.html>.
- New York Times*. 2003. "Abortion and Breast Cancer." January 6, 2003. <https://www.nytimes.com/2003/01/06/opinion/abortion-and-breast-cancer.html>.
- Negin, Elliott. 2017. "Energy Department Scientists Barred from Attending Nuclear Power Conference." *The Huffington Post*, August 1, 2017. https://www.huffingtonpost.com/entry/energy-department-scientists-barred-from-attending_us_597f7e2ee4b0cb4fc1c73b8e.
- Nixon, Richard. 1970. "Statement on Establishing the National Industrial Pollution Control Council." April 9, 1970. <http://www.presidency.ucsb.edu/ws/?pid=2454>.
- NRDC (Natural Resources Defense Council). 2017. "Trump Wants to Politicize EPA Science." January 25, 2017. <https://www.nrdc.org/trump-watch/trump-wants-politicize-epa-science>.
- NSF (U.S. National Science Foundation). 2005. "US NSF Grant Policy Manual." Washington, DC: U.S. National Science Foundation.
- O'Toole, Thomas. 1977. "Why Geologist Was Ousted." *Washington Post*, November 13, 1977. https://www.washingtonpost.com/archive/politics/1977/11/13/why-geologist-was-ousted/79097089-c78b-4e0c-92c1-c2f75d18f3ae/?utm_term=.ab71ab687422.
- Obama, Barack. 2009a. Inaugural Speech. January 20, 2009. <https://obamawhitehouse.archives.gov/blog/2009/01/21/president-barack-obamas-inaugural-address>.
- Obama, Barack. 2009b. "Obama at the Academy IV: Speech Text." National Academy of the Sciences. April 27, 2009. <http://www.sciencemag.org/news/2009/04/obama-academy-iv-speech-text>.
- Obama, Barack. 2009c. "Scientific Integrity." Memorandum for the Heads of Executive Departments and Agencies. March 9, 2009. <https://obamawhitehouse.archives.gov/the-press-office/memorandum-heads-executive-departments-and-agencies-3-9-09>.
- Omang, Joanne. 1981. "Panel Questions EPA Officials Over Industry Meetings." *Washington Post*, October 22, 1981. https://www.washingtonpost.com/archive/politics/1981/10/22/panel-questions-epa-official-over-industry-meetings/3bd40f23-808e-4976-b2b5-ab84243b6401/?utm_term=.c507b8181328.
- Oreskes, Naomi and Eric Conway. 2010. *Merchants of Doubt*. New York: Bloomsbury Press.
- Perlstein, Rick. 2008. *Nixonland: The Rise of a President and the Fracturing of America*. New York: Scribner.
- Peterson, Cass. 1984. "EPA Bans Use of EDB on Grain." *Washington Post*, February 4, 1984. https://www.washingtonpost.com/archive/politics/1984/02/04/epa-bans-use-of-edb-on-grain/ff27062c-42c1-4ba1-b460-9758c4877835/?utm_term=.2577d8edef87.
- Plumer, Brad. 2016. "Rick Perry Once Wanted to Abolish the Energy Department. Trump Picked Him to Run It." *Vox*, December 13, 2016. <https://www.vox.com/energy-and->

- environment/2016/12/13/13936210/rick-perry-energy-department-trump.
- Raines, Howell. 1981. "Reagan Reversing Many U.S. Policies." *New York Times*, July 3, 1981. <http://www.nytimes.com/1981/07/03/us/reagan-reversing-many-us-policies.html?pagewanted=all>.
- Rappeport, Alan. 2017. "Ahead of Vote, Promised Treasury Analysis of Tax Bill Proves Elusive." *New York Times*, November 30, 2017. <https://www.nytimes.com/2017/11/30/us/politics/treasury-analysis-tax-bill.html>.
- Reagan, Ronald. 1981. Executive Order 12291 of February 17, 1981. "Federal Regulation." Online by Gerhard Peters and John T. Woolley. *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=43424>.
- Reagan, Ronald. 1988. Statement on Signing the Montreal Protocol on Ozone-Depleting Substances. April 5, 1988. Online by Gerhard Peters and John T. Woolley. *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=35639>.
- Reed, Genna, Seth Shulman, Peter Hansel, and Gretchen Goldman. 2018. *Abandoning Science Advice: One Year in, the Trump Administration Is Sidelining Scientific Advisory Committees*. Cambridge, MA: Union of Concerned Scientists.
- Reinhold, Robert. 1982. "Can Science and Politics Safely Mix." *New York Times*, June 13, 1982. <https://www.nytimes.com/1982/06/13/weekinreview/can-science-and-politics-safely-mix.html>.
- Revkin, Andrew C. 2005. "Bush Aide Softened Greenhouse Gas Links to Global Warming." *New York Times*, June 8, 2005. <https://www.nytimes.com/2005/06/08/politics/bush-aide-softened-greenhouse-gas-links-to-global-warming.html>.
- Revkin, Andrew C. 2006. "Climate Expert Says NASA Tried to Silence Him." *New York Times*, January 29, 2006. <http://www.nytimes.com/2006/01/29/science/earth/climate-expert-says-nasa-tried-to-silence-him.html>.
- Rinberg, T., Anjur-Dietrich, M., Beck, M., Bergman, A., Derry, J., Dillon, L., Gehrke, G., Lave, R., Sellers, C., Shapiro, N., Aizman, A., Allan, D., Britt, M., Cha, R., Chadha, J., Currie, M., Johns, S., Klionsky, A., Knutson, S., Kulik, K., Lemelin, A., Nguyen, K., Nost, E., Ouellette, K., Poirier, L., Rubinow, S., Schell, J., Ultee, L., Upfal, J., Wedrosky, T., and Wylie, J. 2018. *Changing the Digital Climate*. Environmental Data and Governance Initiative.
- Roberts, Alyssa. 2017. "August Wrap Up: Trump's Unprecedented Environmental Attacks." League of Conservation Voters. September 5, 2017. <https://www.lcv.org/article/august-wrap-trumps-unprecedented-environmental-attacks/>.
- Rodgers Jr, William H. 1972. "The National Industrial Pollution Control Council: Advise or Collude?" *Boston College Law Review* 13, No. 4: 719-747.
- Ruskauff, Dale. 1983. "EPA Demotes Official Probed in 'Hit Lists.'" *Washington Post*, March 15, 1983. https://www.washingtonpost.com/archive/politics/1983/03/15/epa-demotes-official-probed-in-hit-lists/bc811665-146a-409a-94e9-fa275b8e1668/?utm_term=.9fb6f0a67860.
- Russakoff, Dale and Howard Kurtz. 1983. "Advisors to Watt Blackballed by GOP Committee." *Washington Post*, March 27, 1983. https://www.washingtonpost.com/archive/politics/1983/03/27/advisors-to-watt-blackballed-by-gop-committee/dd26ee9b-9535-4864-b56e-723a7213ab51/?utm_term=.7ba9ce5a5eff.
- Scheck, Tom and Scott Tong. 2016. "EPA's Late Changes to Fracking Study Downplayed Risk of Polluted Drinking Water." *MPRNews*, November 30, 2016. <https://www.mprnews.org/story/2016/11/30/epa-changes-fracking-study>.
- Schooly, Jim. 2006. "NIST Culture of Excellence Article #2." National Institute of Science and Technology. March 2006. <https://www.nist.gov/director/nist-culture-excellence-article-2>.
- Science*. 1953. "On the Astin Dismissal." New Series 117, no. 3042 (April 17): 3.
- Science*. 1969. "NSF Directorship: Why did Nixon Veto Franklin A. Long?" *Science* 164, No. 3878 (April 26): 406.
- Science*. 1973. "White House Foes: Wiesner Target of Proposal to Cut M.I.T. Funds." *Science* 181, no. 4096 (July 20): 244-6.
- Science*. 1982. "USDA Official Defends Loyalty Checks." *Science* 216, no. 4553 (June 25): 1391.
- Science*. 1983. "Hit List at EPA?" *Science* 219, no. 4590 (March 18): 1303.
- SEC (Securities and Exchange Commission). 2010. *Commission Guidance Regarding Disclosure Related to Climate Change*. Washington, D.C. <https://www.federalregister.gov/documents/2010/02/08/2010-2602/commission-guidance-regarding-disclosure-related-to-climate-change>.
- SEJ (Society of Environmental Journalists). 2010. "White House Under the Gun on Science Integrity, Openness." November 17, 2010. <https://www.sej.org/publications/government>

- /white-house-under-gun-science-integrity-openness.
- Sellers, Christopher, Lindsey Dillon, Jennier Liss Ohayon, Nick Shapiro, Marianne Sullivan, Chris Amoss, Stephen Bocking, Phil Brown, Vanessa De la Rosa, Jill Harrison, Sarah Johns, Katherine Kulik, Rebecca Lave, Michelle Murphy, Liza Piper, Lauren Richter, and Sara Wylie. 2017. "The EPA Under Siege: Trump's Assault in History and Testimony." The Environmental Data & Governance Initiative. https://100days.envirodatagov.org/epa-under-siege/#ftnt_ref22.
- Shabecoff, Philip. 1984. "Rita Lavelle Gets 6-Month Term and is Fined \$10,000 for Perjury." *New York Times*, January 10, 1984. <https://www.nytimes.com/1984/01/10/us/rita-lavelle-gets-6-month-term-and-is-fined-10000-for-perjury.html>.
- Shanley, Robert A. 1992. *Presidential Influence and Environmental Policy*. Westport: Greenwood Press.
- Snider, Annie. 2012. "Vetoes by Eisenhower, Nixon Presaged Today's Partisan Divide." *Greenwire*, October 18, 2012. <https://www.eenews.net/stories/1059971457>.
- Sullivan, Walter. 1984. "Allen V. Astin is Dead at 79; Headed Bureau of Standards." *New York Times*, February 8, 1984. <http://www.nytimes.com/1984/02/08/obituaries/allen-v-astin-is-dead-at-79-headed-bureau-of-standards.html>.
- Time. 1970. "Environment: SST: Boon or Boom-Doggie?" June 1, 1970. <http://content.time.com/time/subscriber/article/0,33009,878301-1,00.html>.
- Train, Russell E. 2003. "When Politics Trumps Science." *New York Times*, June 21, 2003. <https://www.nytimes.com/2003/06/21/opinion/1-when-politics-trumps-science-209236.html>.
- Trump, Donald. 2017. Executive Order 13771 of January 30, 2017. "Reducing Regulation and Controlling Regulatory Costs." White House. <https://www.whitehouse.gov/presidential-actions/presidential-executive-order-reducing-regulation-controlling-regulatory-costs/>.
- UCS (Union of Concerned Scientists). 2004. "2004 Scientist Statement on Restoring Scientific Integrity to Federal Policymaking." Accessed May 16, 2018. <http://www.ucsusa.org/our-work/center-science-and-democracy/promoting-scientific-integrity/scientists-sign-on-statement.html#.Wfx1S4prxYc>.
- UCS (Union of Concerned Scientists). 2006. *Voices of Federal Climate Scientists*. Cambridge, MA: Union of Concerned Scientists.
- UCS (Union of Concerned Scientists). N.d. a. "Abuses of Science: Case Studies." Accessed November 17, 2017. <http://www.ucsusa.org/our-work/center-science-and-democracy/promoting-scientific-integrity/abuses-science-case-studies>.
- UCS (Union of Concerned Scientists). N.d. b. "Agencies Control Scientists' Contact with the Media." Accessed November 17, 2017. http://www.ucsusa.org/center-for-science-and-democracy/scientific_integrity/abuses_of_science/a-to-z/agencies-control-scientists.html#.WgxtZoZrxZc.
- UCS (Union of Concerned Scientists). N.d. c. "Another National Academy of Sciences Study Halted." Accessed May 18, 2017. <https://www.ucsusa.org/center-science-and-democracy/attacks-on-science/another-national-academy-sciences-study-halted#.Wv8k8Mgh1Zl>.
- UCS (Union of Concerned Scientists). N.d. d. "Lead Poisoning Prevention Panel Influenced by Industry." Accessed November 17, 2017. <http://www.ucsusa.org/our-work/center-science-and-democracy/promoting-scientific-integrity/lead-poisoning-prevention.html#.WgZQ5IZrzl0>.
- UCS (Union of Concerned Scientists). N.d. e. "White House Office Overrules Science and Procedures at the EPA." Accessed November 17, 2017. http://www.ucsusa.org/center-for-science-and-democracy/scientific_integrity/abuses_of_science/a-to-z/white-house-office-overrules.html#.WgjNOoZrzl0.
- U.S. House of Representatives Committee on Government Reform—Minority Staff Special Investigations Division. 2003. "Politics and Science in the Bush Administration." Prepared for Rep. Henry A. Waxman. August 2003.
- Waldholz, Rachel and Bill Chappell. 2017. "EPA Halves Staff Attending Environmental Conference in Alaska." *National Public Radio*, February 10, 2017. <https://www.npr.org/sections/thetwo-way/2017/02/10/514479451/epa-halves-staff-attending-alaska-environmental-conference>.
- Waldholz, Rachel. 2017. "EPA Staff Pulled from Alaska Summit after Trump Team Orders." *National Public Radio*, February 10, 2017. <https://www.npr.org/2017/02/10/514566896/epa-staff-pulled-from-alaska-summit-after-trump-team-orders>.

- Waldman, Scott. 2018a. "EPA's Own Advisory Board Questions 'Secret Science' Plan." *E&E News*, May 16, 2018. <https://www.eenews.net/climatewire/2018/05/16/stories/1060081837>.
- Waldman, Scott. 2018b. "Political Appointees Once Kept a Scientist 'Hit List.'" *E&E News*, May 14, 2018. <https://www.eenews.net/stories/1060081559>.
- Wallace, Gregory. 2018. "Report: Trump admin scrubbed mentions of climate change from websites." *CNN*, January 10, 2018. <https://www.cnn.com/2018/01/10/politics/trump-climate-change-websites-remove-report/index.html>.
- Wang, Zuoyue. 2008. *In Sputnik's Shadow: The President's Science Advisory Committee and Cold War America*. New Brunswick: Rutgers University Press.
- Waxman, Henry, John Tierney, Sherrod Brown, Eddie Bernice Johnson, Mark Udall, Brian Baird, and Michael Honda. 2003. Letter to Joshua Bolton. December 15, 2003. http://www.progressivereform.org/articles/peer/Waxman_PR_comments.pdf
- Whitehouse, Sheldon. 2017. "EPA Responds to New England Members of Congress on Silencing of Scientists." News Release. December 6, 2017. <https://www.whitehouse.senate.gov/news/release/epa-responds-to-new-england-members-of-congress-on-silencing-of-scientists>.
- Wolff, Eric. 2017. "Energy Department Climate Office Bans Use of Phrase 'Climate Change.'" *Politico*, March 29, 2017. <https://www.politico.com/story/2017/03/energy-department-climate-change-phrases-banned-236655>.
- Zhou, Li. 2018. "A Brief Guide to Andrew Wheeler, Scott Pruitt's Replacement at the EPA." *Vox*, July 5, 2018. <https://www.vox.com/2018/7/5/17538160/andrew-wheeler-epa-scott-pruit>

Emily Berman is an investigative researcher for the Center for Science and Democracy at the Union of Concerned Scientists. In this role, she examines how political, ideological, and financial interests influence the place of science in public policy. She received a B.A. in history from Cornell University.

Jacob Carter is a research scientist for the Center for Science and Democracy at the Union of Concerned Scientists where he investigates scientific integrity issues in the federal government. Dr. Carter received a B.S. in biology from the University of Central Arkansas, a M.S. in biology from Kansas State University, and a Ph.D. in Ecology and Evolutionary Biology from the University of Kansas. Prior to his current work, Dr. Carter worked as an intern in the White House's Office of Science and Technology Policy and a postdoctoral fellow at the Environmental Protection Agency.
