PRESIDENT TRUMP'S WAR ON REGULATORY SCIENCE

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The Trump Administration has taken numerous actions that appear hostile to scientists, scientific research, and scientific data, leading some observers to assert that a war on science is underway. A more precise characterization is that the Trump Administration is engaging in a war on regulatory science, as these actions take aim specifically at regulatory science—i.e., knowledge production and synthesis carried out by EPA and other government agencies in the course of developing government regulations. The Administrative Procedure Act ("APA") and other laws may constrain some aspects of the war on regulatory science, provided that they are subject to judicial review. Internal administrative law and agency norms also can promote rule of law values, but their success depends largely on the good faith of executive branch actors and the willingness of Congress and the public to push back when norms of administrative legality are ignored. Absent such pushback, the Trump Administration's war on regulatory science could lead to irrational policies and threaten democratic governance.

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Introduction

Various actions of the Trump Administration have departed from norms of how government should operate. Regulatory agencies that rely heavily on science—especially EPA and the Department of the Interior—have engaged in some of the most notable departures. For example, the Department of the Interior has reassigned senior staff because of their previous work on climate change. Federal agencies have removed references to climate change from official agency pronouncements. And, in setting pollution standards, EPA has proposed to disregard studies relying on confidential data, even though they have undergone scientific peer review. Whether these actions will survive legal challenge remains to be seen.

Some popular accounts have declared that the Trump Administration is engaging in a "war on science."[1] But is a "war on science" actually underway? On the one hand, scientific research still receives substantial public and private support, and technological innovation is flourishing, thanks to information technology, artificial intelligence, and other scientific advances.[2] Scientific inquiry seems healthy, suggesting that the "war on science" may be more a rhetor-

1. *See, e.g.*, Editorial, *President Trump's War on Science*, N.Y. Times, Sept. 10, 2017, at SR10.
2. *See* Peter Aldhous, *Trump's "War on Science" Isn't What You Think*, BuzzFeed News (Jan. 18, 2018), https://perma.cc/2QW4-KFF9; Albert C. Lin, *Preliminary Injunctive Regulation*, 58 Ariz. L. Rev. 1027, 1031–32 (2016) (discussing social acceleration).

ical device reflecting opposition to a deregulatory agenda than a fair characterization.

However, a closer examination of science's role in policymaking indicates that the "war on science" is more than mere rhetoric. In an actual war on science, one might expect widespread resistance to scientific inquiry, denials of scientific findings, and a disregard of problems identified through science.[3] All of these features are present in the Trump Administration's systematic efforts to downplay scientific activity, expertise, and scientific data that might support regulation. To stifle scientific activity, the Administration has proposed deep cuts to research funding on specific topics and ordered scientists not to present unfavorable results. To weaken the role of expertise, the Administration has skewed membership on some scientific advisory committees toward industry and dissolved or reduced the role of other committees. And to undermine the use of science in policymaking, the Administration has questioned methodologies and truths that are widely accepted by the scientific community.

Efforts to manipulate or question the science underlying federal regulation are not unprecedented. The George W. Bush Administration, for example, sought to distort or suppress scientific research on climate change and other issues in order to achieve deregulatory goals.[4] The Trump Administration has not only engaged in similar tactics, but has also uniquely rejected science as a basis for regulation to protect human health and the environment.[5]

As this Article explains, the Trump Administration's actions reflect a systematic threat to the science on which federal agencies rely to do their jobs. Part I distinguishes between research science—the research activities scientists are generally understood to engage in—and regulatory science—the science that government agencies undertake or utilize to support regulatory decisions. Part II describes the Trump Administration's actions and places those actions in three general categories: questioning accepted science, devaluing and sidelining scientific expertise, and censoring agency science. This Part then asks whether an actual war on science is underway and finds that the Trump Administration's actions are specifically aimed at regulatory science, as opposed to research science. Part III considers various laws that courts might apply to these actions, including the APA, the Federal Advisory Committee Act ("FACA"), laws governing conflicts of interest, the First Amendment, and whistleblower protections. Congress also has the power to respond through legislation, committee hearings, and other forms of oversight, but many administration actions may remain unchecked. Part IV reflects on broader implications for regulatory

3. *See* SHAWN OTTO, THE WAR ON SCIENCE 7 (2016).

4. *See* H.R. PROPOSED REP. POLITICAL INTERFERENCE WITH CLIMATE CHANGE SCIENCE UNDER THE BUSH ADMINISTRATION, 110th Cong. (2007); Holly Doremus, *Scientific and Political Integrity in Environmental Policy*, 86 TEX. L. REV. 1601, 1611–12 (2008); *see generally* CHRIS MOONEY, THE REPUBLICAN WAR ON SCIENCE (2005).

5. *See President Trump's War on Science*, *supra* note 1.

science, including the erosion of agency norms with respect to science and the undermining of democratic governance.

I. Distinguishing Research Science and Regulatory Science

To understand whether the Trump Administration is waging a war on science, it is necessary to distinguish research science from regulatory science. Research science refers to scientific inquiry as practiced by scientists in general, whereas regulatory science refers to science practiced by administrative agencies. Considered in light of this distinction, the Trump Administration's actions appear to be directed specifically at undermining regulatory science.

A. Research Science

Science is the pursuit of "empirically based knowledge"[6] or "an effort to understand what is real and true in an enduring sense."[7] To obtain knowledge, scientists practice the scientific method, "a mode of investigation characterized by cycles of systematic empirical observation and hypothesis formation."[8] The knowledge generated through the scientific method is provisional, meaning that it is subject to revision in light of future data.[9] Features that distinguish a scientific theory from non-scientific ones include whether the theory is based on independently verifiable empirical observations, whether it can generate testable predictions, and the extent to which it accounts for various phenomena and uncertainties.[10]

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6. Deborah M. Hussey Freeland, *Speaking Science to Law*, 25 Geo. Int'l Envtl. L. Rev. 289, 296 (2013).

7. Robin Feldman, The Role of Science in Law 137 (2009).

8. Freeland, *supra* note 6, at 296; *see also* Otto, *supra* note 3, at 178 (identifying techniques deployed by the scientific method, including "observation, inductive reasoning, hypothesizing, unique prediction, experimentation, recording, critical peer review, and replication").

9. *See* Holly Doremus, *Science Plays Defense: Natural Resource Management in the Bush Administration*, 32 Ecology L.Q. 249, 303 (2005) (explaining that the scientific process is "continually gathering additional information and re-evaluating beliefs about the system in light of that new information"); Deborah M. Hussey Freeland, *Law & Science: Toward a Unified Field*, 47 Conn. L. Rev. 529, 538, 540 (2014); Shannon M. Roesler, *Evaluating Corporate Speech About Science*, 106 Geo. L.J. 447, 471 (2018) ("[T]he ultimate objective of scientific understanding . . . is not truth per se, but something that approximates truth and is always open to revision.").

10. *See* Feldman, *supra* note 7, at 134–35; Freeland, *supra* note 9, at 538; *cf.* Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 593–94 (1993) (listing factors relevant to determining whether a theory or technique is scientifically valid, including testability, whether it has been subjected to peer review and publication, known or potential error rates, the existence of standards controlling a technique's operation, and general acceptance within the relevant scientific community).

Science is sometimes framed as an objective process that generates definitive results.[11] Scientists pursue objectivity by following specific conventions, such as seeking replicable results and using a 95% confidence interval to identify statistically significant results.[12] Other norms of science that promote objectivity include suspending personal feelings, avoiding the appearance of bias, and shying away from advocacy.[13] Notwithstanding adherence to such norms, some subjectivity is inevitable.[14] Deciding what objects to study and how to study them, how to interpret data, and whether evidence justifies acceptance of a theory all involve a degree of subjectivity.[15]

Just as science is not purely objective, neither does science yield completely definitive results. Results are probabilistic rather than absolute.[16] The very nature of scientific inquiry—an ongoing process whose results are subject to future revision—ensures uncertainty.[17] Natural variation, inaccurate measurement, modeling limitations, and incomplete data all contribute to uncertainty.[18] Environmental science is especially prone to uncertainty because the environment often involves dynamic change and many interacting variables.[19]

Peer review—the independent evaluation of others' work before publication—is a critical feature of scientific inquiry.[20] The object of peer review is to ensure the quality of scientific work and to certify scientific knowledge.[21] Although peer review is not without its flaws, it is an important check on subjectivity and is a widely accepted mechanism for evaluating scientific quality.[22] A scientific consensus regarding the truth of an observation or the validity of a

11. *See* Freeland, *supra* note 9, at 537.
12. *See* DAVID L. FAIGMAN, LEGAL ALCHEMY 192 (1999).
13. *See* Freeland, *supra* note 6, at 305–07.
14. *See* Doremus, *supra* note 9, at 254, 297; Freeland, *supra* note 6, at 301–02; *see also* FELDMAN, *supra* note 7, at 124 (explaining Thomas Kuhn's view that objectivity arises out of scientific consensus, which is itself subjective).
15. *See* FELDMAN, *supra* note 7, at 123; FAIGMAN, *supra* note 12, at 192; Doremus, *supra* note 9, at 254.
16. *See* Freeland, *supra* note 9, at 540, 545; OTTO, *supra* note 3, at 234–35.
17. *See* Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 597 (1993) ("Scientific conclusions are subject to perpetual revision."); Doremus, *supra* note 9, at 297 (explaining that the scientific process is "designed to illuminate the extent and reliability of knowledge about studied systems and to increase the reliability and extent of that knowledge over the course of time").
18. *See* Deborah M. Brosnan, *Science, Law, and the Environment: The Making of a Modern Discipline*, 37 ENVTL. L. 987, 994, 999–1000 (2007); Freeland, *supra* note 9, at 545.
19. *See* Eric Biber, *Which Science? Whose Science? How Scientific Disciplines Can Shape Environmental Law*, 79 U. CHI. L. REV. 471, 477 (2012).
20. *See* Linda Greer & Rena Steinzor, *Bad Science*, 19 ENVTL. F. 28, 32 (2002).
21. *See* SHEILA JASANOFF, THE FIFTH BRANCH: SCIENCE ADVISERS AS POLICYMAKERS 61 (1990); Brosnan, *supra* note 18, at 1002.
22. *See* JASANOFF, *supra* note 21, at 69–76; Richard Smith, *Peer Review: A Flawed Process at the Heart of Science and Journals*, 99 J. ROYAL SOC'Y MED. 178, 179 (2006).

theory develops as a critical mass of scientists comes to accept peer-reviewed and published results.[23]

B. Regulatory Science

Science intersects with law in the courts and in regulatory agencies. Courts use scientific facts with the goal of resolving disputes fairly and efficiently.[24] Of particular interest here, agencies practice regulatory science by undertaking scientific inquiry and using scientific data to make policy. Statutes governing policymaking by agencies may explicitly demand that agencies employ the best available science.[25] But even statutes that are less explicit about the role of science, such as those requiring agencies to demonstrate the benefits of a regulatory standard, implicitly require agencies to have supporting scientific data.[26] In contrast to courts, which typically resolve disputes with finality, agencies often have an opportunity to revisit previously established standards in light of subsequent scientific discoveries. Indeed, a basic assumption of the modern administrative state is that agencies' expertise enables them to address societal challenges in a more informed and responsive manner than legislatures or courts.[27]

Regulatory science differs from the model of inquiry applicable to research science. Unlike research science, regulatory science does not seek out truth for its own sake. Rather, the task of regulatory science is to provide, within a specific timeframe, the answers to questions articulated by agencies and framed by legal standards.[28] Moreover, whereas research science focuses on knowledge production, regulatory science engages in knowledge synthesis and prediction as well as knowledge production.[29] When policy matters have a scientific aspect, "science can play a role by providing informed opinions about the plausible

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23. *See* Freeland, *supra* note 6, at 301–02.

24. *See* Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 597 (1993) ("Law . . . must resolve disputes finally and quickly.").

25. *See infra* note 171.

26. For example, the Clean Air Act authorizes EPA to set ambient air quality standards at a level that protects the public health with an adequate margin of safety. 42 U.S.C. § 7409(b)(1) (2012). The standards are to be based on air quality criteria that "shall accurately reflect the latest scientific knowledge . . ." *Id.* § 7408(a)(2). Even statutes that authorize precautionary regulation require some scientific basis for agency action. *See* Ethyl Corp. v. EPA, 541 F.2d 1, 28 (D.C. Cir. 1976).

27. *See generally* JASANOFF, *supra* note 21, at 40–45.

28. *See id.* at 78; Brosnan, *supra* note 18, at 994, 1002.

29. *See* JASANOFF, *supra* note 21, at 77 (defining knowledge synthesis as the evaluation, screening, and meta-analysis of data from other studies); *see also* Greer & Steinzor, *supra* note 20, at 33 (noting that in-house scientists at EPA support decisionmaking by analyzing outside studies and reassessing toxicological profiles).

consequences of our actions (or inactions), and by monitoring the effects of our choices."[30]

In synthesizing knowledge and making predictions, agencies use available scientific evidence to assess relationships between possible causes and effects.[31] "The expert considers all available studies and determines the weight to be afforded to each on the basis of the strengths and weaknesses of the individual studies."[32] The information that agencies use may incorporate unpublished "grey literature" which has not been subject to formal peer review, as well as peer-reviewed research.[33] Grey literature includes technical reports, conference proceedings, and datasets generated for policymaking.[34]

Notably, the regulatory science that supports a particular standard need not meet the stringent standards of statistical significance that research science conventionally requires. Statutes can empower an agency to act at levels of uncertainty that would lead a scientist to hesitate to certify a fact.[35] Establishing a fact with a ninety-five percent level of certainty may not be necessary for an agency to regulate; substantial evidence or a preponderance of the evidence may suffice. For example, the Clean Air Act requires EPA to regulate new motor vehicle pollution "which may reasonably be anticipated to endanger public health or welfare."[36] When interpreting similar statutory language, the D.C. Circuit explained, "[t]he Administrator may apply his expertise to draw conclusions from suspected, but not completely substantiated, relationships between

30. Naomi Oreskes, *Science and Public Policy: What's Proof Got to Do With It?*, 7 ENVTL. SCI. & POL'Y 369, 381 (2004).

31. Thomas O. McGarity & Sidney A. Shapiro, *Regulatory Science in Rulemaking and Tort: Unifying the Weight of the Evidence Approach*, 3 WAKE FOREST J. L. & POL'Y 65, 78, 91 (2013).

32. *Id.* at 78; *see also* Pasky Pascual et al., *Making Method Visible: Improving the Quality of Science-Based Regulation*, 2 MICH. J. ENVTL. & ADMIN. L. 429, 444 (2013) ("The most challenging aspect of scientific inference—the challenge that lies at the intersection of law and science—is to determine which combination of data and methods best contributes to the weight of evidence supporting one inference versus other competing inferences.").

33. *See* Kirsten Engel & Jonathan Overpeck, *Adaptation and the Courtroom: Judging Climate Science*, 3 MICH. J. ENVTL. & ADMIN. L. 1, 19 (2013); JASANOFF, *supra* note 21, at 77. Agencies nonetheless may adapt some elements of peer-reviewed science to the policymaking context, such as openly evaluating opposing viewpoints and publicly disclosing studies relied upon. Brosnan, *supra* note 18, at 997–98.

34. *See* Engel & Overpeck, *supra* note 33, at 19; Brosnan, *supra* note 18, at 1002.

35. *See* Sidney A. Shapiro, *"Political" Science: Regulatory Science After the Bush Administration*, 4 DUKE J. CONST. L. & PUB. POL'Y 31, 37 (2009) ("The lack of definitive scientific evidence does not mean that regulation is inappropriate. . . . Congress has required agencies to regulate on the basis of potential risk to humans, rather than waiting for definitive evidence that a substance is harmful."); SIDNEY A. SHAPIRO & ROBERT L. GLICKSMAN, RISK REGULATION AT RISK: RESTORING A PRAGMATIC APPROACH 33 (2003) (discussing risk-based thresholds under which agencies must prove exposure to a hazard "that is potentially dangerous").

36. 42 U.S.C. § 7521(a)(1) (2012).

facts, from trends among facts, from theoretical projections from imperfect data, from probative preliminary data not yet certifiable as 'fact,' and the like."[37] In other words, legal processes may focus on obtaining "good enough knowledge"—i.e., "knowledge that satisfies tests of scientific acceptability and supports reasoned decision making, but also assures those exposed to risk that their interests have not been sacrificed on the altar of an impossible scientific certainty."[38]

The discrepancy between research science and regulatory science—and the corresponding distinction between scientific uncertainty and legal uncertainty—have long served as a battleground between advocates and opponents of regulation. The George W. Bush Administration, for example, frequently used scientific uncertainty to question the need for regulation.[39] On subjects ranging from oil drilling to climate change to obesity, the Bush Administration invoked "sound science" as a rationale for deregulation.[40] This strategy exploited the common yet simplistic view of science as an objective process that "produces clean yes or no answers to questions about the necessity or effectiveness of regulation."[41] Such a view can foster unrealistic expectations regarding the science supporting regulatory standards. Against such expectations, the uncertainty that inevitably accompanies research offered an argument for blocking or delaying regulation.[42] The "sound science" strategy also allowed fundamental disagreements over policy to be disguised as disputes over the scientific validity of data. Science does not—and should not—dictate regulatory policy: whether, whom, and how to regulate are policy questions that rest on value judgments rather than scientific facts.[43] Opponents of regulation nevertheless sought to sidestep these policy questions by asserting an absence of sound science.

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37. Ethyl Corp. v. EPA, 541 F.2d 1, 29 (D.C. Cir. 1976) (interpreting a Clean Air Act provision that authorized the regulation of gasoline additives whose emissions "will endanger the public health or welfare").

38. JASANOFF, *supra* note 21, at 250.

39. *See* Doremus, *supra* note 9, at 266–67. For a discussion of the Reagan Administration's treatment of science, see generally MOONEY, *supra* note 4, at 35–48.

40. Chris Mooney, *Beware "Sound Science." It's Doublespeak for Trouble*, WASH. POST (Feb. 29, 2004), https://perma.cc/PK2Z-H3VH; *Gore and Bush Offer Their Views on Science*, 290 SCIENCE 266 (2000) (quoting George W. Bush as stating that "our health and safety regulations must be based on sound science").

41. Doremus, *supra* note 9, at 297; *see also id.* at 255 ("Science is a politically appealing justification because it promises objective, rational decisions.").

42. Brosnan, *supra* note 18, at 1000; *see* Freeland, *supra* note 9, at 548.

43. Wagner, *supra* note 45, at 64–65; FELDMAN, *supra* note 7, at 197 ("[S]cience itself lacks the capacity to answer the questions that law must address."). Indeed, agencies often face a slew of "science policy" questions—such as how data should be interpreted—that raise both scientific and policy considerations. *See* Thomas O. McGarity, *Substantive and Procedural Discretion in Administrative Resolution of Science Policy Questions: Regulating Carcinogens in EPA and OSHA*, 67 GEO. L.J. 729, 732–47 (1979).

II. President Trump's Alleged War on Science Within Federal Agencies

This Part explores elements of the Trump Administration's alleged war on science, including its proposed rule targeting "secret science" at EPA, its replacement of academic experts on scientific advisory boards with industry representatives, its personnel actions involving agency scientists, and its elimination of references to climate change on agency websites and in official pronouncements. These actions can be placed into three general categories: questioning accepted science, devaluing scientific expertise, and censoring agency science. Rather than reflecting an all-out war on science, these actions constitute a pervasive effort to undermine regulatory science.

A. Questioning Accepted Science

Scientific inquiry is an ongoing process for "deepening our understanding of the natural world."[44] Through the application of empirical, "value-neutral tools," science generates knowledge that serves as a critical input to environmental policymaking.[45] This knowledge may demonstrate the existence of serious threats to human health and the environment. If this knowledge is widely accepted, public and political pressure may build for government to respond to such threats. In the face of accepted scientific knowledge, the Trump Administration has isolated certain characteristics of the scientific process—transparency and skepticism—and sought to delegitimize scientific findings that the Administration asserts do not fully exhibit these characteristics.

1. EPA's "Secret Science" Proposal

A leading example of this approach is the Administration's proposal to prohibit EPA from issuing rules based on studies that use confidential data.[46] Touted as a measure to promote transparency and counter "secret science," the proposal requires EPA to "clearly identify all studies (or other regulatory science) relied upon when it takes any final agency action" and to "ensure that *dose response data and models* underlying *pivotal regulatory science* are publicly availa-

44. Holly Doremus, *Precaution, Science, and Learning While Doing in Natural Resource Management*, 82 Wash. L. Rev. 547, 560 (2007).

45. *Id.* at 560; *see* Wendy Wagner, *The "Bad Science" Fiction: Reclaiming the Debate over the Role of Science in Public Health and Environmental Regulation*, 66 L. & Contemp. Probs. 63, 64 (2003); Biber, *supra* note 19, at 476.

46. *See* Strengthening Transparency in Regulatory Science, 83 Fed. Reg. 18,768 (Apr. 30, 2018) (to be codified at 40 C.F.R. pt. 30). Despite delays in the expected completion date for the rule, EPA Administrator Andrew Wheeler has expressed his desire to finalize the rule in 2019. *See* Timothy Cama, *EPA to Pursue Final "Science Transparency" Rule in 2019*, The Hill (Dec. 14, 2018), https://perma.cc/2YFL-9EBU.

ble in a manner sufficient for independent validation."[47] Apparently developed without input from the scientific community, EPA's proposal resembles proposals advocated by industry groups and conservative think tanks and is patterned after proposed legislation previously sponsored by former Representative Lamar Smith (R-Tex.), an avowed opponent of climate science.[48]

On its face, the proposed rule's precise effect is uncertain, as it contains somewhat vague provisions and authorizes the EPA administrator to make case-by-case exemptions.[49] The proposal might have little impact on short-term industry studies that tend to suggest exposure to a substance causes little or no harm.[50] However, the proposal would likely exclude—and appears to be aimed at—influential long-term studies that use private health data to link air pollution with serious health effects.[51] Excluding such studies presumably would result in the issuance of weaker health and environmental standards.[52]

Transparency in agencies' use of science can enhance accountability by allowing the public to evaluate the scientific and policy judgments contributing to agency decisions.[53] In general, agencies should "identify[ ] the overarching values and assumptions that influenced the technical decision-making[,] . . . detail[ ] the literature consulted[, and] explain[ ] how or why they weighted or excluded" various studies.[54]

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47. Strengthening Transparency in Regulatory Science, 83 Fed. Reg. at 18,773 (emphasis in original).

48. *See* Maxine Joselow, *Emails: EPA All Ears as Industry Pitched "Secret Science,"* GREENWIRE (May 17, 2018), https://perma.cc/KVA4-VFH9; Scott Waldman & Niina Heikkinen, *Smith Pitched Pruitt on "Secret Science." Now It's Happening*, CLIMATEWIRE (Apr. 20, 2018), https://perma.cc/2JT7-X7L8; Scott Waldman, *Science Reform Eyed as Path to Unravel Endangerment Finding*, CLIMATEWIRE (Mar. 19, 2018), https://perma.cc/DQS8-JN5P; Letter from Michael Honeycutt, Chair of Science Advisory Board, to E. Scott Pruitt (June 28, 2018), https://perma.cc/WK2P-Q4BB.

49. *See* Strengthening Transparency in Regulatory Science, 83 Fed. Reg. at 18,772–74.

50. *See* Waldman, *supra* note 48 (noting that proposal would exclude long-term historical studies while allowing industry to "provide the studies they've done that show the effects are minimal or less").

51. *See* Scott Waldman, *Here Are 3 Studies that Might Be Hit by Pruitt's Rule*, CLIMATEWIRE (Apr. 26, 2018), https://perma.cc/TK74-N8AL; Robinson Meyer, *Scott Pruitt's New Rule Could Completely Transform the EPA*, ATLANTIC (Apr. 25, 2018), https://perma.cc/2JNC-7TGS. The "Six Cities" study, a long-term Harvard School of Public Health study that has served as the basis for tightened air pollution standards, would likely be excluded under the proposed rule and has been the target of deregulatory groups since the late 1990s. *See* Waldman, *supra*; Wagner, *supra* note 45, at 79; NATIONAL RESEARCH COUNCIL, ACCESS TO RESEARCH DATA IN THE 21ST CENTURY, at vii–viii (2002).

52. *See* Waldman, *supra* note 51; Meyer, *supra* note 51.

53. *See* WENDY WAGNER, SCIENCE IN REGULATION: A STUDY OF AGENCY DECISIONMAKING APPROACHES 14 (2013).

54. *See id.* at 25.

However, EPA's proposal incorrectly assumes that data transparency is a necessary condition of scientific validity.[55] Objecting to the proposal, the editors of four major scientific journals explained that "in not every case can all data be shared," and "[i]t does not strengthen policies based on scientific evidence to limit the scientific evidence that can inform them."[56] The hallmark of the scientific process is peer review, rather than data transparency per se.[57] Prior to the Trump Administration, agencies were encouraged to disclose underlying data "to the extent practicable and permitted by law."[58] This limitation reflects the importance of safeguarding personal privacy, trade secrets, and confidential business information.[59] Until now, however, agencies have not been precluded from relying on studies that incorporate confidential data. This long-standing approach—which federal agencies other than EPA continue to follow—is consistent with accepted scientific practice and ethical standards, which guarantee data privacy to human subjects through confidentiality agreements and the like.[60] Indeed, the scientific community is able to judge the merits of studies that rely on confidential data: "as a core skill, scientists are trained in assessing research publications by judging the articulation and logic of the research design, the clarity of the description of the methods used for data collection and analysis, and appropriate citation of previous results."[61]

2. The Proposed "Red Team, Blue Team" Climate Debate

In another example of questioning accepted science, former EPA Administrator Scott Pruitt repeatedly advocated a "red-team, blue-team" exercise as a

55. *See* Waldman & Heikkinen, *supra* note 48; *see also* David Michaels & Thomas Burke, *The Dishonest HONEST Act*, 356 SCIENCE 989 (2017) (criticizing similar legislative proposal as "an attempt by politicians to override scientific judgment and dictate narrow standards by which science is deemed valuable for policy"); Wendy Wagner et al., *Whose Science? A New Era in Regulatory "Science Wars*," 362 SCIENCE 636, 636 (2018) (suggesting that the EPA proposal adopts as a legal requirement a particularized notion of transparency, even though the concept is in flux and subject to interpretation within the scientific community).

56. Jeremy Berg et al., *Joint Statement on EPA Proposed Rule and Public Availability of Data*, SCIENCE (Apr. 30, 2018), https://perma.cc/X2SB-EBHH; *see* Robinson Meyer, *Even Geologists Hate the EPA's New Science Rule*, ATLANTIC (July 17, 2018), https://perma.cc/9T3B-LMGN.

57. *See* Berg et al., *supra* note 56.

58. Recommendations of the Administrative Conference of the United States, 78 Fed. Reg. 41,358, 41,358 n.12 (July 10, 2013).

59. *See id.*

60. *See* Waldman, *supra* note 51; *see also* Berg et al., *supra* note 56 (noting the importance of data sharing while recognizing that data sets featuring personal identifiers "cannot be shared openly with all").

61. Berg et al., *supra* note 57.

means of challenging the scientific consensus on climate change.[62] Such an exercise would have misframed a policy debate over responding to climate change as a scientific debate over climate change's existence.[63]

Developed by the U.S. military to test assumptions associated with a particular action or set of circumstances, the red-team, blue-team technique is a tool for analyzing policy options, not for determining scientific truths.[64] The red team's task is to challenge a strategy or preconceived notions by "fram[ing] a problem from the perspective of an adversary or sceptic . . . ."[65] Vulnerabilities and uncertainties are identified through a back-and-forth debate between red- and blue-team analysts.[66]

Unlike the scientific method, the red-team, blue-team approach is "not designed to take a testable hypothesis and then look at whether observations and theory support or refute it."[67] Accordingly, the technique is not suited to assess whether the evidence demonstrates the existence of particular risks—for example, in the case of climate change, to determine whether climate change is occurring. Rather, the red-team, blue-team approach is designed to assist policymakers in deciding how to respond to particular risks —i.e., problems of risk management.[68] The technique can be used to map possible future scenarios,

62. *See* Emily Holden, *Pruitt Will Launch Program to "Critique" Climate Science*, CLIMATEWIRE (June 30, 2017), https://perma.cc/28Z5-M833. While Pruitt's successor, Administrator Andrew Wheeler, has disavowed plans to pursue a "red-team, blue-team" debate, the matter is not completely settled. *See* Robin Bravender & Kevin Bogardus, *Transcript of E&E News' Interview with Andrew Wheeler*, E&E NEWS PM (July 13, 2018), https://perma.cc/227H-UN2M. In the context of a rulemaking for new power plants, EPA recently asked for comments on whether it must make a new finding that GHGs endanger public health—the very finding that was the target of the proposed exercise. EPA, Review of Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 83 Fed. Reg. 65,424, 65,432, & n.25 (Dec. 20, 2018) (to be codified at 40 C.F.R. pt. 60); *see also* Emily Holden, *Scott Pruitt Never Gave Up EPA Plans to Debate Climate Science, Records Show*, GUARDIAN (Dec. 21, 2018), https://perma.cc/3G9U-H796 (reporting that EPA and the White House reached a compromise to ask for public comments on the endangerment finding rather than hold a public debate on climate change).

63. Appeals to scientific authority are sometimes made to avoid accountability for policy decisions. *See* Wendy Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1617 (1995).

64. *See* Holden, *supra* note 62; Steven Koonin, *A "Red Team" Exercise Would Strengthen Climate Science*, WALL ST. J. (Apr. 20, 2017), https://perma.cc/XR5C-HRGC.

65. *Red Team*, FINANCIAL TIMES LEXICON, https://perma.cc/GJX5-JKEL.

66. *See* Koonin, *supra* note 64.

67. Richard B. Rood, *Red Team-Blue Team? Debating Climate Science Should Not Be a Cage Match*, THE CONVERSATION (Aug. 13, 2017), https://perma.cc/47XN-5SKT.

68. *See* DEFENSE SCIENCE BOARD TASK FORCE, THE ROLE AND STATUS OF DOD RED TEAMING ACTIVITIES 2 (2003) (stating that the purpose of red teams "is to reduce an enterprise's risks and increase its opportunities").

find gaps in plans, and develop alternative strategies.[69] As such, the red-team, blue-team technique differs substantially from scientific peer review, a process in which qualified experts review a work to provide feedback and assure that it meets scientific standards.[70] Unlike the red-team, blue-team approach, which is deliberately adversarial,[71] peer review is intended to be independent and objective, but not necessarily adversarial.

As contemplated by Pruitt, a red-team, blue-team debate on climate change would have proceeded through a series of exchanges between a "red team" of scientists tasked with critiquing the published science on climate change and a "blue team" charged with rebutting the red team's critique.[72] Public and televised, this back-and-forth process could have served as a stepping stone for reversing EPA's 2009 finding that greenhouse gas ("GHG") emissions endanger public health or welfare.[73] Such a reversal could lead to the unwinding of federal regulation of GHG emissions under the Clean Air Act.[74]

Leading scientific organizations worried that a red-team, blue-team exercise on climate change would allow the "use [of] policy disagreements as a pretext to challenge scientific conclusions,"[75] offer a prominent platform to climate change deniers, and cultivate skepticism regarding factual matters on which the scientific community has reached a consensus.[76] Indeed, the debate contemplated by Pruitt would not have been a neutral exercise aimed at discovering

69. *See* Fin. Times Lexicon, *supra* note 65; Def. Sci. Bd. Task Force, *supra* note 68, at 4.

70. *See* Dino Grandoni, *The Energy 202: What Would Be the Point of Pruitt's "Red Team-Blue Team" Climate Exercise?*, Wash. Post (July 3, 2017), https://perma.cc/HK4M-WYNH; *see also* Kelly Levin, *Pruitt's "Red Team-Blue Team" Exercise a Bad Fit for EPA Climate Science*, World Res. Inst. (June 20, 2017), https://perma.cc/P5WL-ZEVL.

71. *See* Def. Sci. Bd. Task Force, *supra* note 68, at 4–5 (noting that red teams may serve as "surrogate adversaries" or as "devil's advocates").

72. *See* Koonin, *supra* note 64; Scott Waldman, *Pruitt "Guaranteeing" Debate on Climate Science Soon*, Climatewire (Dec. 1, 2017), https://perma.cc/5RU5-YDEK.

73. *See* Holden, *supra* note 62; Valerie Volcovici, *EPA Chief Wants Scientists to Debate Climate on TV*, Reuters (July 11, 2017), https://perma.cc/3G6E-GLAU; EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,523 (Dec. 15, 2009).

74. *See* Bob Sussman, *Back to Basics or Slash and Burn? Scott Pruitt's Reign as EPA Administrator*, 47 Envtl. L. Rptr. 10,917, 10,923 (2017); *see also* Utility Air Resources Group v. EPA, 573 U.S. 302, 310–12 (2014) (discussing endangerment finding and subsequent EPA actions to regulate GHG emissions). A reversal of the 2009 endangerment finding would face an uphill struggle to survive judicial review. *See* Sussman, *supra* note 74, at 10,923.

75. Letter from Rush Holt, Chief Executive Officer, American Association for the Advancement of Science, et al., to Scott Pruitt, Administrator, EPA (July 31, 2017), https://perma.cc/P54L-EGGW.

76. *See* Levin, *supra* note 70.

scientific truth.[77] Potential participants included scientists who lack expertise in climatology or any field relating to climate change, as well as non-scientists who staunchly oppose vigorous climate policies.[78] In addition, a televised debate format would have readily lent itself to magnifying dissension and conflict.[79]

A red-team, blue-team debate would have complemented other efforts by the Trump Administration to foster public doubt on climate change.[80] President Trump once described climate change as a "hoax" and has continued to dismiss scientific evidence of climate change since taking office.[81] In confirmation hearings and public pronouncements, numerous cabinet members have asserted that the science on climate change is unclear.[82] More recently, the Trump Administration announced a National Security Council initiative under which a group of federal scientists would reassess government analyses of cli-

77. *See* Grandoni, *supra* note 70; *see also* Roesler, *supra* note 9, at 498 (describing danger that a statement highlighting uncertainty regarding climate change can be misleading "precisely because it capitalizes on the cognitive biases and cultural predispositions of some people").

78. *See* Scott Waldman, *Picking "Red-Team" Roster Presents Minefield for Pruitt*, CLIMATEWIRE (Oct. 26, 2017), https://perma.cc/WNG5-2PAE.

79. *See* Jaeho Cho & Yerheen Ha, *On the Communicative Underpinnings of Campaign Effects: Presidential Debates, Citizen Communication, and Polarization in Evaluations of Candidates*, 29 POL. COMM. 184, 184–85 (2012) (noting studies concluding that viewing presidential debates reinforces viewers' partisan preferences); Benjamin R. Warner & Mitchell S. McKinney, *To Unite and Divide: The Polarizing Effect of Presidential Debates*, 64 COMM. STUD. 508, 522 (2013) (finding that viewing presidential debates increases polarization, especially among those who were least polarized before viewing debates).

80. *See* Matt Viser, *"Just a Lot of Alarmism": Trump's Skepticism of Climate Science Is Echoed Across GOP*, WASH. POST (Dec. 2, 2018), https://perma.cc/NLP8-FTDH.

81. *See* Josh Dawsey et al., *Trump on Climate Change: "People Like Myself, We Have Very High Levels of Intelligence But We're Not Necessarily Such Believers*," WASH. POST (Nov. 27, 2018), https://perma.cc/M7BT-GHJ4; Michael Biesecker et al., *Trump Wages Battle Against Regulations, Not Climate Change*, PBS NEWS HOUR (June 10, 2017), https://perma.cc/MS5W-YYP6; Grace Guarnieri, *Trump Questions Climate Change in Piers Morgan Interview*, NEWSWEEK (Jan. 28, 2018), https://perma.cc/4SHV-35G2.

82. *See, e.g.*, *Hearing on Nomination of Attorney General Scott Pruitt to be Administrator of the U.S. Environmental Protection Agency*, 115th Cong. 28 (2017), https://perma.cc/MCA5-JJ7M (stating that "[t]he ability to measure with precision the degree and extent of [climate change] impact[s] . . . are subject to continuing debate and dialogue"); *Hearing on Nomination of Kirstjen M. Nielsen to be Secretary of the U.S. Department of Homeland Security*, 115th Cong. 34 (2017), https://perma.cc/QU55-FK3M (responding to question whether climate change is primarily caused by humans, "I believe that climate change exists. I am not prepared to determine causation"); *see also* Scott Waldman, *Here's How Science Fared in the First Year of Trump*, CLIMATEWIRE (Dec. 20, 2017), https://perma.cc/AH5C-7Z5Q; Emily Holden & Niina Heikkinen, *Top Officials Harden Against Climate Science Since Confirmation*, CLIMATEWIRE (July 25, 2017), https://perma.cc/PPV4-698Q. At his confirmation hearing, Administrator Pruitt questioned the degree of human influence on the climate and the extent of climate impacts. *See* Scott Waldman & Niina Heikkinen, *Pruitt Suggests Warming Can Help Humans*, CLIMATEWIRE (Feb. 7, 2018), https://perma.cc/L7WU-TTN8.

mate science.[83] Even the mere prospect of a red-team, blue-team debate could sow further doubts among the public about the validity of climate science by suggesting that the matter is unresolved.[84]

B. Devaluing and Sidelining Scientific Expertise

A second category in the alleged war on science consists of actions aimed at diminishing the role of scientific experts in government. Individual appointment decisions as well as broader changes in the composition and use of scientific advisory committees have devalued expert contributions to policy.

President Trump took more than nineteen months to appoint a presidential science advisor, more than double the length of time any president went without such an advisor since a full-time advisor was first named by President Eisenhower.[85] Such an advisor could assist the president in sorting through different perspectives on federal disaster response, North Korea's nuclear program, and other policy matters that raise scientific issues.[86] The President's Council of Advisers on Science and Technology, an advisory group of private sector experts that has provided reports on scientific and technological developments to the president since 1990, has remained unpopulated and unstaffed.[87] And EPA

83. Juliet Eilperin et al., *White House To Set Up Panel to Counter Climate Change Consensus, Officials Say*, WASH. POST (Feb. 24, 2019), https://perma.cc/49Y7-FR6S.

84. *See* Scott Waldman, *Climate Critics See New Paths to "Alternative" Science*, CLIMATEWIRE (July 24, 2018), https://perma.cc/96FM-XR5X (discussing red team approach as one of several options for "creating doubt in the public mind around climate change").

85. *See* Sara Reardon & Alexandra Witze, *Trump Finally Nominates a Science Adviser*, 560 NATURE 150, 150 (2018); Mythili Sampathkumar, *Donald Trump Has Not Had a Science Advisor for Longer Than Any Other President*, INDEPENDENT (July 27, 2018), https://perma.cc/H6CK-NM4Y; Christa Marshall, *Trump Plans Shakeup of Science Council*, GREENWIRE (Feb. 6, 2018), https://perma.cc/Z6V7-5CZH. The nominee, Kelvin Droegemeier, was confirmed on January 2, 2019, more than twenty-three months after Trump took office. *See* Lauren Morello, *Donald Trump Finally Has a White House Science Adviser*, NATURE: INT'L J. OF SC. (Jan. 3, 2019), https://perma.cc/VA8D-TPV3. By comparison, President George W. Bush's science adviser was confirmed nine months after Bush took office, and President Clinton's science adviser was confirmed just days after Clinton took office. *See* Daniel Southerl, *Gibbons Confirmed as President's Science Adviser*, WASH. POST (Jan. 29, 1993), https://perma.cc/5JPJ-TD55 (reporting confirmation of John Gibbons as Clinton's presidential science advisor); MOONEY, *supra* note 4, at 240 (noting that Bush's science adviser was confirmed in late October 2001). For a historical account of how the presidential science advisor position was established, *see* Roger Pielke Jr. & Roberta Klein, *The Rise and Fall of the Science Advisor to the President of the United States*, 47 MINERVA 7 (2009); Dave Levitan, *When a President Banishes Science From the White House*, ATLANTIC (Oct. 31, 2016), https://perma.cc/23WZ-B6V9.

86. *See* Scott Waldman, *Will Trump Name a Scientist? A Poli-Sci Grad Runs the Show*, CLIMATEWIRE (Feb. 14, 2018), https://perma.cc/9JH9-EMHQ.

87. *See* KENNETH M. EVANS & KIRSTIN R.W. MATTHEWS, SCIENCE ADVICE TO THE PRESIDENT AND THE ROLE OF THE PRESIDENT'S COUNCIL OF ADVISORS ON SCIENCE AND

has announced plans to dissolve its Office of the Science Advisor, which provides scientific advice directly to the EPA administrator.[88]

Furthermore, the Administration has nominated or appointed non-scientists to positions that require scientific expertise or have traditionally been held by scientists. Examples include: Sam Clovis, a former economics professor and talk radio host with no science background, nominated to a Department of Agriculture position that by statute must be filled by a "distinguished scientist[ ] with specialized training or significant experience in agricultural research, education, and economics;"[89] Barry Myers, CEO of AccuWeather, nominated to lead the National Oceanic and Atmospheric Administration;[90] Jim Bridenstine, a former congressman and Navy aviator, appointed as the first politician to lead NASA;[91] and Aurelia Skipwith, a former molecular geneticist and manager at Monsanto, nominated as U.S. Fish and Wildlife Service director, who by statute must "by reason of scientific education and experience, [be] knowledgeable in the principles of fisheries and wildlife management."[92]

Appointments of agency officials are not the only way in which the Trump Administration has reduced the role of scientific expertise. An even more pervasive effort has involved changes in the staffing and operation of scientific advisory committees. EPA relies heavily on 22 scientific advisory committees to inform its work.[93] Input from these committees not only informs the agency's actions but also helps to persuade courts to defer to those actions.[94] Among the

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Technology 15 (Rice Univ. Baker Inst. for Pub. Pol'y ed., 2018), https://perma.cc/SPE2-NUEV (noting that Trump had not named any individuals to the Council as of July 2018). Predecessors to the PCAST in providing scientific advice to the president date back to the 1930s. *See* Rod Kuckro & Christa Marshall, *Top Advisory Groups Dormant at DOE, White House*, Energywire (May 11, 2017), https://perma.cc/C3UP-ZBNQ.

88. *See* Coral Davenport, *EPA to Eliminate Office That Gives Scientific Input*, N.Y. Times, Sept. 28, 2018, at A13.

89. *See* Marc Heller, *After Clovis, Groups Debate Need for Scientists in USDA Post*, Greenwire (Dec. 18, 2017), https://perma.cc/X5L3-D2RH. Clovis withdrew from consideration prior to a confirmation vote. *Id.*

90. *See* Rob Hotakainen, *Trump Picks CEO to Lead NOAA, Lockheed Exec for Defense*, E&E Daily (Oct. 12, 2017), https://perma.cc/H5MT-RJFN.

91. *See* Scott Waldman, *Trump's Pick for NASA Chief Hits a Senate Roadblock*, Climatewire (Jan. 25, 2018), https://perma.cc/YZV3-HCW4.

92. Emily Holden, *Trump to Nominate Former Monsanto Executive to Top Interior Department Position*, Guardian (Oct. 23, 2018), https://perma.cc/3S54-ZDML; 16 U.S.C. § 742b(b) (2012).

93. *See All Advisory Committees at EPA*, EPA (Feb. 13, 2019), https://perma.cc/8VEJ-G7R3.

94. *See, e.g.*, Mississippi v. EPA, 744 F.3d 1334, 1344–45 (D.C. Cir. 2013) (upholding EPA's setting of ambient pollution standard based in part on unanimous recommendation by Clean Air Scientific Advisory Committee); Nat. Res. Def. Council v. EPA, 808 F.3d 556, 573–76 (2d Cir. 2015) (finding that EPA failed to adequately consider ballast water treatment options where letter from members of science advisory committees indicated that agency had prevented development of relevant information); *see also* Pascual et al., *supra* note 32, at 457

most prominent of EPA's advisory committees are its Science Advisory Board ("SAB"), Clean Air Scientific Advisory Committee ("CASAC"), and Board of Scientific Counselors ("BOSC"). The SAB, established to provide scientific advice to EPA or Congress upon request, reviews whether the scientific and technical basis of proposed regulations is adequate.[95] By statute, the SAB must be "composed of at least nine members . . . qualified by education, training, and experience to evaluate scientific and technical information on matters referred to the Board."[96] The CASAC advises EPA on setting and revising ambient air quality standards and on research regarding the adequacy of such standards.[97] The CASAC's seven members must include "at least one member of the National Academy of Sciences, one physician, and one person representing State air pollution control agencies."[98] Finally, the BOSC advises EPA on the technical and management aspects of its research programs.[99] Created under the agency's discretionary authority,[100] the BOSC is composed of twenty members selected "from the environmental scientific and technical fields, human health care professions, academia, industry, public and private research institutes and organizations, and other relevant interest areas."[101]

Under the Trump Administration, EPA has taken several steps to alter the composition of these committees or reduce their influence. In June 2017, EPA announced that it would not renew BOSC members with expiring appointments—contrary to past practice—and cancelled upcoming meetings of the board's subcommittees.[102] EPA similarly departed from longstanding precedent in declining to renew members of its SAB.[103] Such steps, initiated by then-Administrator Pruitt, have continued under Administrator Wheeler, who has

("[C]ourts seem to defer more heavily to agency outputs that have been reviewed and endorsed by science advisory panels.").

95. *See* 42 U.S.C. § 4365 (2012); *see also* U.S. Gov't Accountability Office, GAO-15-500, EPA's Science Advisory Board: Improved Procedures Needed to Process Congressional Requests for Scientific Advice 4 (2015), https://perma.cc/7U3N-LCTC.
96. 42 U.S.C. § 4365(b). The SAB is currently composed of approximately fourty-five members. *See* 2017 SAB Renewal Membership Balance Plan (Aug. 15, 2017), https://perma.cc/7NY3-PXBU.
97. *See* 42 U.S.C. § 7409(d)(2) (2012); U.S. Gov't Accountability Office, *supra* note 95, at 1, 5.
98. 42 U.S.C. § 7409(d)(2)(A).
99. *See* BOSC Renewal Charter (May 9, 2018), https://perma.cc/E9DE-PUDL.
100. Memorandum from E. Scott Pruitt, EPA Adm'r to Assistant Adm'rs et al. on Strengthening and Improving Membership on Federal Advisory Committees 1 & n.7 (Oct. 31, 2017), https://perma.cc/U8DT-2P72.
101. BOSC Renewal Charter, *supra* note 99, at 3.
102. *See* Sean Reilly, *38 Science Advisers Get Pink Slips—Internal Email*, Greenwire (June 20, 2017), https://perma.cc/7JW4-X9AP.
103. Center for Sci. & Democracy at the Union of Concerned Scientists ("CSD"), Abandoning Science Advice 5 (2018).

displaced academic researchers on the CASAC and eliminated advisory panels charged with reviewing the agency's standards for ozone and particulate matter—two of the most significant air pollutants the agency regulates.[104] Though not legally required to do so, EPA had relied on such advisory panels to provide specialized expert advice since at least the late 1970s.[105]

In the most far-reaching measure to date, EPA issued a directive barring scientists receiving EPA grants from serving on any of the agency's advisory committees.[106] The directive's stated purpose was to avoid "the appearance or reality of potential interference with [committee members'] ability to independently and objectively serve."[107] However, the directive has been widely criticized. Noting that pre-existing policies already addressed the alleged conflicts, one prominent scientific organization denounced the directive as "motivated by politics, not the desire for quality scientific information."[108] Other critics noted that the directive ignores more serious conflicts faced by committee members who work for industry or receive industry funding—and whom the directive does not bar from serving.[109] Indeed, inconsistent application of the directive in the year since its issuance has cast further doubt on its stated purpose of ensuring objectivity.[110]

Historically, EPA advisory committees have been comprised primarily of academics.[111] However, the recent changes have sidelined academic experts in favor of expanded industry representation.[112] Reliance on industry experts for advice can be problematic because such experts' employers often have a finan-

104. *See* Sean Reilly, *Wheeler Bumps More Academics from Advisory Panel*, GREENWIRE (Oct. 11, 2018), https://perma.cc/4QLS-CRRB; Sean Reilly, *EPA Scraps Science Panel: "Your Service . . . Has Concluded*," GREENWIRE (Oct. 12, 2018), https://perma.cc/3UNF-LRPG.

105. *See* Letter from H. Christopher Frey et al., former members of 2015–18 CASAC Particular Matter Review Panel, to Tony Cox, Chair, CASAC, E-37–E-39 (Dec. 10, 2018), https://perma.cc/24X4-G8T7.

106. *See* Memorandum from E. Scott Pruitt, EPA Adm'r to EPA Assistant Adm'rs et al. on Strengthening and Improving Membership on Federal Advisory Committees 3 (Oct. 31, 2017), https://perma.cc/3HM3-WXYW.

107. *Id.*

108. Am. Ass'n for the Advancement of Sci., Statement on EPA Science Adviser Boards (Oct. 31, 2017), https://perma.cc/P5Y5-AA9E.

109. *See* Kevin Bogardus & Sean Reilly, *Pruitt Bars Science Advisers with Agency Grants*, E&E NEWS PM (Oct. 31, 2017), https://perma.cc/R55J-F8EH.

110. *See* Sean Reilly, *Uneven Enforcement Follows Pruitt Edict on Science Panels*, GREENWIRE (Sept. 21, 2018), https://perma.cc/EB69-EVY9.

111. *See* Scott Waldman, *The Skeptics Who Could Snag Science Adviser Slots*, CLIMATEWIRE (Sept. 14, 2017), https://perma.cc/J9KT-KDSN; *see also* Sean Reilly, *Pruitt Extends Grant Policy to New Advisory Panels*, E&E NEWS PM (Nov. 29, 2017), https://perma.cc/L6NZ-JPDM.

112. *See* Juliet Eilperin, *EPA's New Science Advisers Add More Industry Experts, Conservatives to the Mix*, WASH. POST (Nov. 4, 2017), https://perma.cc/JYJ4-NQPG; *see also* Reilly, *supra* note 111; Waldman, *supra* note 111.

cial stake in resulting regulations.[113] Moreover, CASAC has come to be dominated by state regulators who have little background in research on the health effects of air pollution and who hail from states that have been hostile to stringent air pollution rules.[114] Similarly, recent appointees to the SAB include leading proponents of deregulation, climate change skeptics, and recipients of industry funding who have attacked mainstream climate science and questioned widely recognized pollution problems.[115] For example, the chair of the SAB, Michael Honeycutt, has attracted attention for downplaying the risks of exposure to ozone and mercury.[116]

Measures to stack, alter, or sideline scientific advisory boards have not been limited to EPA or to narrow issues. At the Departments of Commerce, Energy, Interior, and EPA the frequency of science advisory committee meetings and/or number of committee members in 2017 reached their lowest levels since the government began collecting such data in 1997.[117] And across the federal government, advisory committees that work on climate change-related issues have been dissolved or allowed to expire.[118]

Worries about the politicization of scientific advisory committees are not novel. President Obama's CASAC appointments were criticized for lacking geographical and ideological diversity.[119] The George W. Bush Administration was attacked for appointing scientists with ties to industry and asking potential nominees about their political preferences and their views on capital punish-

113. *See* Jennifer Sass, *Correspondence, Credibility of Scientists: Conflict of Interest and Bias*, 114 ENVTL. HEALTH PERSP. A147, A147–A148 (2006); *see also* Sheldon Krimsky & Tim Schwab, *Conflicts of Interests among Committee Members in the National Academies' Genetically Engineered Crop Study*, 12 PLOS ONE 2 (2017) (describing the "funding effect," in which studies funded by private companies tend to produce outcomes consistent with those companies' financial interests).

114. Sean Reilly, *EPA's Ozone Review Plan "Harmful"—Former Advisers*, GREENWIRE (Nov. 26, 2018), https://perma.cc/V2PT-KNGD; Sean Reilly, *Wheeler Bumps More Academics from Advisory Panel*, *supra* note 104.

115. *See* Waldman, *supra* note 111; Brady Dennis & Juliet Eilperin, *Scott Pruitt Blocks Scientists with EPA Funding from Serving as Agency Advisers*, WASH. POST (Oct. 31, 2017), https://perma.cc/RE5B-V2QS; Scott Waldman, *Some Agency Advisers Reject Smog. Pruitt Contradicted Them*, CLIMATEWIRE (Dec. 8, 2017), https://perma.cc/35FP-ZFB6.

116. *See* Jennifer Lu, *Outsider from Texas Now Setting EPA's Science Panel Agenda*, BNA ENERGY & ENV'T REPORT (Nov. 7, 2017), https://perma.cc/BB56-TYBC.

117. *See* CSD, *supra* note 103, at 2–3. Many advisory committees met less frequently than their committee charters require. *Id.* at 3.

118. *See* Scott Waldman & Brittany Patterson, *Trump Team Has Slowed Down or Disbanded 3 Climate Panels*, CLIMATEWIRE (Aug. 22, 2017), https://perma.cc/A53D-HGCJ (discussing dissolution of NOAA's advisory committee for the National Climate Assessment and the Interior Department's Advisory Committee on Climate Change and Natural Resource Science).

119. *See* Jason Plautz, *Republicans Take Science Advisory Panels to Task Over Potential Bias*, E&E DAILY (Mar. 21, 2013); Sean Reilly, *EPA Seeks Comments on Nominees to Hot-Button Science Panel*, GREENWIRE (June 22, 2016), https://perma.cc/5G3B-H92Y.

ment and abortion.[120] And under President Reagan, EPA compiled a covert "hit list" of scientific advisors to eliminate from its advisory boards.[121] These earlier efforts, however, focused on committee appointments and generally did not extend to committees' existence and use.

Finally, policy decisions involving science have sometimes been driven by factors other than science. EPA Administrator Pruitt reportedly relied on lawyers, lobbyists, and Republican state attorneys general, rather than agency scientists and staff, to make policy decisions.[122] In one rulemaking, EPA cited as scientific support a source that did not involve a scientific study at all.[123] And in another rulemaking, the Trump Administration criticized an Obama-era rule for "plac[ing] too much emphasis" on information and conclusions from a scientific report.[124]

C. Censorship of Agency Science

A third category of Trump Administration actions hostile to science includes political interference with the work of agency scientists and politicization of speech relating to climate change and other subjects. These actions raise concerns regarding scientific integrity and censorship.

Agencies rely on their own scientists to conduct research and to review and analyze the work of scientists outside the agency.[125] However, political interference can undermine the integrity of government scientists' work and the science-driven policies that rely on their work. In one example of such interference, EPA blocked one of its research ecologists from delivering a keynote conference address on climate change and other factors affecting the health of Rhode Island's Narragansett Bay.[126] While an agency spokesman con-

120. *See* MOONEY, *supra* note 4, at 241, 251–52, 258; House Committee on Government Reform, *supra* note 4, at ii–iii.

121. *See* Scott Waldman, *Political Appointees Once Kept a Scientist "Hit List,"* CLIMATEWIRE (May 14, 2018), https://perma.cc/WU8X-YHW5; JASANOFF, *supra* note 21, at 89. Although EPA denied using the list to decide on SAB appointments, a number of scientists on the list were not reappointed. *See id.* The controversy ultimately prompted Congress to expand the SAB and to require EPA to consider a broader range of potential appointees. *See id.*

122. *See* Daniel A. Farber, *Presidential Administration Under Trump*, 28–29 (UC Berkeley Public Law Research Paper, 2017).

123. *See* Juliet Eilperin & Brady Dennis, *Amid Ethics Scrutiny, EPA's Pruitt also Finds his Regulatory Rollbacks Hitting Bumps*, WASH. POST (May 20, 2018), https://perma.cc/B6N7-G99G.

124. Definition of "Waters of the United States"–Recodification of Preexisting Rule, Supplemental Notice of Proposed Rulemaking, 83 Fed. Reg. 32,227, 32,241 (Proposed July 6, 2018) (to be codified at 33 C.F.R. pt. 328).

125. *See* NAT'L RES. COUNCIL, BUILDING A FOUNDATION FOR SOUND ENVIRONMENTAL DECISIONS 49–58 (1997).

126. *See* Arianna Skibell, *Agency Keeps Scientists from Speaking at Watershed Conference*, GREENWIRE (Oct. 23, 2017), https://perma.cc/7UYC-DMHA. Another agency scientist and a contractor were also barred from presenting at the conference. *Id.*; Lisa Friedman, *EPA*

tended that "EPA scientists . . . are not presenting, it is not an EPA conference,"[127] the incident prompted Senator Sheldon Whitehouse (D-R.I.) to express concern that EPA was censoring scientific findings on climate change. Then-Administrator Pruitt responded with a pledge that "[p]rocedures have been put in place to prevent such an occurrence in the future" and reaffirmed the agency's commitment to its policy of scientific integrity.[128]

Pruitt's pledge has not eased concerns about censorship. The Trump Administration's skepticism toward climate change has prompted worries that political officials would alter scientific reports or suppress scientific inquiry in order to reduce climate change's public visibility and undermine the case for a government response.[129] Online access to climate change data and reports at EPA, the Department of the Interior, and other agencies has been curbed.[130] References to climate change have disappeared from agency websites.[131] Agency

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Cancels Talk on Climate Change by Agency Scientists, N.Y. TIMES, Oct. 23, 2017, at A16. The Administration has also pressured scientists outside the agency to alter the content of scientific presentations. For example, the National Park Service compelled a Colorado College environmental science professor to eliminate references to climate change from a class he was teaching at a national monument. *See* Juliet Eilperin & Lena H. Sun, *Trump Administration Targets Certain Words, and the Bureaucracy Pushes Back*, WASH. POST (Dec. 21, 2017), https://perma.cc/CEG2-SYZ7.

127. Skibell, *supra* note 126.

128. Letter from E. Scott Pruitt to Sheldon Whitehouse (Dec. 4, 2017), https://perma.cc/663A-379U; Arianna Skibell, *Scientists Will Be Free to Discuss Their Work—Pruitt*, E&E NEWS PM (Dec. 6, 2017), https://perma.cc/UHU9-CUWV. In a similar incident, the Bureau of Land Management blocked several agency archaeologists from attending a conference to discuss protecting cultural resources on public lands. *See* Michael Doyle, *BLM Nixes Archaeologists from Big Annual Conference*, GREENWIRE (May 3, 2018), https://perma.cc/5R3Y-WTP6.

129. *But see* Brady Dennis et al., *Trump Administration Releases Report Finding "No Convincing Alternative Explanation for Climate Change*," WASH. POST (Nov. 3, 2017), https://perma.cc/VL9A-US9F (reporting release of first volume of legally mandated National Climate Assessment, apparently without alteration of scientific conclusions by political officials); Brady Dennis & Chris Mooney, *Major Trump Administration Climate Report Says Damage Is "Intensifying Across the Country*," WASH. POST (Nov. 23, 2018), https://perma.cc/UEG8-LNCE (reporting release of second volume of Fourth National Climate Assessment).

130. *See* Dennis et al., *supra* note 129; Maxine Joselow, *More Climate Change References Missing From Webpages*, E&E NEWS PM (Dec. 8, 2017), https://perma.cc/NT3G-FL9T; Maxine Joselow, *"It's Not a Happy Place,"* CLIMATEWIRE (Nov. 21, 2018), https://perma.cc/CEB4-G2PM (reporting that EPA has not updated the climate change indicators webpage since 2016).

131. *See* Scott Waldman, *Missing Agency Webpages Return Without Climate Info*, CLIMATEWIRE (Oct. 20, 2017), https://perma.cc/W74P-XPL8; Corbin Hiar, *Missing EPA Report Warned of Flooding at Superfund Dumps*, CLIMATEWIRE (Sept. 18, 2017), https://perma.cc/2B4N-67KD (reporting loss of access to agency report warning that climate change could intensify storms and thereby increase the risk of contamination from flooded Superfund sites); Brittany Patterson, *Climate Skeptic Oversaw Sprawling Review of Agency Policy*, CLIMATEWIRE (Mar. 8, 2018), https://perma.cc/G9LH-WMFH (describing efforts of Indur Goklany, an

staffers removed mentions of climate change from reports and rescinded directives relating to climate change.[132] Additionally, researchers outside the government have been asked to remove the terms "climate change" and "global warming" from federal grant proposals.[133] In an unprecedented step, political appointees at EPA and the Department of the Interior now review grants to universities and outside groups—a move that could undermine the integrity of contracting processes and subvert research priorities previously determined by Congress.[134] In addition, the Administration has halted research projects aimed at identifying health and safety risks associated with fossil fuel extraction.[135] While some climate change work continues within the federal government, it is subject to the messaging efforts and potential interference of political officials.[136]

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electrical engineer, to revise Interior Department webpages and policies to delete references to climate change).

132. *See* Adam Aton, *Parks Officials Scrubbed Climate Report*, CLIMATEWIRE (Apr. 3, 2018), https://perma.cc/ZTY9-3556; Brittany Patterson, *Order Scrapping Climate Plans Could Hurt National Parks*, CLIMATEWIRE (Jan. 8, 2018), https://perma.cc/WW9P-WCHY; Adam Aton, *IG Halts Climate Censorship Investigation*, CLIMATEWIRE (Aug. 16, 2018), https://perma.cc/E7YQ-CG85 (reporting that the National Park Service delayed release of a study on the impacts of rising seas on the national parks, officials tried to remove references to human influences on climate change from a draft version of the study, and the Interior Department's inspector general halted its investigation of alleged censorship after the study was finally released).

133. *See* Jeff Tollefson & Amy Maxmen, *US Energy Agency Asked Scientists to Scrub References to Climate Change*, NATURE (Aug. 25, 2017), https://perma.cc/HZ6L-HNDJ.

134. *See* Juliet Eilperin, *Interior Puts Science Grants Through Political Review*, WASH. POST (Jan. 9, 2018), https://perma.cc/APW4-9255.

135. The Department of the Interior ordered the National Academies of Sciences, Engineering, and Medicine to stop a study of health risks from living near mountaintop removal coal mining sites and a study of the government's offshore oil and gas operations safety inspection program. Darryl Fears, *Trump Administration Halted a Study of Mountaintop Coal Mining's Health Effects*, WASH. POST (Aug. 21, 2017), https://perma.cc/CR86-XDWG; Press Release, The Nat'l Acads of Scis., Engineering, and Med., Statement on Stop-Work Order for National Academies Study on the Department of the Interior's Offshore Oil and Gas Operations Inspection Program (Dec. 21, 2017), https://perma.cc/Q5NE-SNVE.

136. *See* Robin Bravender, *"Can We Say . . . Climate?" Agency Grapples with Trump's Views*, CLIMATEWIRE (Apr. 2, 2018), https://perma.cc/7VHT-3SPJ; Scott Waldman, *Agency Leaders Tout "Great Work" on Climate Under Trump*, CLIMATEWIRE (Apr. 13, 2018), https://perma.cc/MTH6-Q4BE; Chris Mooney & Juliet Eilperin, *In an Internal Memo, the White House Considered Whether to Simply "Ignore" Federal Climate Research*, WASH. POST (May 23, 2018), https://perma.cc/PQ7A-V2QS; *see also* Zack Colman, *Trump Didn't Mess with Climate Study. But He Might Ignore It*, CLIMATEWIRE (Nov. 6, 2017), https://perma.cc/Z3AF-N8GA (reporting that the Trump Administration released a legally mandated climate report without apparently interfering with its content). Secrecy has not been limited to climate science. The Agency for Toxic Substances and Disease Registry's release of a draft toxicology profile of toxic nonstick chemicals was delayed as EPA met with industry to decide how to

Adverse personnel actions also may constitute censorship. In July 2017, the Interior Department reassigned fifty senior career officials, ostensibly to "match[ ] . . . their skill sets with mission and operational requirements."[137] Among them was the Interior Department's top climate change official, Joel Clement, who was reassigned to an office responsible for collecting oil and gas royalty payments.[138] Clement had highlighted the dangers climate change poses for Alaska Native communities, and the other reassigned officials had also worked on climate change and other scientific issues.[139] EPA also has witnessed personnel changes that could negatively impact scientific inquiry critical to protecting public health and the environment. Ruth Etzel, the director of EPA's Office of Children's Health Protection, was abruptly placed on administrative leave, just as EPA was preparing a federal strategy for combating lead exposure.[140] And within the Trump Administration's first year, hundreds of scientists left the agency in the wake of proposed budget cuts and harsh criticism from political leaders.[141]

Efforts to censor agency science are not unique to the Trump Administration. Political appointees in the George W. Bush Administration blocked agency scientists from publishing papers and making presentations, asked agency scientists to change information or conclusions in scientific reports, and edited scientific conclusions in reports and documents.[142] In one incident, Bush White House officials demanded revision of an EPA report to eliminate the conclusion that climate change has global health and environmental consequences and to incorporate contrary language from a study funded by the American Petroleum Institute.[143] And notwithstanding public pronouncements

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respond. *See* Corbin Hiar, *EPA Met with Industry after White House Flagged Health Study*, E&E NEWS PM (May 21, 2018), https://perma.cc/5GXD-X4EH.

137. Jennifer Yachnin & Corbin Hiar, *Zinke Shaking Up Senior Staff*, GREENWIRE (June 16, 2017), https://perma.cc/8K7DL-DZL.

138. *See* Juliet Eilperin, *Senate Democrats Call for an Investigation of Climate Scientist Whistleblower Complaint*, WASH. POST (July 24, 2017), https://perma.cc/4PRF-ACWR.

139. *See* Joel Clement, Opinion, *I'm a Scientist. I'm Blowing the Whistle on the Trump Administration*, WASH. POST (July 19, 2017), https://perma.cc/T3TG-MXJ5; Kellie Lunney, *Dems Slam Zinke after IG Report on Staff Moves*, E&E NEWS PM (Apr. 11, 2018), https://perma.cc/TAF3-3RGQ.

140. *See* Ariel Wittenberg, *Wheeler Wouldn't Meet with Kids' Health Chief—Sources*, GREENWIRE (Oct. 19, 2018), https://perma.cc/BE8M-JWLQ; Coral Davenport & Roni Caryn Rabin, *Top Children's Health Official at EPA Is Placed on Leave*, N.Y. TIMES, Sept. 27, 2018, at A15.

141. *See* Lisa Friedman et al., *EPA Officials, Disheartened by Agency's Direction, Are Leaving in Droves*, N.Y. TIMES (Dec. 22, 2017), https://perma.cc/X62E-DG5N.

142. *See* Sidney A. Shapiro, *"Political" Science: Regulatory Science After the Bush Administration*, 4 DUKE J. CONST. L. & PUB. POL'Y 31, 32 (2009); Heidi Kitrosser, *The Accountable Executive*, 93 MINN. L. REV. 1741, 1772–73 (2009); Doremus, *supra* note 4, at 1604–09.

143. *See* Jody Freeman & Adrian Vermeule, Massachusetts v. EPA: *From Politics to Expertise*, 2007 S. CT. REV. 51, 55 (2007); Michele Estrin Gilman, *The President as Scientist-in-Chief*,

to the contrary, executive branch officials have long impeded the ability of agency scientists to communicate with the media and with Congress through preclearance requirements, denials of interview requests, and other restrictive practices.[144] The Obama Administration engaged in some of these practices and also sought to control communications by aggressively prosecuting government employees who leaked classified or confidential information.[145]

D. Characterizing the Trump Administration's Actions

Viewed against the President's frequent misleading statements, the Trump Administration's disregard of scientific facts and expertise is no surprise.[146] Indeed, there is a risk of overstating the broader effects of the Administration's anti-scientific measures. Despite outcries regarding the "war on science," the Trump Administration is hardly dismantling science itself, nor is it clear that it could do so. Government-supported research continues—although the government shutdown delayed new research awards and review of research proposals—and much scientific inquiry takes place outside the government.[147] In fact, federal research and development spending for the 2018 fiscal year totaled an estimated $176.8 billion, its highest level ever, even after accounting for inflation.[148] Overall levels of public confidence in science and scientists remain relatively high.[149] The Trump Administration has expressed enthusiasm for certain categories of science and technology, including artificial intelligence and

45 WILLAMETTE L. REV. 565, 571–72 (2009). EPA ultimately chose to omit any discussion of climate change rather than make the revisions. *See* Freeman & Vermeule, *supra*, at 55.

144. *See* Gabriel Popkin, *Trump Doesn't Want the Public to Know What Government Scientists Are Doing*, WASH. POST (Dec. 12, 2018), https://perma.cc/B3R9-NUQ2; Heidi Kitrosser, *Scientific Integrity: The Perils and Promise of White House Administration*, 79 FORDHAM L. REV. 2395, 2410–13; Doremus, *supra* note 4, at 1609–13.

145. Kitrosser, *supra* note 144, at 2411–13.

146. *See* Glenn Kessler & Meg Kelly, *President Trump Made 2,140 False or Misleading Claims in His First Year*, WASH. POST (Jan. 20, 2018), https://perma.cc/YP2H-JBLJ; *see also* Farber, *supra* note 122, at 28 (suggesting "clear reasons for concern about Trump's respect for expertise, whether in agencies or elsewhere").

147. *See, e.g.*, Christa Marshall, *"It's a Mess": Employees Fret Over Spending Spree*, E&E NEWS (June 7, 2018), https://perma.cc/Z9H3-QVYL (reporting on research grants awarded by Department of Energy); Michael Doyle, *Science Shutdown an Experiment in Fear, Frustration*, GREENWIRE (Jan. 11, 2019), https://perma.cc/6JSS-J49N.

148. *Trump, Congress Approve Largest U.S. Research Spending Increase in a Decade*, SCIENCE NEWS (Mar. 23, 2018), https://perma.cc/46JH-S3CM (noting also that the Trump Administration originally proposed deep cuts to research funding).

149. *See* AM. ACAD. OF ARTS & SCIS., PERCEPTIONS OF SCIENCE IN AMERICA 1, 4–5 (2018); Cary Funk, *Mixed Messages About Public Trust in Science*, PEW RESEARCH CENTER (Dec. 8, 2017), https://perma.cc/L3BW-8NX8 (reporting results of 2016 survey).

manned space exploration.[150] Under President Trump, the Office of Science and Technology Policy has supported efforts to expand internet access, promote the use of self-flying drones, and advance artificial intelligence research.[151]

Further reflection on the distinction between research science and regulatory science suggests that *the Trump Administration is engaged in a war on regulatory science, not a war on research science*. Like other recent Republican administrations, the Trump Administration is reversing numerous regulatory measures aimed at protecting health and the environment. Those regulatory measures rely heavily on scientific data, and thus it is unsurprising that Republican administrations "attack science's forms of truth-making, its databases, and its budgets . . . as part of a coherent strategy to weaken the power of the federal agencies that rely on them."[152] As Clark Miller has explained, "[w]hat appears to be a war on science . . . is a war on a form of government with which science has become deeply aligned and allied over the past century."[153]

Scientific knowledge can serve purposes other than regulation: industry can use science to innovate, and government agencies can use science to achieve missions ranging from national defense to space exploration. Even regulatory scientific activity need not lead to regulation; an agency that studies a perceived threat might conclude that the threat is not significant or that regulation is not an appropriate response. However, in the absence of regulatory scientific data, regulation is unlikely to emerge or survive. As former EPA administrator Gina McCarthy and a colleague put it, "Mr. Pruitt's goal is simple: No studies, no data, no rules."[154] Administrator Wheeler's commitment to finalizing the secret science rule suggests a similar objective.[155] In the "deconstruction of the administrative state" pledged by former Trump advisor Steve Bannon, regulatory science is a prime target.[156]

In this struggle, regulatory science is not defenseless. As the next Part explains, many of the Administration's actions are (or will be) subject to litigation, and courts have an essential role in ensuring those actions are reasoned and empirically based. Nonetheless, some of the Administration's actions lie

150. *See* John D. McKinnon, *Trump Administration Vows to Maintain U.S. Edge in AI Technology*, WALL STREET J. (May 10, 2018), https://perma.cc/5WPW-MRVS; Presidential Memorandum on Reinvigorating America's Human Space Exploration Program, 2012 DAILY COMP. PRES. DOC. (Dec. 11, 2017).

151. Tony Romm & Ben Guarino, *Senate Confirms Trump's Science and Tech Adviser After Lengthy Vacancy*, WASH. POST (Jan. 3, 2019), https://perma.cc/N98E-HETQ.

152. Clark A. Miller, *It's Not a War on Science*, 33 ISSUES SCI. & TECH. no. 3 (Spring 2017), https://perma.cc/7XD8-EKGP.

153. *Id.*

154. Gina McCarthy & Janet G. McCabe, Opinion, *Scott Pruitt's Attack on Science Would Paralyze the EPA*, N.Y. TIMES (Mar. 26, 2018), https://perma.cc/E38N-UMJ3.

155. *See* Strengthening Transparency in Regulatory Science, *supra* note 46, at 18,768.

156. *See* Miller, *supra* note 152.

beyond the reach of the judiciary and could have lasting impacts on the relationship between law and science.

III. Laws Relevant to the War on Regulatory Science

Various laws are relevant to the war on regulatory science, including the APA, FACA, laws governing conflicts of interest, the First Amendment, and whistleblower protections. As it turns out, limited aspects of the Trump Administration's war on regulatory science are subject to enforceable legal constraints. In some instances, applicable law grants the executive branch wide discretion, and in other instances, no enforceable laws apply.

A. The Administrative Procedure Act

Final agency actions, including the issuance of new rules, revocation of previously issued rules, and granting of permits, are generally subject to judicial review under the APA. Indeed, several of the Trump Administration's actions delaying or suspending Obama-era rules have been successfully challenged for failing to comply with APA requirements.[157] Further litigation can be expected once new substantive rules are finalized. With federal agencies serving as the central battleground for the war on regulatory science, judicial review under the APA offers an important mechanism for guarding against some abuses of science.

1. Judicial Review under the APA

The APA authorizes judicial review of "[a]gency action made reviewable by statute and final agency action for which there is no other adequate remedy in a court."[158] Such review most commonly occurs under the "arbitrary and capricious" standard[159]—"a collection of more particularized inquiries into specific components of agency decision making, rather than a uniform assessment of the rationality of an agency's decision."[160] Courts examine whether an agency

157. *See* Lisa Heinzerling, *Unreasonable Delays: The Legal Problems (So Far) of Trump's Deregulatory Binge*, 12 Harv. L. & Pol'y Rev. 13, 19–21 (2018); *see also* Bill Funk, *Breaking the Law: Many Trump Regulatory Rollbacks and Delays Are Unlawful*, CPR Blog (Jan. 30, 2018), https://perma.cc/G6PH-AVJE.

158. 5 U.S.C. § 704 (2012).

159. *Id.* § 706(2)(A); *see also* Emily Hammond Meazell, *Super Deference, the Science Obsession, and Judicial Review as Translation of Agency Science*, 109 Mich. L. Rev. 733, 740 (2011) (noting that while "substantial evidence" standard of review applies to formal agency action, arbitrary and capricious review "serves as a catch-all standard that generally applies" to informal agency action).

160. Louis J. Virelli, III, *Deconstructing Arbitrary and Capricious Review*, 92 N.C. L. Rev. 721, 725 (2014).

relied only on factors intended by Congress, considered important aspects of a problem, articulated a rational connection between its choice and the underlying facts, or offered an explanation supported by the evidence before it.[161] And if an agency changes its position, courts require the agency to provide a reasoned explanation "for disregarding facts and circumstances that underlay or were engendered by the prior policy."[162] While sometimes characterized as "hard look" review, arbitrary and capricious review is a deferential approach that reflects notions of "agency expertise and political accountability."[163]

How might arbitrary and capricious review apply to the war on regulatory science? Environmental regulatory decisions typically incorporate "a series of sub-decisions that alternate or zigzag between science and science-policy."[164] Courts might be asked to review scientific data or policy judgments, and substantive as well as procedural issues.[165] Challenges might allege that an agency ignored credible scientific data, based its decision on unreliable or insufficient data, incorporated unreasonable scientific models, relied on a biased advisory committee, or disregarded input from an advisory committee.[166]

In evaluating such challenges, courts may hesitate to second-guess an agency's scientific determinations.[167] As noted above, agencies typically assess health and environmental risks through a "weight-of-the-evidence" approach that considers the totality of the available scientific information.[168] Courts'

161. *See* Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins., 463 U.S. 29, 43 (1983).

162. Fed. Commc'n Comm'n v. Fox Television Stations, Inc., 556 U.S. 502, 516 (2009).

163. Virelli, *supra* note 160, at 762–64; *see* Meazell, *supra* note 159, at 756.

164. Wagner, *supra* note 45, at 65.

165. *See, e.g.*, J.B. Ruhl, *Reconstructing the Wall of Virtue: Maxims for the Co-Evolution of Environmental Law and Environmental Science*, 37 ENVTL. L. 1063, 1072–73 (2007) (listing various principles and criteria that may be at issue when courts review agency implementation of Endangered Species Act).

166. *See* Meazell, *supra* note 159, at 749 (noting that successful challenges to use of "bad science" by agencies often involve agency failure to provide reasoned decisionmaking); Virelli, *supra* note 160, at 745 (discussing judicial review of agency procedures for ensuring reliability of informational inputs as an element of arbitrary and capricious review); Alan Charles Raul & Julie Zampa Dwyer, *"Regulatory* Daubert*": A Proposal to Enhance Judicial Review of Agency Science by Incorporating* Daubert *Principles into Administrative Law*, 66 L. & CONTEMP. PROBS. 7, 19–20 (2003) (giving examples of the courts striking down EPA regulations because of the improper use of science). Notably, the Information Quality Act's requirement that agencies "issue guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information . . . disseminated by the agency" does not create a judicially enforceable right. Salt Inst. v. Leavitt, 440 F.3d 156, 158–59 (4th Cir. 2006).

167. *See* Meazell, *supra* note 159, at 734; Balt. Gas & Elec. Co. v. Nat. Res. Def. Council, 462 U.S. 87, 103 (1983) (urging judicial review to "be at its most deferential" when examining agency predictions "within its area of special expertise, at the frontiers of science").

168. *See supra* notes 31–32 and accompanying text.

"super deference" to agencies' scientific assessments is based on a sense that agencies possess scientific expertise that generalist judges do not.[169]

However, many issues that courts review in fact do not require scientific expertise and thus neither warrant nor receive super deference.[170] For example, determining whether an agency included adequate procedures for ensuring data reliability or whether an agency considered relevant data are relatively straightforward questions of administrative law.[171] Furthermore, many challenges to science-based decisions involve an agency's alleged failure to explain itself in a reasoned manner—another issue courts are well-equipped to review.[172] In practice, courts are rarely called on to address actual errors in the science or other purely scientific questions that demand scientific expertise.[173]

2. APA Challenges to Delays or Suspensions of Obama-Era Rules

In President Trump's first year, regulatory agencies focused on delaying or suspending rules issued by the Obama Administration.[174] Challenges to these actions centered on basic questions of administrative law rather than on agency science, and courts have invalidated several actions that were taken without

169. *See* Virelli, *supra* note 160, at 746–47. *But cf.* Meazell, *supra* note 159, at 756 (suggesting that while courts sometimes invoke super deference, they do not appear to apply it in any principled way).

170. *See* Virelli, *supra* note 160, at 766–70; Meazell, *supra* note 159 at 738 (contending that courts are "trend[ing] away from super deference toward hard-look review, albeit couched in super-deference terminology").

171. *See* Virelli, *supra* note 160, at 766–70. A handful of statutes require agencies to make decisions using the "best available science." *See, e.g.*, 16 U.S.C. § 1533(b)(1)(A) (2012) (containing the Endangered Species Act provision governing listing of protected species); *id.* § 1536(a)(2) (containing the Endangered Species Act provision governing determination of whether proposed federal action jeopardizes continued existence of species or adversely modifies critical habitat); *id.* § 1371(a)(3)(A) (containing the Marine Mammal Protection Act provision governing permits to allow take of marine mammals); *id.* § 1851(a)(2) (containing the Magnuson-Stevenson Act provision governing fishery conservation and management measures). Various commentators have concluded, however, that these provisions "essentially duplicate the background requirements of the [APA] and other general limitations on agency decisions making." Holly Doremus, *The Purposes, Effects, and Future of the Endangered Species Act's Best Available Science Mandate*, 34 ENVTL. L. 397, 421 (2004); *see also* J.B. Ruhl, *The Battle Over Endangered Species Act Methodology*, 34 ENVTL. L. 555, 581–82 (2004); Elizabeth Kuhn, Comment, *Science and Deference: The "Best Available Science" Mandate Is a Fiction in the Ninth Circuit*, GEO. ENVTL. L. REV. SYNDICATE 1 (Oct. 23, 2016), https://perma.cc/MB5E-LB9F.

172. *See* Meazell, *supra* note 159, at 749, 779.

173. *See* Wagner, *supra* note 45, at 72 (suggesting that "there are surprisingly few examples of EPA using unreliable science or using science inappropriately to support a final regulation").

174. *See* Heinzerling, *supra* note 157, at 14.

notice-and-comment rulemaking.[175] In these actions, Lisa Heinzerling observes, agencies paid "little attention to legal authority, process, or reason giving, and in doing so . . . violated basic principles of administrative law."[176]

To buy additional time to issue substantive replacements for the Obama rules, agencies in several instances issued a second round of rule suspensions. In one example, the Bureau of Land Management ("BLM") suspended a 2016 rule governing methane emissions from oil and gas operations.[177] In a second case, EPA delayed by twenty months the effective date of a rule designed to prevent accidental chemical releases from industrial facilities.[178] And in a third instance, EPA and the Corps of Engineers purported to establish a 2020 "applicability date" for a 2015 rule defining the "waters of the United States" subject to regulation under the Clean Water Act.[179]

In none of these cases did the agencies meaningfully grapple with the substantive justification for the rule being suspended, a point underscored in legal challenges.[180] To support its suspension of the rule governing methane emis-

175. *See, e.g.*, Clean Air Council v. Pruitt, 862 F.3d 1, 8–14 (D.C. Cir. 2017) (vacating EPA stay of rule regulating methane emissions from oil and gas facilities, and rejecting EPA contention that it had inherent or statutory authority to issue stay); Becerra v. Dep't of Interior, 276 F. Supp. 3d 953, 964–65 (N.D. Cal. 2017) (holding that APA did not authorize defendants to postpone implementation of final rule on mineral valuation where effective date of rule had already passed); California v. Bureau of Land Mgmt., 277 F. Supp. 3d 1106, 1118–24 (N.D. Cal. 2017) (vacating postponement of compliance date for BLM rule limiting natural gas waste from federal leases because postponement without notice and comment was unauthorized); Nat. Res. Def. Council v. Perry, 302 F. Supp. 3d 1094, 1100–01 (N.D. Cal. 2018) (ordering Department of Energy to publish energy conservation standards adopted in December 2016 but never published in the Federal Register); Nat. Res. Def. Council v. U.S. Dep't of Energy, 362 F. Supp. 3d 126, 147–51 (S.D.N.Y. 2019) (holding that Department of Energy's issuance of stay indefinitely postponing effective date of test procedure rule regarding energy efficiency of air conditioners and heat pumps was arbitrary and capricious).

176. Heinzerling, *supra* note 156, at 16.

177. BLM, Waste Prevention, Production Subject to Royalties and Resource Conservation, 82 Fed. Reg. 58,050, 58,051 (Dec. 8, 2017) (to be codified at 43 C.F.R. pt. 3160, 3170) (expressing desire to avoid enforcing 2016 rule requirements "that might be rescinded or significantly revised in the near future").

178. Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Further Delay of Effective Date, 82 Fed. Reg. 27,133, 27,133 (June 14, 2017) (to be codified at 40 C.F.R. pt. 68).

179. Department of Defense, Definition of "Waters of the United States"—Addition of an Applicability Date to 2015 Clean Water Rule, 83 Fed. Reg. 5200, 5200 (Feb. 6, 2018) (stating intent to continue to administer pre-2015 regulations while considering revisions to 2015 rule) (to be codified at 33 C.F.R. pt. 328, 40 C.F.R. pts. 110, 112, 116–117, 122, 230, 232, 300, 302, 401).

180. For a summary of litigation surrounding the BLM actions, see Hana Vizcarra, *BLM Methane Waste Prevention Rule*, Harvard Environmental & Energy Law Program (Sept. 20, 2017), https://perma.cc/LDR4-ZHV9. For a discussion of the litigation involving the waters of the U.S. rule, see Ariel Wittenberg, *States, Greens Sue over Trump Admin's WOTUS Delay*, E&E News PM (Feb. 6, 2018), https://perma.cc/6EMS-V3FN.

sions, BLM cited "concerns regarding the [rule's] statutory authority, cost, complexity, feasibility, and other implications."[181] To support its delay of the accidental release rule, EPA contended that it needed additional time to reconsider the rule.[182] To support their action on the "waters of the United States" rule, EPA and the Corps similarly cited the need to "provid[e] continuity and regulatory certainty . . . while the agencies continue to consider possible revisions to the 2015 Rule."[183] In light of the agencies' proffered rationales, legal challenges were resolved without any scientific expertise by applying basic principles of administrative law.[184]

3. APA Challenges to Substantive Rules

In many instances, the final content of the Trump Administration's substantive rules and the rationales supporting those rules are undetermined. However, consideration of EPA's secret science proposal and BLM's rule on methane emissions suggests issues that are likely to arise.

a. EPA's Secret Science Rule

As proposed, EPA's "secret science" rule would prohibit the agency from issuing rules based on studies that use confidential data.[185] Assuming it is finalized, the rule would function as a meta-rule governing future rulemaking by EPA.[186] A direct legal challenge to the rule might run afoul of ripeness and standing defenses, based on an argument that the rule's actual effects are too

181. Waste Prevention, Production Subject to Royalties, and Resource Conservation; Delay and Suspension of Certain Requirements, 82 Fed. Reg. 58,051, 58,051 (Dec. 8, 2017) (to be codified at 43 C.F.R. pts. 3160, 3170).

182. Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Further Delay of Effective Date, 82 Fed. Reg. 27,133, 27,135 (June 13, 2017) (to be codified at 40 C.F.R. pt. 68).

183. Definition of "Waters of the United States" – Addition of an Applicability Date to 2015 Clean Water Rule, 83 Fed. Reg. at 5200 (Feb. 6, 2018) (to be codified at 33 C.F.R. pt. 328).

184. California v. BLM, 286 F. Supp. 3d 1054, 1065–76 (N.D. Cal. 2018) (granting preliminary injunction against BLM suspension rule); Air All. Hous. v. EPA, 906 F.3d 1049, 1060–69 (D.C. Cir. 2018) (holding that EPA lacked authority to delay earlier rule designed to prevent accidental chemical releases and that its delay rule was arbitrary and capricious); S.C. Coastal Conservation League v. Pruitt, 318 F. Supp. 3d 959, 963–67 (D.S.C. 2018) (invalidating suspension of 2015 rule defining "waters of the United States" on ground that agencies' refusal to consider comments on substance of rule violated APA).

185. *See supra* Section II.A.1.

186. *See* Eric Roston, *Pruitt Proposes Limits to Scientific Research Used by EPA Staff*, BLOOMBERG (Apr. 24, 2018), https://perma.cc/YR4C-J7AF. Administrator Pruitt emphatically characterized the measure as a binding "rule," as opposed to a guiding "memo" or "policy." *Id.*

uncertain to be evaluated.[187] However, the substance of the rule would be reviewable once the rule is applied in a subsequent rulemaking.

At that stage, courts would face the question of whether it is arbitrary and capricious for EPA to disregard scientific studies that rely on confidential data. Some statutes—such as the Toxic Substances Control Act and the Safe Drinking Water Act—require EPA to rely on the "best available science" when issuing regulations.[188] Ignoring peer-reviewed and validated studies solely because they rely on confidential data seemingly would violate that mandate. Even rules promulgated under statutes that do not explicitly demand use of the "best available science" would be subject to hard-look review requiring "an agency making a decision with substantial scientific content [to] explain how its decision follows from, or at least is not inconsistent with, scientific evidence of which the agency has been made aware."[189]

Challenges to EPA rules have sometimes argued that EPA must obtain and publicize the data underlying the studies that the agency relies on.[190] However, the D.C. Circuit has twice rejected that argument, explaining that such a requirement would be "impractical and unnecessary," and "much plainly relevant scientific information would become unavailable" as a result.[191] This line of reasoning undercuts the secret science rule and suggests that it would be arbitrary and capricious for EPA to disregard studies because they are based on confidential data.

b. BLM's Methane Rule

BLM's rule on methane emissions also could be legally vulnerable.[192] Under President Obama, BLM issued a rule to reduce atmospheric releases of methane, a powerful greenhouse gas, from oil and gas operations on federal lands.[193] In eliminating significant portions of that rule, BLM now questions its

187. In *Public Citizen, Inc. v. Trump*, the court dismissed a challenge to President Trump's executive order requiring the elimination of two regulations for every new regulation issued. 297 F. Supp. 3d 6, 12–13 (D.D.C. 2018). Among the reasons for dismissal was the failure to identify particular persons who would be harmed and the failure to allege that the relevant agency would have issued a desired rule. *Id.* The government would likely seek to dismiss a direct challenge to EPA's secret science rule on similar grounds.

188. 15 U.S.C. § 2625(h) (2012); 42 U.S.C. § 300g-1(b)(3)(A) (2012).

189. Doremus, *supra* note 171, at 423.

190. Am. Trucking Ass'ns, Inc. v. EPA, 283 F.3d 355, 372 (D.C. Cir. 2002); Coal. of Battery Recyclers Ass'n v. EPA, 604 F.3d 613, 623 (D.C. Cir. 2010).

191. *Am. Trucking Ass'ns*, 283 F.3d at 372.

192. The rule is the subject of multiple lawsuits. California et al. v. Zinke, No.3:18-cv-05712 (N.D. Cal. filed Sept. 18, 2018); Sierra Club et al. v. Zinke et al., No.3:18-cv-05984 (N.D. Cal. filed Sept. 28, 2018).

193. *See* Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 83,008, 83,014 (2016).

statutory authority to issue the rule and also cites reasons relating primarily to cost: according to the agency, the 2016 "rule's compliance costs for industry and implementation costs for the BLM exceed the rule's benefits," and compliance burdens could make it uneconomical for marginal or low-producing wells to continue to operate.[194]

At first glance, scientific rationales appear absent from the agency's reasoning. However, a closer examination of BLM's assertions reveals a mix of scientific, economic, and policy determinations.[195] Namely, calculations of the rule's costs and benefits depend in large part on the social cost of carbon—an estimate of the long-term economic damage done by a ton of carbon emissions in a given year.[196] Shortly after taking office, the Trump Administration drastically reduced official estimates of the social cost of carbon from about $42 per ton to between $1 and $6 per ton.[197] To achieve this result, the new Administration excluded the non-domestic benefits of reduced GHG emissions from consideration, increased the discount rate used to value future impacts (thus giving those impacts less weight), reduced estimates of damage from climate change, and altered the projected relationship between higher temperatures and economic impacts.[198] In short, embedded in the cost-benefit analysis of the rule are complex scientific and economic judgments that require justification and supporting data. If agencies disregard scientific data or exhibit unreasoned decisionmaking in the face of such data, the APA authorizes courts to invalidate such actions.

194. Waste Prevention, Production Subject to Royalties, and Resource Conservation; Rescission or Revision of Certain Requirements, 83 Fed. Reg. 49,184, 49,185–87 (2018); *see also* Waste Prevention, Production Subject to Royalties, and Resource Conservation; Rescission or Revision of Certain Requirements, 83 Fed. Reg. 7924, 7924–26 (2018) (preamble to proposed rule noting cost, complexity, and "unnecessary compliance burdens" associated with 2016 rule); *cf.* Exec. Order No. 13,783, Promoting Energy Independence and Economic Growth, 82 Fed. Reg. 16,093 (2017) (emphasizing need to "avoid[] regulatory burdens that unnecessarily encumber energy production").

195. *See* U.S. Bureau of Land Mgmt., Regulatory Impact Analysis for the Proposed Rule to Rescind or Revise Certain Requirements of the 2016 Waste Prevention Rule (Feb. 5, 2018), https://perma.cc/V4E4-ALNG.

196. *The Social Cost of Carbon*, EPA, https://perma.cc/4NKF-VSC5.

197. Exec. Order 13,783, 82 Fed. Reg. 16,093 at 16,095–96; Chelsea Harvey, *Trump Team's Wonky CO2 Calculation is a Big Deal*, E&E News (Oct. 25, 2017), https://perma.cc/6W38-TFZB.

198. *See* Harvey, *supra* note 197; Richard L. Revesz & Jack Lienke, Opinion, *The EPA's Smoke and Mirrors on Climate*, N.Y. Times (Oct. 9, 2017), https://perma.cc/PEJ4-8Q9V; *see also* Richard S.J. Tol, *The Social Cost of Carbon*, *in* The Oxford Handbook of the Macroeconomics of Global Warming § 13.3 (Lucas Bernard & Willi Semmler eds., 2014) (discussing various parameters that affect social cost of carbon).

B. Statutes Governing Advisory Committees

Review under the APA is likely to be the most important judicial check on the Trump Administration's war on regulatory science. Other, more specific, statutes that operate in conjunction with the APA or authorize their own causes of action also may be relevant to the war on regulatory science.

Notably, changes to science advisory committees may implicate FACA. Enacted to increase the transparency and accountability of federal advisory committees, FACA sets out standards governing how these committees are established and operated.[199] Advisory committee meetings must be open to the public and committee documents must be publicly available.[200] Committee membership must "be fairly balanced in terms of the points of view represented and the functions to be performed," and there must be adequate assurance "that the advice and recommendations of the advisory committee will not be inappropriately influenced by the appointing authority or by any special interest."[201] However, as explained below, plaintiffs seeking to enforce FACA's requirements may encounter challenges in demonstrating standing and justiciability.[202] Furthermore, even if a court reaches the substantive merits, FACA allows agencies fairly broad discretion in appointing and using advisory committees.

1. Standing

Standing requires plaintiffs in federal court to demonstrate that they have suffered a particularized injury, the defendant caused the injury, and a legal judgment would redress the injury.[203] Ordinary members of the public may face difficulty in establishing that a not "fairly balanced" advisory committee or "inappropriately influenced" committee advice caused them particularized injury.[204] A regulated industry might present a stronger case for particularized

199. 5 U.S.C. app. 2 §§ 1–16 (2012); *see* Ala.-Tombigbee Rivers Coal. v. Dep't of Interior, 26 F.3d 1103, 1106 (11th Cir. 1994).

200. 5 U.S.C. app. 2 § 10 (2012).

201. *Id.* § 5(b) (establishing requirements for advisory committees created by Congress); *see also id.* § 5(c) (applying same requirements to advisory committees created by the president or agency officials).

202. Although FACA itself does not provide a cause of action, claims that an agency has failed to comply with FACA may be brought under the APA's judicial review provisions. *See* Ctr. for Biological Diversity v. Tidwell, 239 F. Supp.3d 213, 221 (D.D.C. 2017); Judicial Watch, Inc. v. U.S. Dep't of Commerce, 736 F. Supp. 2d 24, 30–31 (D.D.C. 2010) (citing cases from other circuits). Indeed, plaintiffs need not wait for an agency to act on the recommendations of a faulty committee; creation of an improperly constituted committee and a committee's failure to adhere to procedural requirements are reviewable final actions. *Id.* at 39–40.

203. Lujan v. Defenders of Wildlife, 504 U.S. 555, 560 (1992).

204. *See id.* at 573–74 (discussing cases holding that plaintiffs may not raise generalized grievances); *cf.* Fed. Election Comm'n v. Akins, 524 U.S. 11, 23–25 (1998) (noting that widely

injury if a committee is fashioned in favor of a rival industry,[205] but not if an industry is well-represented. Perhaps the strongest claimants of particularized injury—and standing to challenge the Trump Administration's policies regarding advisory committee membership—would be individuals who are removed from an advisory committee or who lost an opportunity to be considered for appointment.[206] Similarly, committee members who are now ineligible to receive EPA grants are potential candidates to challenge EPA's directive excluding grant recipients from advisory committee service.[207]

2. Justiciability

The justiciability doctrines offer further potential grounds to dismiss a FACA challenge as unsuited for judicial review.[208] Among the more serious justiciability concerns is a lack of judicially manageable standards. Namely, how

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shared injuries may be sufficiently concrete to constitute injury in fact, as where many individuals are injured in a mass tort case, many voters suffer interference with voting rights, or many persons are deprived of information directly related to voting).

205. *See* Cargill, Inc. v. United States, 173 F.3d 323, 330 (5th Cir. 1999) (holding that mine owners had suffered an injury in fact from alleged FACA violations and therefore had standing to bring FACA claims).

206. *See* Colo. Envtl. Coal. v. Wenker, 353 F.2d 1221, 1235 (10th Cir. 2004) (finding standing based on "plaintiffs' claim of an interest in a fair opportunity to be appointed," which was denied when fair balance requirement was not met); Nw. Ecosystem All. v. Office of the U.S. Trade Representative, No. C99-1165R, 1999 WL 33526001 (W.D. Wash. 1999) (holding that plaintiffs suffered injury sufficient to establish standing "from the very act of being omitted: lack of access to sensitive information and the inability to provide decisionmakers with contrary viewpoints"); *cf.* Compl. at ¶¶ 89–100, Physicians for Soc. Responsibility et al. v. Pruitt, No. 1:17-cv-02742, 359 F. Supp. 3d 27 (D.D.C. 2019) (alleging that EPA grantees wishing to serve on advisory committees have standing to challenge EPA directive excluding EPA grant recipients from committee service).

207. *See* Physicians for Soc. Responsibility v. Wheeler, 359 F. Supp. 3d 27, 35–38 (D.D.C. 2019) (holding that former member removed from EPA Science Advisory Board and scientists who faced imminent removal from advisory panel or loss of EPA grant funding had sufficiently alleged standing); *see also* Sharon Jacobs, *Advising the EPA: The Insidious Undoing of Expert Government*, HARV. L. REV. BLOG (Dec. 6, 2017), https://perma.cc/F6SA-Y9XB. Redressability also may pose an obstacle for would-be FACA plaintiffs. While one judge has contended that a FACA violation can be "easily remedied by . . . an injunction suspending operation of the Committee until [the interests allegedly omitted] are represented on it," Pub. Citizen v. Nat'l Advisory Comm. on Microbiological Criteria for Foods, 886 F.2d 419, 434 (D.C. Cir. 1989) (Edwards, J., concurring in part and dissenting in part), other judges might hesitate to determine whether a committee is fairly balanced. *Pub. Citizen*, 886 F.2d at 431 (Silberman, J., concurring). Even if a plaintiff succeeds in obtaining an injunction, an agency might choose to proceed without a functioning advisory committee in place.

208. *See Physicians for Soc. Responsibility*, 359 F. Supp. 3d at 43–50 (holding that "fairly balanced" and "inappropriately influenced" provisions of FACA "provide no meaningful standard of review"); *see also* Jonathan R. Siegel, *A Theory of Justiciability*, 86 TEX. L. REV. 73, 76–77 (2007).

can a court determine (1) which groups should be represented on a "fairly balanced" committee, (2) that such groups are not currently represented, (3) that the existing balance of viewpoints is not fair, and (4) that addition of a specific number of representatives would make the balance fair?[209]

The federal appellate courts have largely deemed such challenges justiciable, but not without some disagreement. *Public Citizen v. National Advisory Committee on Microbiological Criteria for Foods* featured contrasting views of justiciability from two respected D.C. Circuit judges.[210] Finding "[t]he relevant points of view on issues to be considered by an advisory committee [ ] virtually infinite," Judge Laurence Silberman concluded that FACA offers "no principled basis for a federal court to determine which among the myriad points of view deserve representation on particular advisory committees."[211] In contrast, Judge Harry Edwards found "nothing in FACA or its legislative history to indicate that the 'fairly balanced' requirement affords executive discretion sufficient . . . to find that 'there is no law to apply.'"[212] Relying heavily on D.C. Circuit precedents, the Fifth Circuit subsequently concluded that "[t]he weight of the case law" supported a finding of justiciability.[213] The Tenth Circuit later "adopt[ed] the reasoning of the Fifth and D.C. Circuits" without analyzing justiciability in depth.[214]

The justiciability of a "fairly balanced" claim may depend on whether a specific statute governs the composition of an advisory committee. For instance, the Ninth Circuit held the "fairly balanced" requirement nonjusticiable as applied to the Trade Act of 1974.[215] Noting that FACA "does not . . . articulate what perspectives must be considered in determining if an advisory committee is fairly balanced," the Ninth Circuit explained that the political branches, rather than the courts, were best suited to apply and review the "fairly balanced"

209. *Pub. Citizen*, 886 F.2d at 431 (Silberman, J., concurring).

210. *Id.* at 419 (per curiam). In some cases, courts have addressed the substantive merits of "fairly balanced" challenges without explicitly addressing justiciability. *See, e.g.*, Nat'l Anti-Hunger Coal. v. Exec. Comm., 711 F.2d 1071 (D.C. Cir. 1983).

211. *Pub. Citizen*, 886 F.2d at 426 (Friedman, J., concurring).

212. *Id.* at 433 (Edwards, J., concurring). The other panel member, Judge Friedman, wrote separately without discussing justiciability and found no violation of the "fairly balanced" requirement. *Id.* at 420–26 (Friedman, J., concurring).

213. Cargill, Inc. v. United States, 173 F.3d 323, 334–35 (5th Cir. 1999) (noting that courts could ensure that persons directly affected by an advisory's committee work have some committee representation).

214. Colo. Envtl. Coal. v. Wenker, 353 F.3d 1221, 1232–33 (10th Cir. 2004).

215. Ctr. for Policy Analysis on Trade & Health v. Office of the U.S. Trade Representative, 540 F.3d 940, 945–46 (9th Cir. 2008).

requirement in light of the complexities of U.S. trade and the lack of statutory guidance.[216]

3. Merits

A FACA plaintiff who overcomes preliminary obstacles to substantive review is hardly guaranteed success on the merits. With respect to whether committee membership is "fairly balanced" or a committee's recommendations are "inappropriately influenced," agencies have broad discretion.

The "fairly balanced" requirement applies to the "functions to be performed" and "the points of view represented" by an advisory committee.[217] Agencies might satisfy the requirement by selecting members from diverse educational and professional backgrounds or a range of interest groups or other affiliations.[218] Agencies have "considerable discretion" in establishing advisory committees, as a D.C. Circuit case, *National Anti-Hunger Coalition*, illustrates.[219] That opinion upheld a lower court finding that a committee appointed to study social service programs was fairly balanced even though "no public interest representative or beneficiaries of [those] programs" were included.[220] Exclusive reliance on corporate executives, the court concluded, was an appropriate way to achieve the committee's function of "apply[ing] private sector expertise to attain cost-effective management."[221]

A Fifth Circuit opinion, *Cargill v. United States*, similarly acknowledged agencies' broad discretion to compose advisory committees in light of their intended functions. The court rejected an argument by mine owners for including company representatives or scientists on a committee charged with reviewing a scientific protocol.[222] As the court explained, "[t]he task of the committee—providing scientific peer review—is politically neutral and technocratic."[223] Ac-

216. *Id.* at 945–47. Similarly, the "inappropriately influenced" language of FACA has been held nonjusticiable in at least some circumstances. Physicians Comm. for Responsible Med. v. Vilsack, No. 16-cv-00069, 2016 WL 5930585, at *3–*8 (N.D. Cal. 2016).

217. 5 U.S.C. app. 2 § 5(b)(2) (2012); *see Cargill*, 173 F.3d at 332–38.

218. *See* Sidney A. Shapiro, *Public Accountability of Advisory Committees*, 1 RISK: ISSUES HEALTH & SAFETY 189, 194–95 (1990).

219. *See Nat'l Anti-Hunger Coal.*, 711 F.2d 1071, 1074; *see also Cargill*, 173 F.3d at 336; Pub. Citizen v. Nat'l Advisory Comm. on Microbiological Criteria for Foods, 886 F.2d 419, 424 (D.C. Cir. 1989) (Friedman, J., concurring) (a "fairly balanced" determination "necessarily lies largely within the discretion of the official who appoints the committee"); Daniel E. Walters, Note, *The Justiciability of Fair Balance Under the Federal Advisory Committee Act: Toward a Deliberative Process Approach*, 110 MICH. L. REV. 677, 681 (2012) (discussing cases).

220. *National Anti-Hunger Coalition*, 711 F.2d at 1074.

221. *Id.*

222. 173 F.3d at 338.

223. *Id.*

cordingly, the exclusion of mine company representatives and scientists did not demonstrate bias in the points of view represented by committee members.[224]

Plaintiffs also face an uphill battle in establishing that the advice of an advisory committee is "inappropriately influenced." The "inappropriately influenced" standard is intended to counter "'the danger of allowing special interest groups to exercise undue influence upon the Government through the dominance of advisory committees which deal with matters in which they have vested interests."[225] However, neither the participation of industry representatives, agency grant recipients, or former or potential employees demonstrates inappropriate influence per se.[226] As the Fifth Circuit stated in *Cargill*:

> Working for or receiving a grant from HHS [the Department of Health and Human Services], or co-authoring a paper with a person affiliated with the department, does not impair a scientist's ability to provide technical, scientific peer review of a study sponsored by HHS or one of its agencies. Moreover, if HHS were required to exclude from peer review committees all scientists who somehow had been affiliated with the department, it would have to eliminate many of those most qualified to give advice.[227]

This language underscores agencies' discretion to constitute advisory committees as appropriate.[228] At the same time, its reasoning directly contradicts EPA's policy of barring EPA grant recipients from serving on its advisory committees.

How might FACA apply to the Trump EPA's handling of advisory committees? Although the case law is generally unfavorable to plaintiffs, a "fairly balanced" or "inappropriately influenced" challenge to an EPA advisory committee might be successful under some circumstances. A facial challenge to EPA's directive on grant recipients would be difficult. Even with the directive in place, a specific advisory committee may be "fairly balanced" and its advice not "inappropriately influenced." However, heavy reliance on industry representatives to populate advisory committees could run afoul of FACA's text as

224. *See id.*

225. Pub. Citizen v. Nat'l Advisory Comm. on Microbiological Criteria for Foods, 886 F.2d 419, 424 (D.C. Cir. 1989) (Friedman, J., concurring) (quoting H.R. Rep. No. 1017, at 6, *reprinted in* 1972 U.S.C.C.A.N. 3496).

226. *See Cargill*, 173 F.3d at 339; *Pub. Citizen*, 886 F.2d at 425 (Friedman, J., concurring) (rejecting claim of inappropriate influence where six of eighteen committee members were employed by industry and four other members had done consulting or other work on behalf of industry).

227. 173 F.3d at 339.

228. *Cf.* Physicians for Soc. Responsibility v. Wheeler, 359 F. Supp. 3d 27, 48 (D.D.C. 2019) ("[E]valuating the relative qualifications of potential committee members is exactly the kind of discretionary decision making that is precluded from judicial review.").

well as its purpose of ending industry domination of advisory bodies.[229] Committees that address substantive policy issues may have to include representatives of those affected by potential policy changes.[230] For example, a committee making recommendations on pollution standards should include a voice for persons who might suffer ill effects of pollution exposure. Likewise, committees charged with reviewing the scientific basis of proposed regulations should have members with relevant scientific expertise.[231] If a FACA violation is found, a trial court has discretion to craft injunctive relief "that will encourage compliance with FACA's strictures while remaining sensitive to its principal purposes of public accountability and avoidance of wasteful expenditures."[232]

In addition to FACA, specific statutes govern the composition and duties of individual EPA advisory committees.[233] For example, the Clean Air Scientific Advisory Committee must consist of "seven members including at least one member of the National Academy of Sciences, one physician, and one person representing State air pollution control agencies."[234] And by statute, the committee must review ambient air quality standards and advise the administrator on research for appraising the adequacy and basis of those standards.[235] Failure to include a required type of panel member or to make required recommendations may give rise to an APA claim by would-be panel members of arbitrary and capricious agency action.

C. Conflict of Interest Law

Conflict of interest concerns, a motivating factor behind FACA, are addressed directly by the federal statute governing conflicts of interest. Advisory

229. *See* Nw. Ecosystem All. v. Office of the U.S. Trade Representative, No. C99–1165R, 1999 WL 33526001, *6 (W.D. Wash. 1999).

230. *See* Nat'l Anti-Hunger Coal. v. Exec. Comm., 566 F. Supp. 1515, 1517 (D.D.C. 1983) (holding that task force was not fairly balanced with respect to recommendations to repeal benefits, where task force included no representatives of benefits programs); *see also Pub. Citizen*, 886 F.2d at 436–37 (Edwards, J., concurring and dissenting) (contending that committee charged with recommending regulations affecting health and safety of food products was required to include representatives of consumer interests).

231. *See* Jacobs, *supra* note 207 (opining that as-applied challenges to the makeup of specific EPA advisory committees are "more likely to succeed" than facial challenges to EPA's directive excluding grant recipients).

232. *Cargill*, 173 F.3d at 342 (noting that a district court may bar use of a committee's work product as a "last resort"); *see also* Ala.-Tombigbee Rivers Coal. v. Dep't of Interior, 26 F.3d 1103, 1107 (11th Cir. 1994) (affirming injunction barring use of advisory committee report prepared in violation of FACA).

233. *See, e.g.*, 42 U.S.C. § 4365 (2012) (establishing SAB); 7 U.S.C. § 136w(d) (2012) (establishing Federal Insecticide, Fungicide, and Rodenticide Scientific Advisory Panel).

234. 42 U.S.C. § 7409(d)(2)(A) (2012).

235. 42 U.S.C. § 7409(d)(2)(B)–(C).

committee members are considered "special government employees" who must comply with this criminal statute.[236]

Only the government may prosecute individuals for violating the conflict of interest statute.[237] However, private parties may assert claims under the APA that federal agencies have violated the statute. In *Lorillard, Inc. v. U.S. Food & Drug Administration*, for example, tobacco companies alleged the appointment of advisory committee members with conflicts of interest.[238] The district court found standing based on allegations that the plaintiffs' confidential information had been disclosed and that they had suffered injury to their right to fair decisionmaking.[239] The court also deemed the alleged "creation and maintenance of an advisory committee tainted by conflicts of interest" to be judicially reviewable.[240]

The conflict of interest statute prohibits federal employees, including special government employees, from "participat[ing] personally and substantially . . . through . . . recommendation, the rendering of advice, investigation, or otherwise" in a "particular matter" in which they have a financial interest.[241] The prohibition applies if the particular matter will have a "direct and predictable effect" on that interest[242]—i.e., "matters that involve deliberation, decision, or action that is focused upon the interests of specific persons, or a discrete and identifiable class of persons." Policymaking "directed to the interests of a large and diverse group of persons" lies outside this prohibition.[243]

Even as to particular matters, various exceptions may allow an individual having a financial interest to serve on an advisory committee. For example, such an individual may participate after disclosing her financial interest and receiving a waiver finding that the interest is not likely to affect the integrity of the services provided or that the need for her services outweighs the potential conflict.[244] Moreover, persons serving on advisory committees "may participate in any particular matter of general applicability where the disqualifying financial interest arises from his non-Federal employment . . ., provided that the matter

236. 18 U.S.C. § 208 (2012) (imposing penalties for acts affecting a personal financial interest); 18 U.S.C. § 202 (2012) (defining "special government employee"); *see* Joe G. Conley, Note, *Conflict of Interest and the EPA's Science Advisory Board*, 86 TEX. L. REV. 165, 168–69 (2007).

237. *See* 18 U.S.C. § 216 (2012); *see e.g.*, Judicial Watch, Inc. v. Clinton, 880 F. Supp. 1, 5 & n.3 (D.D.C. 1995); Scherer v. United States, 241 F. Supp. 2d 1270, 1285 (D. Kan. 2003).

238. Lorillard, Inc. v. U.S. Food & Drug Admin., 2012 WL 3542228, at *1 (D.D.C. 2012).

239. *Id.* at *2.

240. *Id.*

241. 18 U.S.C. § 208(a) (2012).

242. 5 C.F.R. § 2635.402(a) (2018); 5 C.F.R. § 2640.103(a)(1) (2018).

243. 5 C.F.R. § 2640.103(a)(1).

244. 18 U.S.C. § 208(b)(1), (3) (2012); 5 C.F.R. § 2635.402(d)(3) (2018). The government official making the appointment must issue the waiver prior to committee service. 5 C.F.R. § 2635.301(a), .302(a).

will not have a special or distinct effect on the employee or employer other than as part of a class."[245]

Is EPA's policy excluding grant recipients from advisory committees required by the conflict of interest statute? Under the regulations governing participation in particular matters of general applicability, grant recipients should be eligible to serve on advisory committees because their advice would have no more than a general or indirect effect on the universities for which they work.[246] Indeed, scientists who receive funding from companies subject to EPA regulations—whom EPA allows to serve on advisory committees—would seem to be at least as conflicted as scientists who receive EPA funding.[247] However, the conflict of interest statute merely prohibits participation when a conflict exists; it confers no right to participate on persons without a conflict. As a result, the statute offers no basis for challenging EPA's directive.

Does industry representative participation on advisory committees violate the conflict of interest statute? EPA use of advice from an industry-dominated committee in setting a standard for that industry would seem problematic.[248] Under Office of Government Ethics regulations, even the appearance of a lack of impartiality can be sufficient to bar participation where a particular matter is likely to have a direct and predictable effect on a member's financial interests.[249] Nevertheless, proving a violation may be difficult. A "direct and predictable effect" requires "a close causal link" and a "real, as opposed to a speculative possibility that the matter will affect the financial interest."[250] Demonstrated violations typically involve a government employee's participation in discrete matters that directly impacted the employee's finances.[251] In the wake of an alleged conflict involving an advisory committee member, EPA might contest the causal links between the committee's advice and the member's finances. Specifically, the government might contend that the committee's advice did not

245. 5 C.F.R. § 2640.203(g).

246. *See* Michael Burger, *Scott Pruitt's Attack on Scientists Serving on EPA Advisory Boards is Illegal*, Climate Law Blog (Nov. 3, 2017), https://perma.cc/9ERR-FWZ3; *cf.* Grassetti v. Weinberger, 408 F. Supp. 142, 152 (N.D. Cal. 1976) (rejecting grant applicant's argument that grant recipients' participation in application decision constituted conflict of interest, as argument "that their denial to him would leave more money in the pot for future proposals from themselves" presented "too remote" a possible conflict of interest).

247. *See* Burger, *supra* note 246.

248. *See id.*

249. 5 C.F.R. § 2635.502(a). An employee may receive a waiver allowing participation if the government's interest in the employee's participation outweighs the concern regarding the appearance of lack of impartiality. *Id.* at § 2635.502(d).

250. 5 C.F.R. § 2635.402(b).

251. *See, e.g.*, United States. v. White Eagle, 721 F.3d 1108, 1118–19 (9th Cir. 2013) (recounting cases and reversing conviction where defendant allegedly concealed subordinate employee's fraudulent operation of government loan program in order to ensure that program would continue and defendant would keep her own job).

bind the agency in its rulemaking, that EPA's chosen regulatory standard did not affect the member's company, and that any effect on the company did not directly impact the member's finances.

Ultimately, absent evidence of a direct link between a committee member's conduct and financial interests, the conflict of interest statute appears to be a relatively unpromising means of addressing controversial appointments.

D. Scientific Integrity Policies

Most, if not all, aspects of the war on regulatory science raise concerns of scientific integrity. Broadly speaking, scientific integrity refers to adherence to professional values and practices when conducting science and applying its results.[252] Under President Obama, EPA and other federal agencies adopted scientific integrity policies to govern their scientific activities and use of scientific information.[253] These sometimes far-reaching policies underscore agencies' commitments to scientific integrity. Ultimately, however, they do not give rise to legally enforceable constraints.

The following discussion focuses on EPA's scientific integrity policy, which seeks to "[e]nsure that the Agency's scientific work is of the highest quality [and] free from political interference or personal motivations."[254] Issued in 2012, the policy applies to all agency personnel, scientists, and political appointees alike, when engaging in or supervising scientific activities, communicating information about scientific activities, and utilizing scientific information in making policy decisions.[255] The policy provides for a Scientific Integrity Committee, chaired by the agency's Scientific Integrity Official, to oversee its implementation.[256]

EPA's scientific integrity policy focuses on four areas—agency culture, public communications, peer review and advisory committees, and professional development.[257] To promote a culture of scientific integrity, the policy prohibits employees from "impeding the timely release of scientific findings and conclusions," bars agency leadership "from intimidating or coercing scientists to alter scientific data, findings, or professional opinions or inappropriately influencing scientific advisory boards," and advises that candidates for scientific positions be

252. *See Basic Information About Scientific Integrity*, EPA, https://perma.cc/N5UV-9FBS.

253. Memorandum on Scientific Integrity, 2009 Daily Comp. Pres. Doc. 137 (Mar. 9, 2009), https://perma.cc/A98X-FNBG; Kei Koizumi & Jerry Sheehan, *Scientific Integrity Policies: An Update*, White House Office of Sci. & Tech. Policy (Dec. 19, 2016), https://perma.cc/T9YN-LGE3.

254. EPA, Scientific Integrity Policy 3 (2012), https://perma.cc/ZKR3-DV75.

255. *Id.* at 2.

256. *Id.* at 3.

257. *Id.*

selected primarily on their scientific qualifications.[258] In public communications, the agency should "ensur[e] that scientific research and results are presented openly and with integrity."[259] Selection of advisory committee members "should be based on expertise, . . . balance of the scientific or technical points of view represented by the members, and the consideration of conflicts of interest."[260] And with respect to professional development, the policy encourages government scientists to present their work at scientific meetings and participate actively in professional societies.[261]

Various EPA actions appear to violate core elements of this policy, if not its spirit. Blocking agency scientists from presenting their findings at a conference conflicts with the policy's professional development provisions. Ordering or pressuring employees to avoid mentioning climate change seems to run afoul of the policy's provisions regarding public communications. Appointing advisory committee members who lack scientific qualifications or who have close industry connections runs counter to a culture of scientific integrity. And the secret science rule, while purporting to promote transparency, would undermine the integrity of the policymaking process.

Notwithstanding the existence of scientific integrity policies, political interference with science seems commonplace at EPA and perhaps other agencies as well. Unfortunately, legal options for redressing violations of such policies are limited. EPA's policy expressly states that it offers internal guidance and creates no enforceable obligations.[262] The agency's Scientific Integrity Official and Scientific Integrity Review Panel may investigate potential violations, however.[263] EPA's inspector general also may look into instances of research misconduct, including "fabrication, falsification or plagiarism" in performing research or "ordering, advising, or suggesting that subordinates engage in such misconduct."[264]

Within the limited available procedures, establishing a violation of EPA's scientific integrity policy may not be easy. An investigation of remarks by then-Administrator Pruitt illustrates potential difficulties in enforcing the policy. In response to a question regarding whether "it's been proven that carbon dioxide

258. *Id.* at 4–5.

259. *Id.* at 5.

260. *Id.* at 9.

261. *Id.*

262. *Id.* at 2.

263. *Id.* at 10; EPA, Scientific Integrity Program, Determination Regarding Allegations of a Loss of Scientific Integrity Concerning Remarks by Administrator Pruitt 1 (2017), https://perma.cc/F7H3-P4XZ.

264. EPA, Policy and Procedures for Addressing Research Misconduct 1 (2003), https://perma.cc/H7LK-QKL4; *see* EPA, Office of the Science Advisor, Coordination Procedures Between the Scientific Integrity Official and the Office of Inspector General Regarding Research Misconduct Allegations (2015), https://perma.cc/6K3B-SK8V.

is the primary control knob for climate," Pruitt replied, "No. I think that measuring with precision human activity on the climate is something very challenging to do . . . . So no, I would not agree that it's a primary contributor to the global warming that we see."[265] On its face, the statement appears to misrepresent scientific conclusions regarding climate change and to exaggerate the uncertainty associated with it. EPA's Scientific Integrity Review Panel nonetheless characterized the statement as an opinion and noted that it was not made in a decisional context.[266] Thus, the panel concluded, the statement fell squarely within the scientific integrity policy's protections for free expression of opinions by EPA employees.[267]

While the panel may have properly applied the policy to Pruitt's remarks, the decision reflects some of the policy's limits. Scientifically questionable statements often may be characterized as opinions and thus, under the panel's rationale, lie beyond the policy's scope. The panel also seemed to limit the reach of the policy outside of decisional contexts. And although the agency may administer corrective discipline, such discipline focuses on instances of blatant scientific misconduct—"fabrication, plagiarism, misrepresentation," and the like.[268]

Allegations of research misconduct are subject to anti-fraud statutes and research misconduct policies as well as scientific integrity policies. Each federal agency has an inspector general charged with investigating and reporting on fraud, waste, and violations of law within the agency.[269] Appointed by the President with Senate consent and supervised by agency heads, inspectors general report results of investigations to agency heads and to Congress.[270] EPA's inspector general is also authorized to investigate and report on allegations of research misconduct[271]—including interference with the work of agency scientists or ordering or suggesting that subordinates engage in research misconduct.[272]

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265. EPA, Scientific Integrity Program, *supra* note 263, at 2.

266. *Id.* at 4.

267. *Id.* at 4. Although Pruitt's statement was left unsanctioned, a Freedom of Information Act lawsuit resulted in an order requiring EPA to turn over the evidentiary basis for Pruitt's claims. *See* Scott Waldman, *Judge to EPA: Show Your Science*, Climatewire, (June 5, 2018), https://perma.cc/LVB3-RAYP.

268. EPA, Scientific Integrity Program, *supra* note 263, at 10.

269. Inspector General Act of 1978, 5 U.S.C. app. 3, §§ 2, 3 (2008), 4 (2012).

270. *Id.* §§ 3(a) (2008), 4(a)(5) (2016), 5 (2018).

271. EPA, Policy and Procedures for Addressing Research Misconduct, *supra* note 264, at 3.

272. *Id.* at 2 (defining research misconduct). However, aside from criminal matters, which are referred to the Department of Justice, any investigations of the agency head could itself give rise to a conflict of interest because the inspector general would be investigating "the one individual to whom the Act makes him responsible on a day-to-day basis." Dan W. Reicher, Note, *Conflicts of Interest in Inspector General, Justice Department, and Special Prosecutor Investigations of Agency Heads*, 35 Stan. L. Rev. 975, 986–87 (1983) (discussing potential con-

E. First Amendment and Whistleblower Protections

Finally, government efforts to restrict the speech of its employees raise potential First Amendment concerns. If government scientists suffer adverse employment actions for the research they undertake or for the research results they produce, whistleblower protections may be relevant as well.

1. First Amendment

The First Amendment does not restrict the government's own speech, even if misguided or erroneous.[273] Thus, the First Amendment does not prevent government agencies from publishing inaccurate or even false statements about climate change. Moreover, "when public employees make statements pursuant to their official duties, the employees are not speaking as citizens for First Amendment purposes, and the Constitution does not insulate their communications from employer discipline."[274] Accordingly, the First Amendment does not prohibit EPA from restricting its employees from discussing climate change at conferences pursuant to their official duties.

The First Amendment does place some limits on the government's ability to censor the speech of its employees, however. When a public employee "speaks as a citizen addressing a matter of public concern," the government employer may impose "only those speech restrictions that are necessary . . . to operate efficiently and effectively."[275] Two Supreme Court decisions illustrate the distinction between speaking as a public employee and speaking as a citizen. *Garcetti v. Ceballos* held that First Amendment protections did not apply to a deputy district attorney's memorandum recommending dismissal of a pending case.[276] In contrast, *Pickering v. Board of Education* found a teacher's letter to a local newspaper regarding the local school board's funding policies to be protected speech.[277] The letter, unlike the *Garcetti* memorandum, "had no official significance and bore similarities to letters submitted by numerous citizens every day."[278]

Whether an employee is speaking as part of their official duties or as a citizen may not be obvious. Neither the location of the speech, nor its subject matter, nor the fact that the employee learned of the speech's subject matter

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flicts inherent in 1982 inspector general investigation of EPA Administrator Anne Gorsuch). 5 U.S.C. app. 3, § 4(d) (2016).

273. Pleasant Grove City v. Summum, 555 U.S. 460, 467 (2009) ("The Free Speech Clause restricts government regulation of private speech; it does not regulate government speech.").

274. Garcetti v. Ceballos, 547 U.S. 410, 421 (2006).

275. *Id.* at 419, 423.

276. *Id.* at 413–14, 421–22.

277. 391 U.S. 563, 565–66 (1968).

278. *Garcetti*, 547 U.S. at 422.

through her employment, is dispositive.[279] The critical issue is whether the speech was made pursuant to the employee's duties, a practical inquiry that looks beyond the employee's formal job description.[280] Factors relevant to the inquiry include the employee's job responsibilities, the nature and subject matter of the speech, whether the communication was made outside the chain of command, and how and to whom the message was communicated.[281] If a public employee is speaking as a citizen, the *Pickering* test balances the employee's interest "in commenting upon matters of public concern" against the government's interest "as an employer, in promoting the efficiency of the public services it performs through its employees."[282]

How might First Amendment protections apply to speech by government employees on climate change? Climate change is indisputably a "matter of political, social or other concern to the community" and a "subject of legitimate news interest."[283] Whether an employee is speaking as a citizen or pursuant to official duties may present a difficult question, however. For example, suppose that the EPA employees at the Narragansett Bay conference had participated in their personal capacity, taking personal leave in order to attend, identifying themselves only as private citizens, and making clear that their remarks represented their personal views. Or suppose that EPA employees, after being ordered by their supervisors not to report their findings of climate change's impacts, privately contacted the media to distribute those findings.

279. *See* Lane v. Franks, 573 U.S. 228, 239–40 (2014); *Garcetti*, 547 U.S. at 420–21.

280. *See Garcetti*, 547 U.S. at 420–21, 424–25.

281. *See* Ross v. Breslin, 693 F.3d 300, 305–306 (2d Cir. 2012); Dahlia v. Rodriguez, 735 F.3d 1060, 1074–75 (9th Cir. 2013); *see also* Andrew v. Clark, 561 F.3d 261, 267 (4th Cir. 2009) (concluding "there is 'room for serious debate'" regarding whether police department employee's official duties included submission of memorandum to police commissioner and news reporter, where employee was not part of official investigation that was the subject of the memorandum); Freitag v. Ayers, 468 F.3d 528, 546 (9th Cir. 2006) (holding that prison guard's complaints to state senator and inspector general regarding sexually abusive behavior were constitutionally protected, whereas internal complaints were not).

282. 391 U.S. at 568. These principles apply not only to punishment or retaliation for an employee's speech, but also to requirements that employee speech be approved by the government prior to publication. *See also* Harman v. City of New York, 140 F.3d 111, 119–24 (2d Cir. 1998); *cf.* Weaver v. U.S. Information Agency, 87 F.3d 1429, 1439–43 (D.C. Cir. 1996) (upholding requirement that an employee submit articles and speeches on official matters for pre-publication review where review only allowed agency to advise employee of inaccurate or disruptive statements, not to prohibit publication or punish employee).

283. Connick v. Myers, 461 U.S. 138, 146 (1983); *Lane*, 573 U.S. at 241; *see generally* Rodney A. Smolla, 2 Smolla & Nimmer on Freedom of Speech § 18:10 (2019) (noting that courts are more likely to find that employee comments on internal workplace matters, "ranging from anything to office gossip and chit-chat to the affairs and operations of a particular agency or office," are less likely to be deemed matters of public concern than comments on "matters outside the issues of their workplace").

The employee speech in each instance likely would qualify as citizen speech. That the employees may have derived their data and findings from their employment would not be dispositive. "The critical question . . . is whether the speech at issue is itself ordinarily within the scope of an employee's duties, not whether it merely concerns those duties."[284] Employees who express their personal views on their own time at a conference or in a letter to the editor are acting as ordinary citizens. Moreover, if an employee speaks in contravention of a supervisor's orders not to discuss a particular subject, such defiance suggests that the speech in question lies outside of the employee's professional duties.[285]

Assuming that the elements of public concern and speaking as a citizen are satisfied, courts apply the *Pickering* balancing test to determine whether the injury to the government caused by the speech outweighs the employee's interest in free expression.[286] A government order limiting employee speech on climate change would not fare well under this test. The government interests typically asserted in favor of speech restrictions—ensuring operational efficiency or maintaining discipline and respect among co-workers[287]—are unlikely to be present when employees speak out on climate change. Merely preventing employees from speaking in a manner contrary to the government's position on climate change does not appear to be the sort of interest that would outweigh an employee's free speech interests.[288] Indeed, the fact that climate change is a matter of great public concern demands an especially strong showing by the government of harm to its interests.[289]

2. Whistleblower Protections

Adverse actions against government employees for speaking out could implicate not only the First Amendment but also whistleblower protections. Reporting environmental risk data, disclosing efforts to suppress research, or

284. *Lane*, 573 U.S. at 240.

285. *See Dahlia*, 735 F.3d at 1075 ("Indeed, the fact that an employee is threatened or harassed by his superiors for engaging in a particular type of speech provides strong evidence that the act of speech was not, as a 'practical' matter, within the employee's job duties."). *But cf.* Bowie v. Maddox, 653 F.3d 45, 48 (D.C. Cir. 2011) ("[T]he illegality of a government employer's order [to file a false report] does not necessarily mean the employee has a cause of action under the First Amendment when he contravenes that order.").

286. *See Pickering*, 391 U.S. at 568.

287. *See* Waters v. Churchill, 511 U.S. 661, 675 (1994); SMOLLA, *supra* note 283, §§ 18:16–18:19.

288. *Cf.* Hoover v. Morales, 164 F.3d 221, 226 (5th Cir. 1998) ("The notion that the State may silence the testimony of state employees simply because that testimony is contrary to the interests of the State in litigation or otherwise, is antithetical to the protection extended by the First Amendment.").

289. *See* Connick v. Myers, 461 U.S. 138, 152 (1983) ("[A] stronger showing may be necessary if the employee's speech more substantially involved matters of public concern.").

revealing politically motivated tinkering with research results all could qualify as protected activity.

The Whistleblower Protection Act prohibits adverse personnel action against a government employee for disclosing information that the employee reasonably believes to demonstrate a violation of any law or regulation or "gross mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety."[290] A 2012 statutory amendment specifically protects disclosures that reveal "censorship related to research, analysis or technical information"—a term defined as "any effort to distort, misrepresent, or suppress research, analysis or technical information."[291] The amendment thus extends whistleblower protections to government scientists who make disclosures in defense of scientific integrity.[292] At the same time, protected activity under the statute does not include policy disagreements or general criticism of an agency.[293]

In addition to the Whistleblower Protection Act, several environmental statutes prohibit public or private employers from retaliating against employees who institute, assist, or otherwise participate in the administration or enforcement of those statutes.[294] To establish a prima facie case of retaliation, an employee must show that her employer is covered by the act, that she engaged in protected activity, and that she suffered adverse employment action as a result.[295] The employer may rebut this showing by producing evidence of a legitimate reason for the adverse action, which shifts the burden to the employee to show that the protected activity was the reason for the discharge.[296]

The various whistleblower statutes protect a broad range of government scientist activities. However, merely engaging in disfavored research is not a

290. 5 U.S.C. § 2302(b)(8)(A) (2012).

291. Pub. L. No. 112-199, § 110(a)(3), (b)(1) (2012).

292. *See* S. Rep. No. 112-155 (2012), at 24–25; *see also* Jason Zuckerman, *Congress Strengthens Whistleblower Protections for Federal Employees*, Am. Bar Ass'n Sec. of Lab. & Emp. L. Flash (Dec. 2012), https://perma.cc/VV2T-LHHS.

293. *See* S. Rep. No. 112-155, at 7 & n.20 (2012) (quoting S. Rep. No. 969, 95th Cong., 2d Sess. 8 (1978) that "only disclosures of public health or safety dangers" are protected, not "general criticisms by an employee . . . that the agency is not doing enough to protect the environment").

294. Toxic Substances Control Act, 15 U.S.C. § 2622(a) (1986); Clean Water Act, 33 U.S.C. § 1367(a) (1972); Clean Air Act, 42 U.S.C. § 7622(a) (1977); Safe Drinking Water Act, 42 U.S.C. § 300j-9(i) (1994); Resource Conservation and Recovery Act, 42 U.S.C. § 6971(a) (1980); Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9610(a) (1980).

295. *See* Emily Becker, *Calling Foul: Deficiencies in Approaches to Environmental Whistleblowers and Suggested Reforms*, 6 Wash. & Lee J. Energy, Climate & Env't 63, 86 (2014).

296. *See* In re Marcus v. EPA, No. 92-TSC-5, 1994 WL 897260, at *3 (DOL Off. Adm. App., Feb. 7, 1994) (citing St. Mary's Honor Ctr. v. Hicks, 125 L. Ed. 2d 407, 416 (1993)).

protected activity.[297] Nor is it enough for an employee's research to demonstrate harm to human health or the environment.[298] Rather, the employee must engage in whistleblowing—for example, by disseminating his or her concerns to the media—and must prove that adverse personnel action was taken as a result.[299] In addition, under the environmental whistleblowing statutes, the employee's actions must contribute to "a proceeding for the administration or enforcement" of the requirements of the relevant environmental statute.[300] Examples of protected activities include: (1) "criticizing a draft report, concerning toxicology and carcinogenesis studies, which EPA contemplated using in regulating fluoride levels;"[301] (2) complaining to Congress about EPA's failure to disclose and address toxic exposures and its attempts to misrepresent a study establishing that a pesticide was carcinogenic;[302] (3) providing an affidavit to a public interest group supporting a causal relationship between dioxin and human health effects, contrary to statements made by EPA's administrator;[303] and (4) expressing concerns about the safety of sludge fertilization in writings, speeches, and testimony.[304]

A number of incidents under the Trump Administration have triggered whistleblower concerns. The Interior Department's reassignment of top career officials, including Joel Clement, triggered a whistleblower complaint and departmental and congressional inquiries.[305] In addition, gag orders issued at the start of the Trump Administration ran afoul of Whistleblower Protection Act provisions governing agency nondisclosure policies.[306] The orders demanded that employees inform the agency before communicating with Congress and forbade employees from making public statements, but failed to include a required disclaimer affirming employees' whistleblower rights and protections.[307]

297. *See* Robert R. Kuehn, *Suppression of Environmental Science*, 30 Am. J. L. & Med. 333, 357 (2004).

298. *See id.* at 358.

299. 5 U.S.C. § 2302(b)(8)(A) (2017); *see* Kuehn, *supra* note 297, at 355, 358.

300. *See* Kuehn, *supra* note 297, at 357.

301. *In re Marcus*, 1994 WL 897260, at *3.

302. In re Jenkins v. EPA, No. 92-CAA-6, 1994 WL 897221, at *5 (DOL Off. Adm. App., May 18, 1994) (noting that parties had stipulated that such actions constituted protected activity).

303. *Id.* at *6.

304. In re Lewis v. EPA, No. 04-117, 2007 WL 1031361 (DOL Adm. Rev. Bd., Mar. 30, 2007).

305. *See supra* notes 137–139 and accompanying text; Michael Doyle, *IG Looking into Why Senior Staffers Were Moved*, Greenwire (Sept. 11, 2017), https://perma.cc/R2RF-762N.

306. *See* 5 U.S.C. § 2302(b)(13) (2012); Pub. L. No. 112-199, § 115.

307. *See* Pamela Wolf, *Republican Lawmakers Warn HHS Secretary That Memo May Violate Whistleblower Protections*, WK Workday Blog (May 10, 2017), https://perma.cc/Q4W9-PG87; Testimony of Thomas Devine, Government Accountability Project (Sept. 9, 2017), at 14–15, https://perma.cc/Y58D-CWJC; Letter from Rep. Elijah E. Cummings & Rep. Frank Pallone, Jr. to Donald F. McGahn, II (Jan. 26, 2017), https://perma.cc/A45S-YAGR.

Ultimately, whistleblower provisions offer some protections to government scientists but are subject to important limitations. First, these provisions are defensive: they protect employees from adverse employment actions but require employees to put their employment status at risk. Second, pursuing a whistleblowing claim is not easy. Complainants' historical success rate in obtaining administrative remedies has been low.[308] Third, the environmental whistleblower statutes establish short timeframes for seeking relief, requiring that a claim be filed within thirty days of an adverse action.[309]

IV. Sizing Up the War on Regulatory Science

One can easily get lost in the frequent skirmishes, multiple fronts, and wide range of legal doctrines that characterize the war on regulatory science. This Part steps back from the minutiae and assesses the war's broader ramifications. External administrative law, enforced through judicial oversight, provides only a partial constraint. Measures internal to the executive branch are also important—but of limited effect. Beyond the immediate legal concerns, the war on regulatory science has long-term implications for the relationship between law and science and for the practice of regulatory science within the federal government.

A. The Limited Reach of External Administrative Law

As just discussed, numerous laws are relevant to the war on regulatory science. The APA is perhaps the most important bulwark against agency decisions based on inadequate or flawed science. Judicial review under the APA is critical in ensuring that agencies follow appropriate procedures and support their rules with reasoned decisionmaking. However, because APA review is limited to final agency action, "litigants may obtain review only of particular discrete actions of agencies, rather than the internal programs and structures that brought about those actions."[310] Indeed, a brief re-examination of the Trump Administration's actions reveals that many aspects of the war on regulatory science are governed only loosely by law or may escape judicial review completely.

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308. *See* Devine, *supra* note 307, at 8–13.

309. *See, e.g.,* 15 U.S.C. § 2622(b)(1) (2012); 33 U.S.C. § 1367(b)(1) (2012). By contrast, the Whistleblower Protection Act contains no statute of limitations for filing a complaint with the Office of Special Counsel. *See* Thomas M. Devine, *The Whistleblower Protection Act of 1989: Foundation for the Modern Law of Employment Dissent*, 51 Admin. L. Rev. 531, 542 (1999).

310. Gillian E. Metzger & Kevin M. Stack, *Internal Administrative Law*, 115 Mich. L. Rev. 1239, 1264 (2017).

First, EPA's secret science rule may initially sidestep a direct legal challenge. The rule is likely to encounter judicial review once it is applied in subsequent rulemakings, but perhaps only on a case-by-case basis.[311] Regardless of whether those subsequent rules are upheld, the secret science rule in the meantime will drain agency resources as scientists and agency staff track down data and redact personal information.[312]

A red-team, blue-team debate on climate change or National Security Council reassessment of climate science could prove nonjusticiable. Because such a debate or reassessment may not determine "rights or obligations . . . from which legal consequences will flow," courts may conclude that it does not constitute reviewable final agency action.[313] This is not to say that such a debate or reassessment would have no impact. Either could sow unwarranted doubts on climate change and serve as a foundation for deregulating GHG emissions.

Advisory committee appointments and other executive branch appointments also may avoid judicial review. Domination of advisory committees by industry representatives may not give rise to justiciable claims. Even if courts reach the substantive merits, FACA and conflict of interest rules offer only a modest check on agencies' broad discretion over committee appointments and operations. As for the appointment of executive officials, Congress has a greater role than the courts in ensuring such officials possess the requisite qualifications, but neither can do much to compel the executive to make appointments when the chief executive declines to do so.

Finally, adverse personnel actions and direct censorship of agency scientists may give rise to whistleblower and First Amendment claims. However, these claims are not easy to pursue. Furthermore, existing law provides little safeguard for the integrity of agency speech. Scientific integrity policies do speak to such concerns, but enforcement of these policies is left largely to each agency.

Elements of the war on regulatory science that escape judicial review could have serious implications beyond the Trump presidency. EPA's secret science rule may discourage potential research subjects from participating in health studies—many of which span years or even decades—for fear that their personal information will be disclosed.[314] More generally, a failure to collect health and environmental data could leave significant gaps in the knowledge base for future policymaking. Personnel decisions driven by hostility to scientific find-

311. *See supra* Part III.A.3.a.

312. *See* Scott Waldman & Robin Bravender, *Pruitt Is Expected to Restrict Science. Here's What It Means*, E&E NEWS (Mar. 16, 2018), https://perma.cc/9WB2-SLWC.

313. Bennett v. Spear, 520 U.S. 154, 178 (1997); *see* 5 U.S.C. § 704 (2012) (authorizing judicial review of final agency action); Metzger & Stack, *supra* note 310, at 1264.

314. *See* Juliet Eilperin & Brady Dennis, *Pruitt Unveils Controversial "Transparency" Rule Limiting What Research EPA Can Use*, WASH. POST (Apr. 24, 2018), https://perma.cc/PN7K-BDZF (reporting concerns of former EPA administrator Gina McCarthy).

ings may undermine civil service protections and discourage scientists from serving as government employees or advisory committee members. And a lack of scientific integrity in what agencies say and do under the Trump Administration could undermine agencies' credibility with courts, Congress, and the general public even under subsequent administrations. Just as an agency's reputation for strong procedures, capabilities, and substantive programs can earn greater deference from judges and legislators as well as support from nongovernmental actors and the public, a reputation to the contrary can undermine an agency's authority and effectiveness.[315]

B. The Importance of Internal Administrative Law

The foregoing discussion offers an important reminder that "[s]o much of administrative law happens without courts."[316] Describing this universe of "internal administrative law," Gillian Metzger and Kevin Stack point to "measures governing agency functioning that are created within the agency or the executive branch and that speak primarily to government personnel."[317] Indeed, much of the war on regulatory science implicates internal administrative law governing the composition and use of scientific advisory committees, assignment of agency personnel, statements by agencies or agency employees, and the like.

External administrative law is insufficient to constrain agencies, Metzger and Stack explain, because "the vast majority of agency actions and decisions, including those that lead to the adoption of a particular rule or policy, will never be subject to review."[318] Judicial review requires final agency action and a justiciable claim, as well as a plaintiff with the will and resources to pursue litigation.[319] Expanding judicial review by tightening standards of judicial scrutiny or reducing barriers to litigation would not necessarily be desirable, however, lest such measures leave administrative agencies unable to act.[320] In any instance, judicial review usually operates after the fact, when the damage may already be done.[321]

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315. *See* William E. Kovacic, *Creating a Respected Brand: How Regulatory Agencies Signal Quality*, 22 GEO. MASON L. REV. 237, 238–41 (2015).

316. Christopher J. Walker, *Administrative Law Without Courts*, 65 UCLA L. REV. 1620, 1624 (2018).

317. Metzger & Stack, *supra* note 310, at 1251.

318. *Id.* at 1264; *see* Robert L. Glicksman & Emily Hammond, *Agency Behavior and Discretion on Remand*, 32 J. LAND USE & ENVTL. L. 483, 487–88 (2017).

319. *See* Metzger & Stack, *supra* note 310, at 1264.

320. *See* Thomas O. McGarity, *On the Prospect of "Daubertizing" Judicial Review of Risk Assessment*, 66 L. & CONTEMP. PROBS. 155, 171 (2003) (contending that stringent judicial review of agency risk assessments would result in "fewer rules to impede the regulated community and fewer protections for the beneficiaries of congressionally mandated programs").

321. *See* Metzger & Stack, *supra* note 310, at 1264.

One possible response to the insufficiency of external administrative law is to strengthen institutional checks other than the courts, such as inspector general offices, internal "offices of goodness," and civil service protections.[322] Similarly, Metzger and Stack urge the executive branch to establish internal administrative law that reflects "rule-of-law values including transparency, argumentation, and consistency."[323] While such approaches seem generally desirable, their success depends on the good faith of executive branch actors and the willingness of Congress and the public to push back when norms of administrative legality are ignored.[324] Congress has the power to supervise agencies through agency appropriations, oversight hearings, confirmation votes, and legislation.[325] And the public can register its views at the ballot box, in formal comment processes, and through public protests and social media.

C. Eroding Agency Norms with Respect to Science

The fact that much agency action lies outside the reach of the courts points to the importance of not only internal administrative law, but also agency norms. Norms are more than behavioral regularities; they are informal rules that provide reasons for compliance and establish standards for evaluating an actor's behavior.[326] Norms are enforced and reinforced through electoral

322. *See* Shirin Sinnar, *Protecting Rights from Within? Inspector Generals and National Security Oversight*, 65 STAN. L. REV. 1027, 1031 (2013) (detailing significant role of inspectors general in protecting rights within the national security context, but also noting that inspector general reviews "rarely led to individual relief for most victims, repercussions for high-level executive officials, or significant rights-protective constraints on agency discretion"); Margo Schlanger, *Offices of Goodness: Influence Without Authority in Federal Agencies*, 36 CARDOZO L. REV. 53, 55 (2014) (describing offices of goodness as subsidiary agency offices created by Congress or the president to further values that may differ from the agency's primary goals); Jon D. Michaels, *An Enduring, Evolving Separation of Powers*, 115 COLUM. L. REV. 515, 540–41 (2015) (discussing role of civil service as a counterweight to unilateral and potentially abusive exercises of authority by agency leaders).

323. Metzger & Stack, *supra* note 310, at 1297.

324. *See* Walker, *supra* note 316, at 1639–40 ("Administrative law must look beyond courts for additional safeguards. Congress, for example, could better use its oversight powers to rein in instances of administrative law without courts. . . . The President could no doubt also play a meaningful role."); *cf.* Metzger & Stack, *supra* note 310, at 1301 (noting that a new presidential administration that changes substantive direction without heeding internal constraints and values of transparency, reasoned justification, and consistency may achieve faster policy change "but at the cost of an opportunity to embed norms of administrative legality that are important checks against abuse of executive power").

325. *See* HOLLY DOREMUS ET AL., ENVIRONMENTAL POLICY LAW: PROBLEMS, CASES, AND READINGS 105 (6th ed. 2012).

326. *See* Daphna Renan, *Presidential Norms and Article II*, 131 HARV. L. REV. 2188, 2196–98 (2018); *see also* Richard H. McAdams, *The Origin, Development, and Regulation of Norms*, 96 MICH. L. REV. 338, 350 (1997) (contending that norms "are enforced by some means other than legal sanctions").

politics, public pressure, and institutional actors such as Congress, the bureaucracy, and the media.[327] But norms can dissolve if they are disregarded and if political forces or the public fail to reinforce them.[328] Various norms govern how agencies handle science and scientific experts: agencies should allow experts to discuss their work; agencies should base their decisions on scientific evidence; political officials should not direct agencies' scientific findings; and agencies should not stack scientific advisory boards with political appointees.[329]

1. Undermining the Role of Scientific Authority in Rulemaking

A number of the Trump Administration's actions could undermine the role of scientific authority in the rulemaking process. Science's role is vulnerable because agency policy and custom, as well as law, define that role. The establishment and operation of scientific advisory committees illustrates the combined influence of law and norms. As discussed above, FACA governs the hundreds of scientific and technical advisory committees that assess scientific research and offer policy recommendations.[330] Yet agencies retain broad discretion in matters such as how often a committee meets, how they use a committee's advice, and whether committee members may expect their terms to be renewed. Until recently, past practice has strongly influenced agencies' exercise of that discretion.

The Trump Administration has departed repeatedly from historical norms in using and managing science advisory committees, with each departure in the direction of lessening scientific input. Various committees have been disbanded or fallen into disuse, and EPA's policy barring grant recipients from advisory committees, along with its unprecedented nonrenewal of certain committee members, has dramatically shifted the composition of these committees in industry's favor.[331] These moves reflect a view that the provision of scientific advice is just another target for political maneuvering, rather than a source of

327. *See* Renan, *supra* note 326, at 2198, 2204 (discussing enforcement of presidential norms); *cf.* Jessica M. Nolan, *Social Norms and Their Enforcement*, *in* THE OXFORD HANDBOOK OF SOCIAL INFLUENCE 3 (Stephen G. Harkins et al. eds., 2017) (describing social norms as rules "that guide morally relevant social behavior by way of social sanctions, instead of the force of laws").

328. *Cf.* Renan, *supra* note 326, at 2191 (suggesting that presidential norms break down "when the extralegal system ceases to enforce them").

329. *See* Wendy E. Wagner, *A Place for Agency Expertise: Reconciling Agency Expertise with Presidential Power*, 115 COLUM. L. REV. 2019, 2029–30 (2015) (discussing examples of norms the violation of which have historically triggered outrage and bipartisan disapproval).

330. *See supra* Part III.B; *see also* CSD, *supra* note 103, at 3.

331. For instance, as of early 2018, industry representatives comprised twenty-three percent of SAB membership, up from six percent just a year before. *See* CSD, *supra* note 103, at 6 fig. 4.

objective expertise. The politicization of scientific advice is not novel, but its extent, and the particular techniques used, are unprecedented.

One might argue that the present politicization of advisory committees is of fleeting significance. A subsequent administration could reconstitute committees that have been disbanded and repopulate advisory committees with well-respected and open-minded experts from diverse backgrounds. However, the damage from disregarding norms against politicization may be lasting. An advisory committee's credibility may suffer long-term damage if it is perceived as a politicized body.[332] Recruitment of qualified candidates may be difficult if committee service seems subject to political whims.[333] And future administrations may consider themselves less constrained by norms against politicization.

Nor are such concerns alleviated by the fact that these committees are merely advisory. Granted, advisory committees have neither the ability nor the authority to decide policy questions. However, regulatory agencies need impartial scientific knowledge in order to make well-informed policy decisions. Advisory committees—if unbiased and free of conflicts—are an important mechanism for providing such knowledge.[334] In addition to informing present agency decisions, advisory committees also help to set research priorities. In doing so, they play a critical role in identifying health and environmental concerns, aligning the goals of regulatory science with those of research science, and building up an agency's reputation and expertise.[335]

Politicization of regulatory science and scientific advisory committees undermines the scientific basis and political legitimacy of government policies.[336] Politicized advisory committees facilitate agency capture, rather than providing a bulwark against improper influence. Likewise, censorship of agency scientists reduces transparency and deprives the agencies, courts, and public of critical information.[337] Resulting agency decisions are likely to be poorly informed, in-

332. *See* JASANOFF, *supra* note 21, at 244 (explaining that authority of advisory committees derives in part from the fact that their work is perceived as scientific); *cf.* Doremus, *supra* note 4, at 1619 (discussing danger of politicized scientific debate undermining the role of science).

333. *Cf.* Walters, *supra* note 219, at 693 (suggesting that proceduralization of advisory committee membership requirements may deter qualified potential members from serving).

334. *Cf.* Greer & Steinzor, *supra* note 20, at 37–38 (discussing danger of EPA's Science Advisory Board operating "in a context where self-interested research dominates the agenda of the outside experts recruited for peer review").

335. *See* JASANOFF, *supra* note 21, at 237.

336. *See* Conley, *supra* note 236, at 165 ("[T]he success and legitimacy of scientific advisory committees depend upon their remaining uncontaminated by political and economic pressures."); *cf.* JASANOFF, *supra* note 21, at 86–87, 103 (discussing functions of EPA, SAB, and CASAC); *id.* at 242 (identifying primary function of scientific advisory committees as "to engage the scientific community in negotiating a consensus over regulatory science").

337. *See* Shapiro, *supra* note 35, at 41 (discussing how political manipulation of scientific results undermines courts' ability to review agency actions).

effective, or even harmful.[338] In some instances, agency employees may engage in bureaucratic resistance by whistleblowing, insisting on adherence to norms, or otherwise resisting superiors' directives.[339] However, such measures may not be effective and can come at a high personal cost.[340] Over the long term, scientists may hesitate to work in an environment subject to politicization, and public confidence in the work of government agencies may erode.[341]

2. Ignoring Science as a Basis for Law and Policy

Relatedly, many aspects of the war on regulatory science reflect an unprecedented rejection of science as a basis for law and policy. In contrast to its predecessors, the Trump Administration has pursued its deregulatory agenda by crippling, ignoring, or suppressing regulatory science. Its violation of norms regarding the use of science in reasoned decisionmaking indeed poses a threat to the modern administrative state.

Although prior administrations sometimes exploited the gap between what science can do and what people expect it to do, they generally continued to express a high regard for science. For example, the George W. Bush Administration was criticized for "manipulat[ing] the scientific process and distort[ing] or suppress[ing] scientific findings."[342] In climate change and other areas, that Administration repeatedly pointed to scientific uncertainty as a reason not to regulate.[343] Yet the Bush Administration also touted scientific inquiry and proclaimed adherence to the highest scientific standards. The Bush White House proposed that agencies apply rigorous peer review to all significant regulatory information (although the proposal was seen by some as an

338. *See* Gilman, *supra* note 143, at 588 (explaining that the Bush Administration's efforts to distort and suppress scientific findings caused harm "by making bad policy, demoralizing government scientists, and misinforming the public about important issues").

339. *See* Adam Shinar, *Dissenting from Within: Why and How Public Officials Resist the Law*, 40 Fla. St. U. L. Rev. 601, 622–23 (2013); Rebecca Ingber, *Bureaucratic Resistance and the National Security State*, 104 Iowa L. Rev. 139, 162–72 (2018).

340. *See, e.g.*, Doremus, *supra* note 4, at 1607–08 (discussing agency biologist's efforts to resist apparent politically motivated efforts to influence biological opinion).

341. *See* Gilman, *supra* note 143, at 588.

342. House Comm. on Oversight and Gov't Reform, *supra* note 4, at I; *see also* Shapiro, *supra* note 35, at 31–32 (discussing political interference with science under Bush Administration). Disregard of agency scientists is not the sole province of Republicans; President Obama occasionally "ran roughshod over the views of agencies' scientific experts." Farber, *supra* note 122, at 4.

343. *See* Doremus, *supra* note 9, at 256–57, 266–74. The Bush Administration applied this approach to climate change as well as to various decisions to not list species as endangered. *See id.* at 267–74 (discussing endangered species listing decisions); Control of Emissions from New Highway Vehicles and Engines, 68 Fed. Reg. 52,922, 52,930 (2003) (deciding not to regulate GHGs in part because of scientific uncertainty); *see also* Otto, *supra* note 3, at 287.

effort to hamstring agencies).[344] President Bush appointed in a timely fashion a chief science adviser, who underscored "the President's policy of strongly supporting science and applying the highest scientific standards in decision making."[345] And as that adviser noted, federal research and development budgets increased significantly under President Bush.[346] The Bush Administration may have concealed political decisions "behind a cloak of science," but it did not question the importance of science in making and implementing environmental policy.[347]

The Trump Administration, by contrast, has systematically expressed disdain for regulatory science.[348] The President long delayed appointing a presidential science advisor, has chosen non-scientists to head agencies that deal with science-related matters, and signed a budget authorizing increased research funding only after first proposing stark funding reductions.[349] The Administration's suppression of speech and inquiry on climate change reflects a rejection not only of scientific findings but also of norms regarding transparency and rational agency decisionmaking.[350] Finally, EPA's secret science rule, while purporting to adhere to norms of transparency and objectivity, actually redefines acceptable regulatory science in a manner inconsistent with scientific standards of validity.[351]

It would be naïve to suggest that regulatory science is free of politics. Regulatory science blends science and policy, and agencies—the practitioners of regulatory science—are subject to political demands from Congress, the president, and the public. Nevertheless, agencies are supposed to exercise their ex-

344. *See* Freeman & Vermeule, *supra* note 143, at 57 (discussing Office of Management and Budget's Proposed Bulletin on Peer Review and Information Quality, 68 Fed. Reg. 54,023 (2003)).

345. Statement of the Honorable John H. Marburger, III on Scientific Integrity in the Bush Administration (Apr. 2, 2004), https://perma.cc/PD3D-SRXZ.

346. *See id.*

347. Doremus, *supra* note 9, at 252–53 (noting value that the Bush Administration and its opponents "place[d] on laying claim to the mantle of science"); *cf.* Roger A. Pielke, Jr., *When Scientists Politicize Science: Making Sense of Controversy Over* The Skeptical Environmentalist, 7 ENVTL. SCI. & POL'Y 405, 408–10 (2004) (discussing linear model that assumes that "first getting the science 'right' [is] a necessary, if not sufficient, basis for decision making").

348. *See* Adam Aton, *"Bullied" and "Harassed"—Zinke Foes Recall Past Scandals*, E&E NEWS (May 15, 2018), https://perma.cc/9GMX-SHAZ (contrasting Bush Administration approach of "looking for science to support its messaging" with Trump Administration approach of "sidelining inconvenient science").

349. *See* Scott Waldman, *Trump Seeks Big Cuts to Science Across Agencies*, CLIMATEWIRE (Feb. 13, 2018), https://perma.cc/J98U-;KFLH; *see also supra* text accompanying note 148.

350. *See supra* Part II.C; Scott Waldman, *Climate Webpages Erased, Obscured Under Trump—Report*, CLIMATEWIRE (Jan. 10, 2018), https://perma.cc/W6SC-7EEU.

351. *See supra* Part II.A.1; *see also* Emily Atkin, *The War on Science Is Over. The Republicans Won.*, NEW REPUBLIC (Apr. 5, 2018), https://perma.cc/P68W-H8GT; Waldman & Bravender, *supra* note 312.

pertise and engage in rational decisionmaking; they are not supposed to make purely political decisions.[352] Prior administrations have operated on the assumption that science is foundational to rational policymaking with good reason: an agency that acts without accounting for relevant scientific data is practically inviting courts to invalidate such action.[353] But agencies take account of scientific data for an additional reason: reasoned decisionmaking is a norm that agencies have internalized.[354] Adherence to this norm helps to legitimize their decisions, regardless of the possibility of judicial review.[355]

Courts do serve as a critical safeguard of reasoned decisionmaking when agency actions ignore relevant science. However, when an agency *fails to act* in the face of data that calls for action, judicial review is far less likely.[356] Doctrinal hurdles of standing and nonreviewability often bar courts from reviewing agency inaction.[357] In addition, the judicial review that may occur after a rulemaking petition is denied rarely results in an order to promulgate specific rules.[358] Thus, where inaction is at issue, the norm of reasoned decisionmaking serves as an essential mechanism for prompting an agency to respond to the science. When that norm is flouted—i.e., when an agency fails to respond to

352. *Cf.* Farber, *supra* note 122, at [5] (contending that the balance between agency expertise and political accountability "has shifted too far in the direction of politics rather than expertise"); Elena Kagan, *Presidential Administration*, 114 HARV. L. REV. 2245, 2356 (2001) (urging that presidents exhibit greater deference to agency experts for "regulatory action that in large measure depends on scientific methodology and conclusions").

353. *See supra* Part III.A.

354. *See* Thomas W. Merrill, *Presidential Administration and the Traditions of Administrative Law*, 115 COLUM. L. REV. 1953, 1955–56 (2015); *cf.* Renan, *supra* note 328, at 2221–30, 2276 (discussing norm of deliberative presidency).

355. *See* Merill, *supra* note 354, at 1955–56; Kevin M. Stack, *An Administrative Jurisprudence: The Rule of Law in the Administrative State*, 115 COLUM. L. REV. 1985, 2009 (2015) (Noting that "reason-giving requirements emerged for administrative agencies before courts imposed them.").

356. *See* Lisa Schultz Bressman, *Judicial Review of Agency Inaction: An Arbitrariness Approach*, 79 N.Y.U. L. REV. 1657, 1691–92 (2004); Glen Staszewski, *The Federal Inaction Commission*, 59 EMORY L. J. 369, 376–80 (2009); *see also id.* at 384 ("The most obvious problem with the judiciary's reluctance to review agency inaction is that it allows the Executive Branch to deviate from statutory mandates and render arbitrary and capricious decisions with impunity."); Shapiro, *supra* note 35, at 39–40 ("The courts . . . have difficulty policing the lack of action by an agency, which can result from political pressure by regulated entities opposing regulation.").

357. *See* Bressman, *supra* note 356, at 1666–74. Nonreviewability doctrine is rooted in APA § 701(a), which provides that judicial review is not available under the APA where "statutes preclude judicial review" or "agency action is committed to agency discretion by law." 5 U.S.C. § 701(a)(1), (2) (2012).

358. *See* Staszewski, *supra* note 356, at 381–82. Indeed, even after a court has remanded an agency's refusal to issue a rule, the agency still has little incentive to move forward with affirmative regulation. *See* Mark Seidenfeld, *The Long Shadow of Judicial Review*, 32 J. LAND USE & ENVTL. L. 579, 592–93 (2017).

clear threats despite having the authority, mandate, and resources to do so—political and public pressure to adhere to the norm may be the only viable response.

D. Collateral Effects on Research Science

Finally, the Trump Administration's actions have the potential to exacerbate the erosion of societal norms, not just agency norms, regarding science. Although the Trump Administration's actions are better described as a war on regulatory science than as a war on research science, harm to research science may result as scientists avoid particular lines of inquiry or are dragged into political advocacy. Moreover, the Administration's war on regulatory science is occurring against a backdrop of developments that are more broadly weakening scientific authority and influence in society.

The Administration's attacks on regulatory science, including the proposed slashing of scientific research budgets, have prompted political activism by some scientists. The April 2017 March for Science, for example, attracted an estimated one million people to rallies in hundreds of locations worldwide.[359] While public advocacy by scientists is not inherently problematic, partisan activity by scientists risks the credibility of the scientific community.[360] If scientists are perceived as partisan actors, society may view their research findings as politically motivated arguments, rather than as expert knowledge, and accordingly discount those findings. This is problematic because science is foundational to rational agency decisionmaking as well as democratic governance.[361] A democratic society can identify and confront the problems it faces only if voters are informed about those problems.[362]

All else being equal, some partisan activity by the scientific community might not be too worrisome. But all else is not equal. Postmodernist critiques have weakened science's claim to represent objective reality.[363] For years, powerful industries—most notably, tobacco and fossil fuel companies—have attacked and sought to defund scientists whose findings threaten their economic interests.[364] At the same time, technological developments—think Google,

359. *See* Rebecca Leber, *Anti-Trump Science Protesters Finally Released Their Thoroughly Fact-Checked Crowd Estimates*, MOTHER JONES (May 19, 2017), https://perma.cc/F8AG-52CH.

360. *See* Scott Waldman, *Study Finds Public Will Tolerate Scientists as Advocates*, CLIMATEWIRE (Feb. 28, 2017), https://perma.cc/9F7M-PJRX; Aldhous, *supra* note 2 (suggesting risk that scientists may be perceived as "part of a liberal elite aligned with big-government Democrats"); Pielke, *supra* note 347, at 412–13 (discussing risks that science may lose its power and credibility when scientists engage in political battles).

361. *Cf.* OTTO, *supra* note 3, at 45 ("Because it takes nothing on faith, science is inherently antiauthoritarian, and a great equalizer of political power.").

362. *See id.* at 53.

363. *See id.* at 194.

364. *See id.* at 257–337 (discussing the "industrial" war on science).

Wikipedia, and Facebook—have increased the availability but not necessarily the quality of information, undermining traditional sources of authority.[365] Furthermore, the Internet and the splintering of media allow individuals to indulge in confirmation bias and choose their preferred versions of reality.[366] Together, these attacks and trends have diminished respect for scientific and other kinds of expertise.[367] Partisan activity by scientists might provoke further attacks by a president bent on fueling populist rage at elites and experts.[368] While overall public confidence in scientists to act in the public interest has remained relatively high compared to other groups,[369] trust in scientists is generally soft rather than strong, and trust in scientists with respect to certain issues—including climate change—is comparatively low.[370]

Trump's war on regulatory science could cause long-term damage to research science in other ways as well. Budding scientists might choose other fields of study or avoid much-needed research on disfavored topics; indeed, anecdotal evidence indicates that some scientists are avoiding any mention of climate change in grant proposals.[371] Further effects, such as a decline in overall scientific productivity, are possible though perhaps not immediately measurable. Canada's experience under Prime Minister Stephen Harper offers a warning: following years of censorship of government scientists and cuts to scientific research, as well as elimination of the position of national science adviser, "Canada's share of global scientific publications slipped, as did the number of patents attributed to inventors in Canada and the number of people enrolled in

365. *See* Harry Collins, Are We All Scientific Experts Now? 131 (2014) ("If we start to believe we are all scientific experts, society will change: it will be those with the power to enforce their ideas or those with the most media appeal who will make out truths, according to whatever set of interests they are pursuing."); Tom Nichols, The Death of Expertise 105–33 (2017).

366. *See* Nichols, *supra* note 365, at 134–66; Allison Orr Larsen, *Constitutional Law in an Age of Alternative Facts*, 93 N.Y.U. L. Rev. 175, 190–93 (2018).

367. *See* Otto, *supra* note 3, at 194, 203–04; Larsen, *supra* note 366, at 188–89.

368. *See* Gary E. Machlis and Jonathan B. Jarvis, The Future of Conservation in America: A Chart for Rough Water 36–37 (2018); Cathleen Decker, *Trump's War Against Elites and Expertise*, L.A. Times (July 27, 2017), https://perma.cc/7JD4-AKF9.

369. *See* Nat'l Sci. Bd., *Public Attitudes and Understanding* in Science & Engineering Indicators (2018), at 61–63 (2018); Cary Funk, *Mixed Messages about Public Trust in Science*, 32 Issues in Sci. & Tech. 1 (2017), https://perma.cc/7W2T-SDJ8.

370. *See* Funk, *supra* note 369.

371. *See* Scott Waldman, *Future Climate Scientists Concerned But Not Cowed by Trump*, Climatewire (May 8, 2017), https://perma.cc/V9VW-GXYZ; "*Self-Censorship" as "Climate Change" Is Omitted from Grant,* Climatewire (Nov. 30, 2017), https://perma.cc/GA9A-ABXT.

science Ph.D.s."[372] If it is prolonged, the war on regulatory science in the United States could have similar effects.

Conclusion

Collectively, the Trump Administration's actions constitute a war on regulatory science. The war is being waged on multiple fronts, and itself is a subset of broader efforts to deconstruct the regulatory state. The war on regulatory science also complements other attacks and trends that have undermined traditional sources of authority. Left unchecked, the war on regulatory science threatens vital health and environmental protections and even our democracy.

How can the war on regulatory science be countered? Courts offer one partial avenue for responding, but their reach is limited. Much agency activity lies beyond effective judicial review. Internal administrative law and agency norms are also important, but their enforcement cannot be entrusted to the executive branch alone. Ultimately, broad-based and multi-pronged resistance—at the ballot box, through public protests and political pressure, and via nonfederal and private support for scientific inquiry and data availability—may be necessary to ensure the vitality of science-based decisionmaking in the public interest.

372. Christopher Flavelle, *For the Impact of Trump Slashing Science Funding, Look North*, Bloomberg (July 21, 2017), https://perma.cc/N37D-4PLC; *see* Nicola Jones, *Science Vies for Notice in Canadian Election*, 525 Nature 437, 437 (2015).