

Scientific and Political Integrity in Environmental Policy

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I. Introduction

Environmental-policy conflicts characteristically have scientific dimensions. It matters to decisions about addressing global warming how much temperatures will change, how fast, and what consequences warming will have for the natural world. It matters to decisions about national-forest management whether post-fire salvage logging promotes or retards regrowth, and in what form. It matters to the identification of acceptable levels of air and water pollution what effect pollutants have on human and other life, how long they persist, and how rapidly they move. Incorporating accurate scientific information into environmental-policy decisions is therefore essential to ensuring that those decisions move society toward its chosen goals, and even to identifying goals that accurately reflect societal preferences. Not surprisingly, many federal environmental laws require that administrative agencies, the entities responsible for the vast majority of environmental-policy decisions, obtain and rely on the best available scientific information.¹

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1. See generally Holly Doremus, *The Purposes, Effects, and Future of the Endangered Species Act's Best Available Science Mandate*, 34 ENVTL. L. 397, 405–09 (2004) (describing many points at which the Endangered Species Act and its implementing regulations invoke science). Other federal laws requiring use of the best available science at many points include the Marine Mammal Protection Act of 1972, 16 U.S.C. §§ 1361–1421h (2000), and the Magnuson–Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801–1883 (2000). Numerous other federal laws expressly mandate use of the best available scientific information in specific contexts. See, e.g., 14 U.S.C. § 676(a)(3) (Supp. V 2005) (requiring the Secretary of Transportation to use the best scientific information available in establishing standards for the length of time an individual may serve on watch at Coast Guard search-and-rescue centers); 15 U.S.C. § 2643(d)(7) (2000) (requiring EPA to use the best available scientific evidence to help the public understand the risks of asbestos in building materials and removal of those materials); 16 U.S.C. § 460ss-2(b)(2) (2000) (requiring the Klamath Fishery Management Council to use the best scientific information available in the development of harvest recommendations); *id.* § 839b(h)(6) (requiring the Pacific Northwest Power and Conservation Planning Council to use the best available scientific knowledge to develop a program to protect fish and wildlife while ensuring an adequate power supply); *id.* § 3311(c)(3) (requiring the Salmon and Steelhead Advisory Commission to use the best scientific information available in the development of recommendations for a management structure for salmon and steelhead fisheries); *id.* § 3638 (requiring the Pacific Salmon Commission to use the best scientific information available in regulating salmon fisheries); *id.* § 4711(a)(2) (requiring the Secretary of

However, the tasks of obtaining, identifying, and using the best scientific information available pose a series of challenges to the policy process. This Article concentrates on two intertwined challenges: ensuring scientific integrity and ensuring political integrity. The first comes primarily at the outset of the decision-making process, where information is fed in. Much of the needed information comes from scientists, some employed by the federal government in regulatory and research positions, others working for regulated parties or stakeholder groups, and still others in academic positions. Information contributors may have a variety of reasons to spin or even falsify the data and interpretations they contribute to the regulatory process. That process will not work as intended without some mechanism for ensuring the accuracy and reliability of input information.

The second challenge arises primarily at the back end of the process, when the agency must translate information into decisions. This process requires that agency personnel measure the available information against applicable statutory and regulatory standards and decide what action, if any, to take. The concern here is one familiar to observers of the politics of the regulatory state—that the agency will undermine a statutory scheme by responding more to political pressures or the personal biases of agency personnel than to the evidence and the goals articulated by the legislature.

Both scientific and political integrity are essential to accurate and legitimate policy choices.² Neither is easy to provide in the contested world of environmental decision making. In this Article, I undertake to demonstrate the scope and nature of the problems of scientific and political integrity, and offer some concrete suggestions for correcting interrelated failures of the two in environmental policy. Part II sketches several recent controversies that have been described as failures of scientific integrity. Part III explains the natures and functions of scientific and political integrity,

Transportation to use the best scientific information available in the development of guidelines and regulations for preventing the introduction of invasive species through ballast water); *id.* § 4722(c)(1) (requiring the Aquatic Nuisance Species Task Force to use the best available science when choosing federal efforts to control aquatic nuisance species); *id.* § 4905(a)(3) (requiring the Secretary of the Interior to use the best scientific information available in creating a list of exotic wild birds that may be imported to the United States); *id.* § 5104(a)(2) (requiring the Atlantic States Marine Fisheries Commission to use the best scientific information available in the development of standards for the preparation of Atlantic coastal-fishery management plans); 20 U.S.C. § 80q-9(a)(1) (2000) (requiring the Smithsonian Institution to use the best available scientific documentation in conjunction with historical information to determine the origin of Indian remains and funerary objects); 33 U.S.C. § 2102 (2000) (requiring the Army Corps of Engineers to use the best scientific information available to determine the location and construction of artificial reefs); 42 U.S.C. § 300g-1(b)(3) (2000) (requiring EPA to set drinking-water standards according to the best available peer-reviewed science).

2. David Adelman has articulated a similar thought in a slightly different way, noting “the difficult balancing that is required to protect the integrity of science while ensuring transparency and political accountability.” David E. Adelman, *Scientific Activism and Restraint*, 79 NOTRE DAME L. REV. 497, 505 (2004).

explains how the two are linked, and demonstrates that several of the controversies described in Part II are more directly attributable to shortfalls in political, rather than scientific, integrity. Finally, Part IV offers some concrete suggestions for correcting failures of political integrity through closer oversight of the Executive Branch, and those of scientific integrity through greater attention to role boundaries and reduced incentives for scientific sin.

II. A Few Recent Controversies

The G.W. Bush Administration is by no means the first to be criticized for its use of science in policy making,³ but it has faced the most persistent and blistering criticism, including reports, sign-on letters, and books about its “War on Science.”⁴ This Part briefly reviews three distinct types of complaints lodged against the current Administration, as well as one directed

3. See, e.g., JEANNE NIENABER CLARKE & DANIEL MCCOOL, *STAKING OUT THE TERRAIN: POWER AND PERFORMANCE AMONG NATURAL RESOURCES AGENCIES* 63 (1996) (detailing criticisms of the Reagan Administration for its alleged transformation of the Forest Service into a tree-farming operation); ASHLEY L. SCHIFF, *FIRE AND WATER: SCIENTIFIC HERESY IN THE FOREST* 1–14 (1962) (discussing the government’s limited research and selective disclosure of results during the early twentieth century). See generally PAUL W. HIRT, *A CONSPIRACY OF OPTIMISM: MANAGEMENT OF THE NATIONAL FORESTS SINCE WORLD WAR TWO* (1994) (critiquing the role played by the Forest Service during the period beginning after World War II and running through the early nineties); TODD WILKINSON, *SCIENCE UNDER SIEGE: THE POLITICIANS’ WAR ON NATURE AND TRUTH* (1998) (recounting the stories of eight scientists who blew the whistle on various federal agencies for abusing and manipulating science to further political agendas).

4. See generally COMM. ON OVERSIGHT AND GOV’T REFORM, U.S. HOUSE OF REPRESENTATIVES, 110TH CONG., *POLITICAL INTERFERENCE WITH CLIMATE CHANGE SCIENCE UNDER THE BUSH ADMINISTRATION* (2007) [hereinafter *POLITICAL INTERFERENCE*] (reporting the findings of the Committee’s sixteen-month investigation into the Bush Administration’s alleged interference with government climate-change science and concluding that the Administration engaged in systematic manipulation of science in an effort to mislead policy makers); CHRIS MOONEY, *THE REPUBLICAN WAR ON SCIENCE* (2005) (criticizing the Bush Administration for continuing and increasing the intensity of a Republican agenda that disregards and manipulates science in order to achieve various policy objectives); SETH SHULMAN, *UNDERMINING SCIENCE: SUPPRESSION AND DISTORTION IN THE BUSH ADMINISTRATION* (2007) (criticizing the Bush Administration’s treatment of scientific data and evidence concerning issues such as climate change, AIDS, forestry, endangered species, stem-cell research, and more); UNION OF CONCERNED SCIENTISTS, *SCIENTIFIC INTEGRITY IN POLICY MAKING: A FURTHER INVESTIGATION OF THE BUSH ADMINISTRATION’S MISUSE OF SCIENCE* (2004) (accusing the Bush Administration of undermining the integrity of scientific analysis at federal agencies and of undermining the integrity of science advisory councils by applying a political litmus test to appointees); UNION OF CONCERNED SCIENTISTS, *SCIENTIFIC INTEGRITY IN POLICY MAKING: AN INVESTIGATION INTO THE BUSH ADMINISTRATION’S MISUSE OF SCIENCE* (2004) (decrying the Bush Administration for its abuse of science by suppressing and distorting research and by appointing underqualified and biased persons to important positions); Kathleen M. Rest & Michael H. Halpern, *Politics and the Erosion of Federal Scientific Capacity: Restoring Scientific Capacity to Public Health Science*, 97 AM. J. PUB. HEALTH 1939 (2007) (accusing the Bush Administration of manipulating science on a broad range of issues, including global warming, international health, endangered species, lead poisoning, mercury emissions, condoms, and mining).

at the academic science community, as a prelude to considering the role of scientific and political integrity in each.

A. Challenging and Editing Scientific Evaluations

The most high-profile conflict over the use of science in environmental policy in the current Administration has to do with the conduct of Julie MacDonald, formerly the Deputy Assistant Secretary of Interior for Fish, Wildlife, and Parks. MacDonald, a political appointee trained as a civil engineer and holding a master's degree in management, came to the Department of the Interior from California's Resources Agency, where she was also a political appointee.⁵

In her position at Interior, MacDonald was responsible for oversight of the Fish and Wildlife Service (FWS), and, in particular, of decisions about the listing of endangered and threatened species and designation of critical habitats.⁶ In April 2006, the Department of the Interior's Office of Inspector General, prompted by an anonymous complaint from an FWS employee, began an investigation of MacDonald.⁷ The resulting report found that MacDonald regularly intervened at the earliest stages of review, calling field staff directly "and bullying them into producing documents" that reached the result desired by the Assistant Secretary.⁸ FWS staff interviewed in the course of the investigation characterized MacDonald as "a pain in the butt,"⁹ "highly opinionated,"¹⁰ and "disrespectful, rude, and unprofessional."¹¹ On the other hand, it was acknowledged that MacDonald "had been correct on several occasions in her challenges of field research."¹²

The Inspector General's report seems to conclude that MacDonald's aggressive management style, while unprofessional, did not violate any laws or Department regulations.¹³ The Inspector General did refer the MacDonald case to the Department of Justice—not for her bullying of agency staff, but because the investigation revealed that she had selectively disclosed nonpublic information to allies at the California Farm Bureau and the Pacific

5. Press Release, U.S. Dep't of the Interior, MacDonald Named Deputy Assistant Secretary (May 3, 2004), available at <http://www.doi.gov/news/040503b>.

6. OFFICE OF INSPECTOR GEN., DEP'T OF THE INTERIOR, REPORT OF INVESTIGATION, JULIE MACDONALD, DEPUTY ASSISTANT SECRETARY, FISH, WILDLIFE AND PARKS 2 (2007) [hereinafter MACDONALD REPORT].

7. *Id.* at 4.

8. *Id.*

9. *Id.*

10. *Id.* at 7.

11. *Id.* at 12.

12. *Id.* at 15.

13. *Id.* at 2.

Legal Foundation, potentially violating federal regulations about information disclosure and ethical standards for public service.¹⁴

MacDonald resigned shortly after the Report was released.¹⁵ A separate investigation subsequently concluded that she should have recused herself from a decision about whether or not to list the Sacramento Splittail because she owned land in areas that could be affected by the listing.¹⁶ In July 2007, FWS announced that it would review eight decisions that might have been improperly influenced by political considerations because of MacDonald's pressure tactics,¹⁷ and in November it announced that it had revised or would revise seven of those decisions.¹⁸ Interior's Inspector General is investigating another eighteen decisions in which MacDonald played a role,¹⁹ and environmental groups have sued or given notice of intent to sue over dozens of others.²⁰ MacDonald's actions contributed to the overturning in December 2007 of the Fish and Wildlife Service's decision to reject a petition seeking listing of the Greater Sage-Grouse. A federal court concluded that the Service had not applied the best available science to the decision,²¹ as required by the Endangered Species Act²² (ESA). In reaching that conclusion, the court relied in part on the Inspector General's report together with e-mails that confirmed the Report's account of MacDonald's "brazen . . . political meddling."²³

That MacDonald directly edited or bullied agency scientific staff into revising documents is certainly troubling. That alone, however, does not

14. *Id.*

15. Mike Ferullo, *Official Says Misconduct Casts 'Cloud' Over Scientific Integrity of Interior Program*, 38 *Env't Rep. (BNA)* 1685 (Aug. 3, 2007).

16. Mike Taugher, *Feds Verify Official's Bias in Delisting*, *CONTRA COSTA TIMES*, Nov. 28, 2007, at A1.

17. Mike Ferullo & Linda Roeder, *Fish and Wildlife Service Announces Review of Decisions Influenced by Former Official*, 38 *Env't Rep. (BNA)* 1628 (July 27, 2007).

18. Letter from Kenneth Stansell, Acting Dir., U.S. Fish & Wildlife Serv., to Rep. Nick J. Rahall II, Chairman, Comm. on Natural Res. U.S. House of Representatives 2 (Nov. 23, 2007), available at <http://www.fws.gov/endangered/pdfs/macdonald/rahallsigned.pdf>.

19. Michael Milstein, *Endangered Species Questions Expand*, *PORTLAND OREGONIAN*, Dec. 1, 2007, at A1.

20. *E.g.*, Bob Egelko, *Feds Sued Over Millions of Acres for 13 Species*, *S.F. CHRON.*, Dec. 20, 2007, at B1; Press Release, Ctr. for Biological Diversity, Environmentalists Challenge Political Interference with 55 Endangered Species in 28 States, Seek to Restore 8.7 Million Acres of Habitat Across the Country (Aug. 28, 2007), available at http://www.biologicaldiversity.org/news/press_releases/interference-08-28-2007.html. The Center for Biological Diversity has also filed a separate lawsuit seeking information about MacDonald's participation in endangered-species decision making. Matthew Daly, *Conservationists Sue U.S.*, *S. FLA. SUN-SENTINEL*, Dec. 28, 2007, at A2.

21. *W. Watersheds Project v. U.S. Forest Serv.*, 535 F. Supp. 1173, 1183–85 (D. Idaho 2007).

22. See 16 U.S.C. § 1533(b)(1)(A) (2000) (requiring the Secretary of the Interior to make determinations about endangered species "solely on the basis of the best scientific and commercial data available").

23. *W. Watersheds Project*, 535 F. Supp. at 1187 (quoting MACDONALD REPORT, *supra* note 6, at 12).

prove that she overstepped her role. ESA listings and critical-habitat designations—the decisions MacDonald is accused of interfering with—are a complex mixture of factual (“scientific”) and policy (“value”) judgments. Political appointees are entitled to make the latter judgments, within the boundaries set out by the relevant statutes. The few examples in the Inspector General’s report that include specific details about how certain decisions were reached illustrate the extent to which scientific and political roles are intertwined in much of environmental policy.

Two of the accusations against MacDonald unambiguously allege attempts to meddle in scientific judgments. Both were reported by FWS Director Dale Hall. The first involved the range of the Southwestern Willow Flycatcher. According to Hall, his field biologists had determined, as part of the process of identifying critical habitat for the flycatcher, that its range was a circle with a radius of 2.1 miles around its nest.²⁴ MacDonald “decided that 1.8 miles was more accurate,” and insisted on that change.²⁵ The second involved the flows needed by the Kootenai Sturgeon. FWS staff wanted to express the acceptable flows as a range.²⁶ MacDonald wanted them to use just the end of that range, which would least affect dam operations.²⁷ When Hall insisted that MacDonald put that demand in writing, she withdrew it.²⁸

For the other accusations, it is more difficult to determine whether MacDonald was trying to influence scientific or political judgments. FWS employees asserted that MacDonald had: (1) ordered field employees to conclude, relying on MacDonald’s misinterpretation of local economic-development data, that certain areas should be excluded from the critical habitat designated for vernal pool species because the economic costs of designation were unacceptably high;²⁹ (2) insisted that the California Tiger Salamander be treated as a single entity across its entire geographic range, rejecting staff calls to recognize two “distinct population segments,” possibly entitling those populations to a higher degree of protection;³⁰ (3) “forced a reduction” in critical habitat for the Bull Trout from 296 to 42 river miles on an unspecified basis;³¹ (4) sought to control which consultant was hired to resolve the disagreement over conflicting genetic studies of the Preble’s Meadow Jumping Mouse;³² and (5) instructed FWS employees to reevaluate their determination that existing conservation efforts for the Greater Sage Grouse did not meet the requirements of the Agency’s Policy on Existing

24. MACDONALD REPORT, *supra* note 6, at 16.

25. *Id.*

26. *Id.*

27. *Id.*

28. *Id.*

29. *Id.* at 4.

30. *Id.* at 5–6.

31. *Id.* at 8.

32. *Id.* at 9.

Conservation Efforts to qualify as grounds not to list the species.³³ The desired political result was clear in each case, but the extent to which the judgments she was trying to control were technical as opposed to policy matters is not. The cost of protecting vernal pool species is a technical matter, but identifying the level at which those costs are outweighed by conservation benefits is not. The genetic relationships between populations of salamanders or subspecies of mice are scientific questions, but what level of distinction justifies separate treatment for conservation purposes is not.³⁴

There have also been suggestions that political appointees have edited or interfered with the judgments of staff biologists at the National Marine Fisheries Service (NMFS). One such charge comes from Michael Kelly, who was the lead NMFS biologist charged with drafting a biological opinion on the effects of proposed operations of the Bureau of Reclamation's Klamath Irrigation Project on the threatened Coho Salmon from 2002 to 2012.³⁵ This was a highly charged task, both politically and scientifically, coming in the wake of the ESA-triggered shutdown of the irrigation project in 2001 and a subsequent National Research Council report concluding that the biological opinions that required the shutdown were not supported by scientific evidence.³⁶

Kelly developed a draft biological opinion finding jeopardy to the listed salmon, and proposing reasonable and prudent alternatives.³⁷ Lawyers at the Department of Justice rejected it without explanation.³⁸ James Lecky, then Assistant Administrator of the National Oceanic and Atmospheric Administration (NOAA) for the Pacific Southwest Region and a career NOAA biologist, was brought in to draw up a different version.³⁹ After some back-and-forth between Kelly and Lecky, they produced a new draft which

33. *Id.* at 12.

34. For a detailed discussion of the scientific and nonscientific aspects of the problem of identifying units of conservation concern, see Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029, 1088–1112 (1997) (examining the difficulty of defining the term “species” in the ESA).

35. *Crisis of Confidence: The Political Influence of the Bush Administration on Agency Science and Decision-Making: Oversight Hearing Before the H. Comm. on Natural Resources*, 110th Cong. 105 (2007) [hereinafter *Political Influence Oversight Hearing*] (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA).

36. NAT'L RESEARCH COUNCIL, SCIENTIFIC EVALUATION OF BIOLOGICAL OPINIONS ON ENDANGERED AND THREATENED FISHES IN THE KLAMATH BASIN: INTERIM REPORT 27 (2002). For a detailed discussion of the Klamath water conflicts, see generally HOLLY DOREMUS & A. DAN TARLOCK, *WATER WAR IN THE KLAMATH BASIN: MACHO LAW, COMBAT BIOLOGY, AND DIRTY POLITICS* (2008).

37. *Political Influence Oversight Hearing*, *supra* note 35, at 104 (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA).

38. *Id.* at 105.

39. *Id.* at 106; see also Lissa James, *Fisheries Agency Rewards a Loyal Bureaucrat*, HIGH COUNTRY NEWS, Dec. 20, 2004, http://www.hcn.org/servlets/hcn.Article?article_id=15193 (discussing Lecky's background with NOAA).

called for lower flows but would still, in Kelly's view, "marginally avoid jeopardy."⁴⁰ After a meeting with the Bureau of Reclamation, Lecky then decided that NMFS would accept the Bureau's proposal that it supply only 57% of the flows needed by salmon, while committing to find the additional flows from unspecified sources.⁴¹ At this point, Kelly "requested to be dismissed from the project team because [he] would not participate in an illegal action."⁴² Kelly was not reprimanded or punished for his request.⁴³

A few months later, Kelly lodged a complaint under the Whistleblower Protection Act⁴⁴ with the Office of Special Counsel,⁴⁵ claiming that the biological opinion was unlawfully developed.⁴⁶ In general, the Whistleblower Protection Act has, as a practical matter, offered complaining employees very limited protection.⁴⁷ It did not help Kelly; the Office of Special Counsel declined to pursue his claim.⁴⁸ Eventually, the federal

40. *Political Influence Oversight Hearing*, *supra* note 35, at 106 (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA).

41. *Id.*

42. *Id.*

43. In fact, Kelly received an award for his work on the biological opinion. *Id.*

44. Pub. L. No. 101-12, 103 Stat. 16 (codified as amended in scattered sections of 5 U.S.C.). The Act protects federal employees against adverse personnel actions for disclosures they reasonably believe show a violation of law, gross mismanagement, gross waste of funds, abuse of authority, or a substantial danger to public health or safety. 5 U.S.C. § 2302(b)(8) (2000).

45. The Office of Special Counsel is the federal office charged with protecting federal employees against "prohibited personnel practices, especially reprisal for whistleblowing." Introduction to the OSC, <http://www.osc.gov/intro.htm> (last updated Nov. 9, 2006). A federal employee who has suffered an adverse personnel action can file an administrative complaint with the Office of Special Counsel, which then investigates. 5 U.S.C. §§ 1213(c)(2)(A), 1214(a)(1)(A) (2000). If the Office finds evidence of a retaliatory personnel action, it recommends a remedy. *Id.* § 1214(b)(2)(B). If the agency declines to institute that remedy, the Office seeks corrective action from the Merit Systems Protection Board. *Id.* § 1214(b)(2)(C). If the Office of Special Counsel decides not to pursue the claim, the whistle-blower in some instances can file an appeal directly to the Merit Systems Protection Board on her own behalf. *Id.* § 1214(a)(3).

46. *Political Influence Oversight Hearing*, *supra* note 35, at 107 (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA).

47. See, e.g., Terry Morehead Dworkin, *SOX and Whistleblowing*, 105 MICH. L. REV. 1757, 1766-67 (2007) (noting the limited success of the Whistleblower Protection Act); Mary Kreiner Ramirez, *Blowing the Whistle on Whistleblower Protection. A Tale of Reform Versus Power*, 76 U. CIN. L. REV. 183, 199-219 (2007) (elaborating on some of the shortcomings of whistle-blower protection under the Sarbanes-Oxley Act of 2002); Marci Alboher Nusbaum, *Devine Intervention*, LEGAL AFF., Nov.-Dec. 2002, at 48, 52 (discussing the need to improve the Whistleblower Protection Act); Eugene Russo, *The Plight of the Whistleblower*, SCIENTIST, Jan. 17, 2005, at 39 (detailing the repercussions that whistle-blowers often encounter and the particular challenges that scientists face).

48. The Office of Special Counsel informed Kelly that it could not determine that there was a substantial likelihood that NMFS had violated the law with its biological opinion. Laura Paskus, *Sound Science Goes Sour*, HIGH COUNTRY NEWS, June 23, 2003, http://www.hcn.org/servlets/hcn.PrintableArticle?article_id=14052. Kelly's attorney, Dan Meyer of the nonprofit group Public Employees for Environmental Responsibility, described Kelly as "a model whistleblower." *Id.* However, it is unclear from the press coverage of his case whether he in fact ever suffered any employment consequences as a result of his disclosures.

courts ruled that the biological opinion was indeed unlawful because it did not assure that the full needed flows would be provided.⁴⁹ In 2004, Kelly resigned from NMFS, convinced that “his scientific work [on another project] was again being overruled by politics.”⁵⁰

Like many of the decisions MacDonald tried to influence, the Klamath biological opinion involved both scientific and political judgments. Kelly viewed the involvement of Lecky, the review by the Department of Justice, and his agency’s unwillingness to stand up to the Bureau of Reclamation as evidence that political pressures were trumping the scientific evidence of the needs of the endangered fish. He believed that establishing those needs was as straightforward as doing simple math and that he was being asked to produce a document that said “ $1+1=3$.”⁵¹ The science of biological opinions, though, is never as clear as a simple mathematical equation. Furthermore, Kelly’s most strongly voiced objection was to a legal, rather than a scientific, conclusion—the decision to allow the Bureau of Reclamation to escape responsibility for the full amount of the flows needed by the protected fish.⁵² Kelly was right that the ESA does not permit the biological opinion’s creative attempt to limit the Bureau’s responsibility, but that was not a question within the scope of Kelly’s expertise or his role as an agency biologist.

B. Censoring Agency Scientists

Outside the direct regulatory arena, Bush Administration appointees without scientific credentials have interfered with the ability of agency research scientists to communicate directly with Congress and the public. Interference has been particularly aggressive with respect to scientific evidence of global climate change, its causes, and its consequences.

Dr. James Hansen, a climate researcher at NASA, has been particularly outspoken about restrictions on his contacts. In October 2004, he told the *New York Times* that NASA administrator Sean O’Keefe had criticized him for referring in a public presentation to dangerous anthropogenic effects on climate.⁵³ In January 2006, Hansen again complained that efforts were being made to silence him following a public lecture in which he called for cuts in

49. *Pac. Coast Fed’n of Fishermen’s Ass’ns v. U.S. Bureau of Reclamation*, 426 F.3d 1082, 1091 (9th Cir. 2005).

50. Laura Paskus & Mike Kelly, *Scientific Principle: Klamath Whistleblower Throws in the Towel*, HIGH COUNTRY NEWS, July 19, 2004, http://www.hcn.org/servlets/hcn.Article?article_id=14863.

51. *Political Influence Oversight Hearing*, *supra* note 35, at 105 (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA).

52. *See id.* at 107 (explaining how dangerous the decision to refuse to change flow levels could be for certain endangered fish).

53. Andrew C. Revkin, *NASA Expert Criticizes Bush on Global Warming*, N.Y. TIMES, Oct. 26, 2004, at A22. O’Keefe denied the charge. *Id.*

greenhouse-gas emissions.⁵⁴ A public-affairs officer at NASA headquarters, George Deutsch, rejected a request from National Public Radio (NPR) to interview Hansen because of NPR's perceived liberal leanings.⁵⁵ Deutsch was twenty-four years old at the time.⁵⁶ He had joined NASA as an entry-level public-affairs officer in early 2005.⁵⁷ His only qualification for the job seems to have been that he had worked on the President's reelection campaign and inaugural committee.⁵⁸

Hansen's experience was not unique. In an exhaustive 2007 report, the nonprofit Government Accountability Project (GAP) "found no incidents of direct interference with climate change research,"⁵⁹ but documented a series of "unduly restrictive policies and practices" relating to communication to the media, the public, and Congress of scientific information that might raise questions about the Administration's policy choices.⁶⁰ As in the MacDonald case, political appointees ignored conventional channels to put a partisan spin on communications policy. As the *GAP Report* explained:

Directives and signals from executive offices such as the Council on Environmental Quality, the Office of Management and Budget, and the Office of Science and Technology Policy are channeled through political appointees and younger politically-aligned career civil servants at lower-level press and policy offices. These communications largely take place off the record, frequently deviating from written policy guidelines and involving individuals with few scientific qualifications. Whereas low-level agency and program support staff are typically sympathetic to the scientists and their

54. Andrew C. Revkin, *Climate Expert Says NASA Tries to Silence Him*, N.Y. TIMES, Jan. 29, 2006, at A1.

55. *Id.*

56. *Allegations of Political Interference with Government Climate Change Science: Hearing Before the H. Comm. on Oversight and Gov't Reform*, 110th Cong. 318 (2007) [hereinafter *Climate Change Hearings*] (statement of George C. Deutsch, III).

57. *Id.*

58. *See id.* Deutsch resigned in February 2006 after it came to light that his resume inaccurately stated that he held a college degree when at the time he was one class short of graduation. *Id.* at 319; Andrew C. Revkin, *A Young Bush Appointee Resigns His Post at NASA*, N.Y. TIMES, Feb. 8, 2006, at A13.

59. TAREK MAASSARANI, GOV'T ACCOUNTABILITY PROJECT, REDACTING THE SCIENCE OF CLIMATE CHANGE: AN INVESTIGATIVE AND SYNTHESIS REPORT 1 (2007) [hereinafter *GAP REPORT*], available at <http://www.whistleblower.org/doc/2007/Final%203.28%20Redacting%20Climate%20Science%20Report.pdf>. The *GAP Report* did find a handful of minor incidents, such as attempts to force agency scientists to remove the term "global warming" from the titles of articles submitted to peer-reviewed journals. *Id.* at 64–67.

60. *Id.* at 1. A report subsequently issued by the House Committee on Oversight and Government Reform echoed many of the *GAP Report's* conclusions. POLITICAL INTERFERENCE, *supra* note 4, at 33 (concluding that a sixteen-month investigation revealed a "systematic White House effort to censor climate scientists by controlling their access to the press and editing testimony to Congress").

science, as one scientist noted, “the closer you get to Washington, the more hostile [they are to the science].”⁶¹

The *GAP Report* documents a progressively tighter hold on communications policy from above, particularly at NOAA and NASA, under the Bush Administration. NOAA scientists who had once been free to respond to media calls were first informally told to talk to the agency’s public-affairs office before granting interviews.⁶² By 2002, NOAA’s Atlantic Oceanographic and Meteorological Laboratory had instituted a blanket policy requiring preclearance of interviews.⁶³ In 2004, NOAA instituted an agency-wide policy requiring that the public-affairs office be notified not only of media contacts but even of scientific articles about to be submitted to peer-reviewed journals.⁶⁴ Simply by delaying approval for contacts, this policy effectively drove away some reporters.⁶⁵ In other cases, media requests made to a public-affairs office on topics deemed sensitive were denied or referred to senior administrators.⁶⁶ When NOAA scientists did speak with reporters, the communications policy said that they always represented the agency.⁶⁷ In other words, the policy denied the possibility that employees could speak for themselves without implicating the agency.⁶⁸

The ability of agency scientists to communicate with Congress has been subject to similar interference and restrictions. NOAA employees, for example, must clear congressional testimony with both NOAA headquarters and the Office of Management and Budget.⁶⁹ The review process is reportedly “slow and dominated by non-science staff and high-level management.”⁷⁰ Experts from other agencies also must clear their testimony with high-level political staff. For example, when Julie Gerberding, Director of the Centers for Disease Control and Prevention (CDC), was called to testify at a Senate committee hearing on climate change and public health,

61. *GAP REPORT*, *supra* note 59, at 2.

62. *Id.* at 8.

63. *Id.* at 9.

64. *Id.* at 10–11.

65. *See id.* at 26 (noting that delays were typically about twenty-four hours, but could be up to five or six days on politically sensitive topics); *id.* at 33 (quoting one reporter as saying that it was sometimes easier to contact university co-authors “due to the roadblocks that government PR folks can and do create”).

66. *See id.* at 17 (noting that “climate change-related questions . . . were first to be handed to senior political administrators”). The *GAP Report* notes that on the issue of causes of the highly active 2005 hurricane season, journalists were referred specifically to scientists who espoused the “natural variability” explanation preferred by the Administration. *Id.* at 77–80.

67. *Id.* at 11.

68. *See id.* (concluding that requiring scientists to speak as representatives of the agency “preempt[ed] the ‘personal views’ exception”).

69. *Id.* at 41.

70. *Id.* at 45.

the White House edited her written testimony to eliminate the statement that “CDC considers climate change a serious public concern.”⁷¹

Formal reports to Congress have also been subjected to heavy editing by political appointees. Philip Cooney, chief of staff of the White House Council on Environmental Quality and a lawyer without scientific training,⁷² reportedly made hundreds of edits to drafts of annual reports produced by the federal Climate Change Science Program.⁷³ Most of the edits emphasized uncertainty or softened descriptions of the state of the scientific knowledge.⁷⁴ Many edits did not make it into the published version of the report, but even those that were removed “undoubtedly delayed the process and sent chilling signals to scientists and career bureaucrats.”⁷⁵

Finally, some agency scientists report that they have been punished for efforts to publicize information. The most recent example to hit the news is that of Christopher de Rosa, formerly the director of the Division of Toxicology and Environmental Medicine at the Agency for Toxic Substances and Disease Registry within the CDC.⁷⁶ De Rosa was the lead author of a report, commissioned in 2001 by the International Joint Commission (IJC),⁷⁷ on environmental hazards in the Great Lakes region. The report was pulled “for further review” shortly before its originally scheduled release date in

71. Juliet Eilperin, *Sen. Boxer Seeks Answers on Redacted Testimony*, WASH. POST, Oct. 25, 2007, at A2. The assertion that heat-related illness would likely increase in the Midwest and Northeast was also removed. *Id.* Nonetheless, Gerberding (herself a political appointee, but also a medical doctor and professor of medicine) said that the edits did not undermine the message of her testimony, which she characterized as “frank and candid.” *Id.*

72. *Climate Change Hearings*, *supra* note 56, at 324 (statement of Philip Cooney, former Chief of Staff, White House Council on Environmental Quality). Until 2001, he had worked at the American Petroleum Institute as a lobbyist and as their climate team leader. *Id.*

73. GAP REPORT, *supra* note 59, at 47; Andrew C. Revkin, *Bush Aide Edited Climate Reports*, N.Y. TIMES, June 8, 2005, at A1.

74. A former senior associate of the U.S. Climate Change Science Program, Rick Piltz, later described them to a congressional committee in these terms: “They had the aggregate effect of creating an enhanced manufactured sense of fundamental scientific uncertainty about global warming, of toning language about observed warming and impacts, of basically discarding any idea that climate models were useful and deleting language about the observed or projected impacts of climate change.” *Climate Change Hearings*, *supra* note 56, at 116 (statement of Rick Piltz).

75. GAP REPORT, *supra* note 59, at 47. White House nonscientists also heavily edited the climate-change section of a draft EPA state-of-the-environment report, to the point that EPA decided to delete the section entirely rather than publish it in a form that no longer accurately represented the available scientific information. *Id.* at 59.

76. Sheila Kaplan, *Great Lakes Danger Zones?*, CTR. FOR PUB. INTEGRITY, <http://www.publicintegrity.org/GreatLakes/index.htm> (explaining how Christopher de Rosa claimed he was retaliated against for leaking the linked report).

77. The IJC is a bilateral U.S.–Canadian body that “prevents and resolves disputes between the United States of America and Canada under the 1909 *Boundary Waters Treaty* and pursues the common good of both countries as an independent and objective advisor to the two governments.” International Joint Commission—Home, http://www.ijc.org/en/home/main_accueil.htm (last updated Apr. 16, 2008).

July 2007.⁷⁸ De Rosa claimed that the report was suppressed because of its conclusion that millions of people in the region may face elevated health risks due to past and present industrial pollution.⁷⁹ CDC officials responded that the quality of the report was “below expectations,” and that it was pulled to address the concerns of reviewers at EPA.⁸⁰ Outside scientific reviewers, however, have agreed with De Rosa, and the CDC has admitted that “very senior people not typically in the review process got a copy and had some significant questions and concerns.”⁸¹ De Rosa was demoted from his supervisory position.⁸² The House Committee on Science and Technology is reviewing his claim that he was demoted in retaliation for his efforts to publicize the Great Lakes report and the hazards posed by formaldehyde in trailers supplied to victims of Hurricane Katrina by the Federal Emergency Management Agency.⁸³

C. *Shading Scientific Judgments*

Finally, there are examples—both within federal agencies and in the broader scientific community—of scientists not fully and accurately reporting the limits of their data, and drawing conclusions the data do not reasonably support.

1. *Within Federal Agencies: The Florida Panther Story.*—The Florida Panther (*Puma concolor coryi*) is the last eastern remnant of the cougars that once roamed the entire United States.⁸⁴ It was federally designated as an endangered species in 1967, before passage of the modern ESA.⁸⁵ By 2002, the population was down to about eighty individual cougars, with perhaps fewer than twenty breeding females,⁸⁶ and limited to south Florida, with about half its range in three rapidly urbanizing counties.⁸⁷ FWS faced the task of evaluating the effect on the panther of a series of large-scale

78. Kaplan, *supra* note 76. As of February 2008, the report has not been officially released. *Id.*

79. *Id.*; see also Kari Lyderson, *Delay of Report is Blamed on Politics*, WASH. POST, Feb. 18, 2008, at A3 (quoting an Ontario biologist who believed that the delay was politically motivated).

80. Kaplan, *supra* note 76; Lyderson, *supra* note 79, at A3.

81. Lyderson, *supra* note 79, at A3 (quoting CDC spokesperson Glen Nowak).

82. Kaplan, *supra* note 76.

83. *Id.*; Lyderson, *supra* note 79, at A3; Letter from Bart Gordon, Chairman, Comm. on Sci. & Tech., U.S. House of Representatives, to Julie Gerberding, Dir., Ctrs. for Disease Control & Prevention 1 (Feb. 6, 2008), available at http://democrats.science.house.gov/Media/File/AdminLetters/bg_bm_nl_toDr.Gerberding_Whistleblower_ATSDR_2.7.08.pdf.

84. Kristin Shrader-Frechette, *Measurement Problems and Florida Panther Models*, 3 SOUTHEASTERN NATURALIST 37, 38 (2004).

85. Native Fish and Wildlife, Endangered Species, 32 Fed. Reg. 4001 (Mar. 11, 1967).

86. Shrader-Frechette, *supra* note 84, at 38.

87. JOHN KOSTYACK & KAREN HILL, NAT'L WILDLIFE FED'N & FLA. PANTHER SOC'Y, DISCREDITING A DECADE OF PANTHER SCIENCE: IMPLICATIONS OF THE SCIENTIFIC REVIEW TEAM REPORT 7 (2004), available at <http://www.nwf.org/nwfwebadmin/binaryVault/Discrediting%20a%20Decade%20of%20Panther%20Science.pdf>.

development proposals. In at least four instances between 1994 and 2004, FWS biologists drafted biological opinions concluding that proposed developments would jeopardize the continued existence of the panther and therefore could not proceed as proposed under the ESA,⁸⁸ only to see those drafts overturned by their supervisors.⁸⁹

In each case, the conclusion that development could proceed rested in significant part on the results of the panther habitat evaluation model (PHEM) developed by David Maehr, a respected panther biologist who left the Florida wildlife agency in the mid-1990s to work on his doctoral degree, eventually becoming an academic⁹⁰ and a consultant.⁹¹ PHEM was used to estimate the habitat value of land slated for development based on weighted scores for six habitat factors. The model and its justification were published in a peer-reviewed journal,⁹² albeit not one specializing in ecology, wildlife biology, or conservation. The article outlining the model relied on years of peer-reviewed publications (in more conventional journals) by Maehr and his collaborators.

By 2002, serious questions had been raised about the PHEM methodology. It had been criticized in the scientific literature, the National Wildlife Federation had issued a report excoriating the continued approval of

88. Section 7 of the ESA mandates that all federal agencies ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or adversely modify a designated critical habitat. 16 U.S.C. § 1536(a)(2) (2000). This requirement is implemented through a procedure known as “consultation,” in which the agency describes its plans to FWS, which determines whether they will have an impermissible effect on listed species. See generally 50 C.F.R. pt. 402 (2007) (providing regulations for interagency cooperation under the Endangered Species Act). If FWS issues a jeopardy opinion at the close of that process, it must suggest “reasonable and prudent alternatives” to the proposed action that would avoid jeopardy. 16 U.S.C. § 1536(b)(3)(A). A high proportion of development proposals in south Florida are subject to the § 7 consultation requirement because the landscape is dotted with wetlands which cannot be filled without obtaining a permit from the U.S. Army Corps of Engineers under Clean Water Act § 404. See 33 U.S.C. § 1344 (2000) (providing rules for issuing permits for dredged or fill material in navigable waters).

89. JOHN KOSTYACK & KAREN HILL, NAT’L WILDLIFE FED’N & FLA. PANTHER SOC’Y, GIVING AWAY THE STORE: FACING MOUNTING SCIENTIFIC CRITICISM, THE FEDERAL GOVERNMENT CONTINUES TO APPROVE DEVELOPMENT IN THE PANTHER’S LAST REMAINING HABITATS 5 (2005), available at <http://www.panthersociety.org/science/GivingAwayTheStore2005.pdf>.

90. See Liza Gross, *Why Not the Best? How Science Failed the Florida Panther*, 3 PLOS BIOLOGY 1525, 1526 (2005) (noting that Maehr left the FWC in 1994 to work on his Ph.D.); Faculty Profile of Dave Maehr, Dep’t of Forestry, Univ. of Ky., <http://www.ca.uky.edu/forestry/maehr.php> (last modified Dec. 22, 2006) (describing Maehr’s position as an associate professor of conservation biology).

91. KOSTYACK & HILL, *supra* note 89, at 4 (describing Maehr as a consultant to developers); Gross, *supra* note 90, at 1527 (explaining that Maehr developed the PHEM while working as a consultant for Lee County, Florida).

92. David S. Maehr & Jonathan P. Dcason, *Wide-Ranging Carnivores and Development Permits: Constructing a Multi-scale Model to Evaluate Impacts on the Florida Panther*, 3 CLEAN TECH. & ENVTL. POL’Y 398 (2002), available at <http://www.springerlink.com/content/8hxujhuxmeqx3cd4/fulltext.pdf>.

development in panther habitat, and Senator Joseph Lieberman of Connecticut had demanded explanations from FWS.⁹³ The agency convened a team of four outside scientists, led by Dr. Paul Beier, to review the panther literature in order to evaluate PHEM. In 2003, that team issued a highly critical report pointing out a lack of support for PHEM's key assumptions.⁹⁴ The team concluded that sufficient information was available by 1993 to produce a more reliable habitat-evaluation tool.⁹⁵

Even after this highly critical review, FWS did not immediately change the panther-conservation strategy it had developed using the PHEM methodology. In May 2004, after sparring for two years with his supervisors over what he saw as pressure to favor development in biological opinions,⁹⁶ and shortly after co-authoring an article criticizing PHEM,⁹⁷ FWS panther biologist Andrew Eller, joined by Public Employees for Environmental

93. KOSTYACK & HILL, *supra* note 89, at 15.

94. PAUL BEIER ET AL., FLA. FISH & WILDLIFE CONSERVATION COMM'N, AN ANALYSIS OF SCIENTIFIC LITERATURE RELATED TO THE FLORIDA PANTHER, FINAL REPORT 14 (2003) [hereinafter BEIER ET AL., ANALYSIS OF SCIENTIFIC LITERATURE], available at <http://oak.ucc.nau.edu/pb1/publications.htm>. The team followed its report with two articles in the peer-reviewed literature. Paul Beier et al., *Evaluating Scientific Inferences About the Florida Panther*, 70 J. WILDLIFE MGMT. 236 (2006) [hereinafter Beier et al., *Evaluating Scientific Inferences*]; Michael J. Conroy et al., *Improving the Use of Science in Conservation: Lessons from the Florida Panther*, 70 J. WILDLIFE MGMT. 1 (2006). Two key assumptions the reviewers found insufficiently supported were that the Florida panther preferred forest habitat and that it was reluctant to cross unforested areas of 90 meters or more. BEIER ET AL., ANALYSIS OF SCIENTIFIC LITERATURE, *supra*, at 10. The preference for forests was supported only by a single radiotelemetry study, which the reviewers concluded was seriously flawed. *Id.* at 7, 9. The article gave the impression that it was based on the tracking of forty-one panthers; in fact only data from twenty-three panthers had been used and the elimination of data from the other eighteen tagged panthers was not even acknowledged, much less explained. *Id.* at 8. Furthermore, the methodology was systematically biased in a way that would tend to overestimate the importance of forest habitat. Beier et al., *Evaluating Scientific Inferences*, *supra*, at 240–41. The claim that panthers are reluctant to cross open areas was simply repeated in the article that set out the model, but when traced back, the article cited in support of this claim did not actually support it. *Id.* at 241–42. Although the article did report that some 96% of panther locations were within 90 meters of forest cover, more than 99% of the observations were made during the day, at a time when panthers are not very active. *Id.* at 242. The lack of nighttime telemetry data was not a deliberate attempt to skew the findings—it is impractical to track collared animals from airplanes at night. See David S. Maehr et al., *Shopping Centers as Panther Habitat: Inferring Animal Locations from Models*, 9(2) ECOLOGY & SOC'Y 9 (2004), available at <http://www.ecologyandsociety.org/vol9/iss2/art9> (citing “[e]quipment limitations and safety issues”). GPS-equipped collars have only recently become available. See *id.* (describing the ongoing, first generation of research into panther habitats using GPS-equipped collars). There are other strong criticisms of Maehr's model. See, e.g., E. Jane Comiskey et al., *Panthers and Forests in South Florida: An Ecological Perspective*, CONSERVATION ECOLOGY 6(1): 18, June 28, 2002, at 13–16, available at <http://www.ecologyandsociety.org/vol6/iss1/art18/print.pdf> (noting that the Maehr model's use of daytime telemetry data overrepresented the importance of forest cover to panther habitats); Shrader-Frechette, *supra* note 84, at 38 (claiming there are seven errors in the Maehr model).

95. Beier et al., *Evaluating Scientific Inferences*, *supra* note 94, at 242.

96. Gross, *supra* note 90, at 1528.

97. E. Jane Comiskey et al., *Evaluating Impacts to Florida Panther Habitat: How Porous is the Umbrella?*, 2 SOUTHEASTERN NATURALIST 51 (2004).

Responsibility, sent FWS a challenge under the Data Quality Act,⁹⁸ demanding the correction of a number of draft and final regulatory documents developed using PHEM.⁹⁹ FWS initially responded by admitting some errors but declining to change its documents pending revision of the multi-species conservation plan.¹⁰⁰ In an appeal of that response, lawyers for Eller explained that:

[He had] experienced considerable pressure (a) to express no views that counter the flawed science the [Vero Beach FWS] office has used in the past and (b) to shade or misrepresent science in the course of his work. Eller was ordered to incorporate flawed information in biological opinions under threat of insubordination. He was later removed from panther work altogether because supervisors feared that he might write a jeopardy biological opinion, which was forbidden in the office. He was instructed not to talk about panthers to colleagues lest he “contaminate their views.”¹⁰¹

Finally, in March 2005, after further questioning by Senator Lieberman and a court decision setting aside a no-jeopardy opinion on a massive rock mine,¹⁰² FWS agreed to revise several documents.¹⁰³

In November 2004, Eller was fired. FWS claimed his job performance was unsatisfactory,¹⁰⁴ among other things, he was accused of not meeting deadlines and of “unprofessional exchanges with the public.”¹⁰⁵ An appeal to the Merit Systems Protection Board resulted in a settlement¹⁰⁶ under which

98. 44 U.S.C. § 3516 (2000).

99. Complaint of Eller & PEER Pursuant to the Data Quality Act of 2000 at 19, *Eller v. Dep’t of the Interior* (U.S. Dep’t of the Interior, U.S. Fish & Wildlife Serv., May 4, 2004), available at <http://www.fws.gov/informationquality/topics/FY2004/Florida%20Panther/Complaint%204%20May%202004.pdf>.

100. KOSTYACK & HILL, *supra* note 89, at 14; Letter from Thomas O. Melius, Assistant Dir. of External Affairs, Fish & Wildlife Serv., to Jeff Ruch, Executive Dir., Pub. Employees for Env’tl. Responsibility & Andrew C. Eller Jr. 3 (July 7, 2004), available at <http://www.fws.gov/informationquality/topics/FY2004/Florida%20Panther/Response%207%20July%202004.pdf>.

101. Appeal of Andrew Eller and Public Employees for Environmental Responsibility (PEER) Pursuant to the Data Quality Act of 2000 at 4, *Eller v. Dep’t of Interior* (U.S. Dep’t of the Interior, U.S. Fish & Wildlife Serv., July 28, 2004), available at <http://www.fws.gov/informationquality/topics/FY2004/Florida%20Panther/Challenge%2028%20July%202004.PDF>.

102. *Nat’l Wildlife Fed’n v. Norton*, 332 F. Supp. 2d 170, 180 (D.D.C. 2004).

103. Letter from Steve Williams, Dir., Fish & Wildlife Serv., to Jeff Ruch, Executive Dir., Pub. Employees for Env’tl. Responsibility 1 (Mar. 16, 2005), available at http://www.fws.gov/informationquality/topics/FY2004/Florida%20Panther/Final_Appeal_Mareh_16_2005.pdf.

104. Eugene Russo, *The Plight of the Whistleblower*, SCIENTIST, Jan. 17, 2005, at 39–40.

105. Gross, *supra* note 90, at 1528.

106. The only public explanation of the settlement was the following statement, posted on an FWS Web site: “Mr. Eller and the U.S. Fish & Wildlife Service have jointly come to an agreement that is in the best interest of both parties and that does not admit any liability or wrongdoing on the part of either party.” Press Release, U.S. Fish & Wildlife Serv., Joint Statement of Andrew Eller and the U.S. Fish & Wildlife Service (June 29, 2005), available at <http://www.fws.gov/southeast/news/2005/r05-057.html>.

Eller was reinstated to FWS but moved to a national wildlife refuge in Kentucky.¹⁰⁷

2. *Outside Agencies: The Fine Line Between Scientific Interpretation and Advocacy.*—Most of the complaints over the last several years have focused on the practice of science within federal agencies. But there are also aspects of the way scientific research is done and presented outside the government that have ramifications in the policy world. One problem is that regulated interests may be able to influence regulatory evaluation through submission of flawed or misleading scientific information. I do not mean to underplay the extent or importance of that problem—anytime the regulatory system is dependent upon information that is peculiarly within the control of those with a strong financial interest in the outcome of the regulatory process there are very real opportunities for scientific review to be hijacked or skewed.¹⁰⁸ But it is important to see this problem in a more general light. Scientists sometimes violate the underlying norms of scientific inquiry in the ways that they collect, interpret, or communicate data with policy consequences, sliding from skeptical evaluation into advocacy in one form or another. Employment by an entity with a financial stake can trigger this kind of role confusion, but so can other sorts of strong policy preferences.

Consider a recent high-profile example from the world of ocean-fisheries research. In 2003, the late Dr. Ransom Myers, a prominent marine biologist, and Boris Worm, his post-doctoral fellow, published a short article in the journal *Nature* claiming that fisheries in the world's oceans had reduced the biomass of large predatory fish more than 90% from pre-industrial levels, with most of that reduction coming in the earliest years of the fisheries.¹⁰⁹ The nonprofit organization SeaWeb issued a three-page press release to accompany the three-page article.¹¹⁰ The article itself noted

107. Press Release, Pub. Employees for Env'tl. Responsibility, Interior Official Responsible for Scientific Fraud Promoted (Feb. 1, 2006), available at http://www.peer.org/news/news_id.php?row_id=637.

108. See, e.g., Deborah E. Barnes & Lisa Bero, *Industry-Funded Research and Conflict of Interest: An Analysis of Research Sponsored by the Tobacco Industry through the Center for Indoor Air Research*, 21 J. HEALTH POL. POL'Y & L. 515, 516–17 (1996) (noting concerns about skewed scientific review in many areas, including studies about the effects of smoking, certain pharmaceuticals, and asbestos); Thomas O. McGarity, *Beyond Buckman: Wrongful Manipulation of the Regulatory Process in the Law of Torts*, 41 WASHBURN L.J. 549, 562 (2002) (noting that regulated industries can manipulate regulating agencies by hiring scientific consultants to refute adverse scientific studies); Wendy Wagner & David Michaels, *Equal Treatment for Regulatory Science: Extending the Controls Governing the Quality of Public Research to Private Research*, 30 AM. J.L. & MED. 119, 120 (2004) (mentioning that regulated industries that fund scientific research regarding their industry have strong incentives to influence the outcomes).

109. Ransom A. Myers & Boris Worm, *Rapid Worldwide Depletion of Predatory Fish Communities*, 423 NATURE 280, 282 (2003).

110. Press Release, SeaWeb, Cover Study of *Nature* Provides Startling New Evidence that Only 10% of All Large Fish are Left in Global Ocean (May 14, 2003), available at <http://ram.biology.dal.ca/~myers/dpletion/docs/MyersWormFinalPR.pdf>. SeaWeb describes itself

that its conclusions had “important management implications,”¹¹¹ but the language in which it described those implications was tempered.¹¹² The press release was more aggressive, calling for “a minimum reduction of 50% of fishing mortality.”¹¹³ The article generated stories in publications like the *Washington Post* and *The Economist*, as well as interviews on CNN, the BBC, and NPR.¹¹⁴ Myers also testified at a U.S. Senate committee hearing on global overfishing.¹¹⁵

Subsequently, serious concerns were raised about the quality of the Myers and Worm article. The article drew several independent critiques,¹¹⁶ focused primarily on the inappropriateness of drawing conclusions about abundance from limited data on catch rates. Those critiques, however, were not published in such high-profile journals or with such fanfare.¹¹⁷ It is unlikely that they reached an audience as large the audience exposed to the initial article and press release.¹¹⁸

as “a communications-based nonprofit organization that uses social marketing techniques to advance ocean conservation.” SeaWeb—About SeaWeb, <http://seaweb.org/about.php>.

111. Myers & Worm, *supra* note 109, at 282.

112. *See id.* at 282–83 (arguing that managers need to consider the potential ecosystem effects of fisheries, be aware of the possibility of local extinctions, pay more attention to the sustainability of fishing practices, and “attempt restoration on a global scale”).

113. Press Release, SeaWeb, *supra* note 110, at 3.

114. *See* Tom Polacheck, *Tuna Longline Catch Rates in the Indian Ocean: Did Industrial Fishing Result in a 90% Rapid Decline in the Abundance of Large Predatory Species?*, 30 MARINE POL’Y 470, 471 (2006) (mentioning the many interviews and stories in the print news media that the Myers and Worm article generated).

115. *Global Overfishing and International Fisheries Management: Hearing Before S. Comm. On Commerce, Sci., and Transp.*, 108th Cong. (2003).

116. *See, e.g.*, John Hampton et al., *Decline of Pacific Tuna Populations Exaggerated?*, 434 NATURE E1, E1 (2005) (stating that the biomass and fishing impacts are in fact much less severe than the Myers and Worm article suggests); Polacheck, *supra* note 114, at 471 (noting that Myers and Worm’s reliance on catch-rate data likely skewed their results); Carl Walters, *Folly and Fantasy in the Analysis of Spatial Catch Rate Data*, 60 CANADIAN J. FISHERIES & AQUATIC SCI. 1433, 1433–34 (2003) (arguing that Myers and Worm misused catch-rate data in a way that placed inordinate weight on heavily fished cells but not on others). The critics were careful to note that their concerns with the Myers article should not be taken to suggest that there were no problems with the status of large predatory fish. *See, e.g.*, Polacheck, *supra* note 114, at 481 (emphasizing that serious concerns exist regarding the status of many stocks currently being fished).

117. *Nature* refused to publish a letter submitted by a group of tuna experts critical of the Myers article because, according to the editors, it did not “take our knowledge forward in some discernible way.” Polacheck, *supra* note 114, at 480 (quoting Joint Inst. for Marine & Atmospheric Research, *Changes in the Biomass of Large Pelagic Predators*, http://www.soest.hawaii.edu/PFRP/large_pelagic_predators.html (last updated May 21, 2004)). Eventually, the letter was published solely as an online communication, long after the original article. Hampton et al., *supra* note 116, at E1.

118. It is clear that critiques and rebuttals in the scientific literature are not always effective, or at least not quickly effective. “Even after the rebuttals are published, the original papers continue to be cited by scientists and referred to by policy makers as if they are fact.” Michael Sissenwine, Comment, *Environmental Science, Environmentalism and Governance*, 34 ENVTL. CONSERVATION 90, 90 (2007).

Ordinarily, disagreements in the scientific literature are fairly impersonal and bland; scientists attack each other's methods, results, and conclusions vigorously but do not accuse each other of stepping outside the scientist's role. In this case, however, that was the key charge. Tom Polacheck wrote that Myers and Worm had violated the basic scientific principles of full consideration of alternative explanations, accurate use of the scientific literature cited, and clear separation of scientific results from policy implications.¹¹⁹ Their article and the way it was published, Polacheck argued, "tended to pre-empt substantive debate," and served primarily as a platform for Myers and Worm to advocate their preferred policy outcomes of substantial reduction in fisheries.¹²⁰ Ray Hilborn later cited the Myers and Worm article, along with several others about the collapse of global fisheries, as evidence of "failure of the peer review system and lack of the basic skepticism needed in science."¹²¹ Hilborn suggested that belief in the need to radically change fisheries management had become so strong in some circles that "[c]ritical peer review has been replaced by faith-based support for ideas and too many scientists have become advocates. An advocate knows the answer and looks for evidence to support it; a scientist asks nature how much support there is for competing hypotheses."¹²²

This is just one example of a long-standing debate about the role of scientists as activists and the separation of advocacy from rigorous science. Political scientist Roger Pielke, Jr., has observed that some scientists "increasingly seem to be equating particular scientific findings with political and ideological perspectives."¹²³ He warns:

If scientists evaluate the research findings of their peers on the basis of political perspectives, then "scientific" debate among academics risks morphing into political debates. From the perspective of the public or policy makers, scientific debate and political debate on many environmental issues already have become indistinguishable, and such cases of conflation limit the role of science in the development of creative and feasible policy options. In many instances science, particularly environmental science, has become little more than a mechanism of marketing competing political agendas, and scientists have become leading members of the advertising campaigns.¹²⁴

119. Polacheck, *supra* note 114, at 479.

120. *Id.*

121. Ray Hilborn, *Faith-Based Fisheries*, 31 *FISHERIES* 554, 554 (2006).

122. *Id.* at 555.

123. Roger A. Pielke, Jr., *When Scientists Politicize Science: Making Sense of Controversy Over The Skeptical Environmentalist*, 7 *ENVTL. SCI. & POL'Y* 405, 405 (2004).

124. *Id.* at 405-06.

III. Integrity in Policy Decisions

Two distinct features are critical to good environmental policy: factual accuracy—a clear view of what the available evidence does and does not reveal about the environmental impacts of the status quo and available alternatives; and political legitimacy—adherence to societal values and trade-offs arrived at through the democratic process. The first requires *scientific integrity*, the second *political integrity*. Integrity in general is about adhering to principles rather than bending those principles to rationalize convenient actions.¹²⁵ At the base level, scientific and political integrity are much the same. They are analogous forms of professional virtue, requiring honest, principled performance of a professional role, resisting what may be strong temptations to put one's personal preferences or benefit first.

A. *Understanding Scientific Integrity*

Environmental-policy goals cannot be sensibly pursued without an accurate understanding of what is known of the scientific context, the likely consequences of alternative decisions for the natural world, and human goals. This does not mean that decisions cannot be made under uncertainty—it is a truism that environmental-policy choices must almost always be made in the face of significant uncertainties. Sound choices depend not on certainty but on awareness of uncertainties and their possible consequences. Scientific integrity in the development, gathering, presentation, and interpretation of evidence helps ensure that decisions are supported by the best current understanding of the facts.

1. *Scientific Integrity in Research.*—The term *scientific integrity* gained prominence in the regulatory arena in 1989 with the establishment in the Department of Health and Human Services (HHS) of the Office of Scientific Integrity (known today as the Office of Research Integrity) in response to the perception, which was heightened by several highly publicized instances of scientific fraud, that the scientific community was not doing an adequate job of policing itself.¹²⁶ Scientists and federal science-funding agencies joined the calls of politicians for enhanced oversight because they were concerned

125. See David Luban, *Integrity: Its Causes and Cures*, 72 *FORDHAM L. REV.* 279, 298–99 (2003). (“The low road to integrity is simply not the same as the high road, and bending your principles to rationalize your actions is not the same as bringing your actions into conformity with your principles.”).

126. See David P. Hamilton, *Can OSI Withstand a Scientific Backlash?*, 253 *SCIENCE* 1084, 1084 (1991) (explaining the creation of the Office of Scientific Integrity); Chris B. Pascal, *The History and Future of the Office of Research Integrity: Scientific Misconduct and Beyond*, 5 *SCI. & ENGINEERING ETHICS* 183 (1999) (explaining the origin, early years, current successes and failures, and future of the Office of Research Integrity).

that public support for federal science funding, and public respect for science more generally, might be diminished.¹²⁷

Despite its name, the Office of Scientific Integrity never tried to affirmatively define scientific or research integrity. Instead, it defined the sanctionable opposite of integrity, scientific misconduct (later called research misconduct). Soon a number of other federal granting agencies, including the Department of Energy, NASA, and the National Science Foundation, issued their own regulations prohibiting scientific misconduct by grantees. Those regulations differed in their details, causing confusion in the scientific community. In 2000, the President's Office of Science and Technology Policy issued a unified policy applicable to all federal-research-grant recipients.¹²⁸ This policy, which remains in effect, defines research misconduct as "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results."¹²⁹ It notes that research misconduct does not include "honest error or differences of opinion."¹³⁰

The research-misconduct policy is intended to protect the accuracy and reliability of the research record, and to promote public confidence in the research process.¹³¹ It responds to several overlapping interests: that of the federal taxpayer in getting value for the federal-grant dollar, that of the general public in furthering the advance of scientific knowledge, and that of the honest scientific community in maintaining a level playing field for competition. By negative implication, the policy identifies scientific integrity as the practice of research without misconduct.

The federal government promotes this vision of scientific integrity in two major ways. First, federal grantees who commit research misconduct are potentially subject to a variety of severe sanctions. They may be declared ineligible for future federal funding,¹³² their employers may impose their own

127. COMM. ON ASSESSING INTEGRITY IN RESEARCH ENV'TS, NAT'L RESEARCH COUNCIL, INTEGRITY IN SCIENTIFIC RESEARCH: CREATING AN ENVIRONMENT THAT PROMOTES RESPONSIBLE CONDUCT I (2002) [hereinafter INTEGRITY IN SCIENCE] ("The public will support science only if it can trust the scientists and the institutions that conduct research.").

128. Federal Policy on Research Misconduct, 65 Fed. Reg. 76,260 (Dec. 6, 2000). The policy is codified at 10 C.F.R. § 733.1 (2007) (as it applies to the Department of Energy); 14 C.F.R. § 1275.101 (2007) (as it applies to NASA); 42 C.F.R. § 93.103 (2007) (as it applies to the Public Health Service); and 45 C.F.R. § 689.1 (2007) (as it applies to the National Science Foundation).

129. 65 Fed. Reg. at 76,262.

130. *Id.*

131. *Id.* at 76,260, 76,262.

132. See, e.g., 42 C.F.R. § 93.407 (describing administrative sanctions that can be imposed on Public Health Service grantees). Loss of eligibility for federal funding can terminate a scientific career. See Dan L. Burk, *Research Misconduct: Deviance, Due Process, and the Disestablishment of Science*, 3 GEO. MASON INDEP. L. REV. 305, 322 (1995) ("Given the dependence of researchers on federal funding, and the expectation of universities and other institutions that scientists will find their own funding, debarment is tantamount to excluding a scientist from practicing her profession for the period of the sanction.").

sanctions, the funding agency may seek to recover misspent grant funds,¹³³ and in egregious cases scientists have been subject to criminal as well as civil penalties.¹³⁴ Second, federally funded institutions (in other words, essentially every research university in the United States) must “foster a research environment that promotes the responsible conduct of research,”¹³⁵ an obligation fulfilled primarily by offering graduate classes on the topic of responsible research; the institutions must also have an administrative process for investigating charges of misconduct.¹³⁶

2. *A Broader View of Scientific Integrity.*—The federal research-misconduct policy is far too limited to ensure appropriate use of science in policy decisions. It applies only as a condition of federal-grant funding. It does not cover other sources of information that may be relevant to the policy context, nor does it apply to the participation of scientists in policy debates or to the evaluation of information by agency scientists as part of the policy process.

Even if it covered the full universe of policy-relevant scientific activities, the misconduct policy does not go far enough to ensure scientific integrity at the science–policy interface. It addresses only the most serious scientific misdeeds—those scientific sins that, in the judgment of Congress and the funding agencies, sufficiently threaten the research enterprise to merit severe external sanctions. The effective use of science requires of those acting in a professional scientific role more than refraining from sin. It requires that they practice the virtue of scientific integrity, or at least continuously and consciously struggle to do so.

133. The False Claims Act permits recovery by the United States, on its own behalf or through the intervention of a relator, of money fraudulently obtained from the United States. 31 U.S.C. § 3729 (2000); see, e.g., Lorelei Ritchie de Larena, *The Price of Progress: Are Universities Adding to the Cost?*, 43 HOUS. L. REV. 1373, 1404–08 (2007); Bratislav Stankovic, *Pulp Fiction: Reflections on Scientific Misconduct*, 2004 WIS. L. REV. 975, 995–1001; Nisan A. Steinberg, *Regulation of Scientific Misconduct in Federally Funded Research*, 10 S. CAL. INTERDISC. L.J. 39, 84–87 (2000) (all discussing the details of several False Claims Act suits based on research misconduct). See generally Burk, *supra* note 132, at 324–27; Christopher P. Perzan, *Research and Relators: The False Claims Act and Scientific Misconduct*, 70 WASH. U. L.Q. 639, 655–63 (1992) (both discussing the suitability of *qui tam* actions in this context).

134. See Burk, *supra* note 132, at 322–23 (describing a variety of statutes that could be used to impose criminal and civil sanctions for research misconduct); Stankovic, *supra* note 133, at 1001–03 (discussing the availability of criminal sanctions as well as an instance of a researcher being criminally prosecuted for misconduct); see also Press Release, Office of Research Integrity, U.S. Dep’t of Health & Human Servs., Dr. Eric T. Poehlman (Mar. 17, 2005), available at http://ori.dhhs.gov/misconduct/cases/press_release_poehlman.shtml (providing an example of a settlement of criminal charges arising from research misconduct). Of course, the reputational damage and public shaming that accompany the full range of sanctions is also intended to deter misconduct.

135. 42 C.F.R. § 93.300(e).

136. 42 C.F.R. §§ 93.300(a), (b), 93.304–93.316.

Scientific integrity is, in fact, a quality most scientists aspire to develop. The elements of integrity are not often discussed in detail, but there is a kind of general background notion that it represents the way scientists should act. Free of regulatory overtones, the concept of scientific integrity focuses on conduct consistent with broad professional norms that go far beyond simply not falsifying results or plagiarizing another's work. A National Research Council report provides a good starting point for understanding more clearly what scientific integrity entails: "For a scientist, integrity embodies above all the individual's commitment to intellectual honesty and personal responsibility. It is an aspect of moral character and experience . . ."¹³⁷

Philosopher of science (and law professor) Susan Haack describes the traits most needed by professional scientists and other empirical inquirers. What scientists do, she points out, is make informed conjectures, test them against the available evidence, and decide whether to accept, revisit, extend, or modify them. Doing that well requires:

. . . imagination, to think up plausible potential explanations of problematic phenomena, to devise ways to get the evidence they need, and to figure out potential sources of error; care, skill, and persistence, to seek out any relevant evidence no one yet has, as well as relevant evidence others have; intellectual honesty, the moral fiber to resist the temptation to stay out of the way of evidence that might undermine their conjectures, or to manipulate unfavorable evidence they can't avoid; rigorous reasoning, to figure out the consequences of their conjectures; and good judgment in assessing the weight of evidence, unclouded by wishes or fears or hopes of getting tenure or resolving a case quickly or pleasing a patron or mentor or becoming rich and famous.¹³⁸

The last three of these traits—intellectual honesty, rigorous reasoning, and unclouded judgment—together comprise the virtue of scientific integrity.¹³⁹

Objectivity is widely recognized as the key norm of science.¹⁴⁰ What Haack's description adds to the picture is the continual force of temptation

137. INTEGRITY IN SCIENCE, *supra* note 127, at 4.

138. SUSAN HAACK, DEFENDING SCIENCE—WITHIN REASON: BETWEEN SCIENTISM AND CYNICISM 97 (2003).

139. For a slightly different view of scientific integrity, see Gerald Holton, *Candor and Integrity in Science*, 145 SYNTHESIS 277, 284–90 (2005). Holton lists four principles of scientific integrity, including: (1) trying "to get it right at all costs, sparing no effort"; (2) trying "to be a scientist first, a specialist second"; (3) recognizing that "[s]cience is, and should be, part of the total world view of our time" and that this is "a vision [one] should imaginatively explore, defend, and contribute to"; and (4) "the last and most demanding of the principles of integrity: the special obligation scientists have to exercise sound citizenship." *Id.* at 284, 286, 288, 290.

140. See, e.g., Deborah M. Hussey Freeland, *Maieusis Through a Gated Membrane: "Getting the Science Right" in Public Decisionmaking*, 26 STAN. ENVTL. L.J. 373, 382 (2007) ("[T]he scientific method, the practice of ensuring that results are reproducible, and the peer review process are all designed to wash the subjective perspective of the scientist out of the process of science, so that in the ideal limit, only nature remains to speak for itself.").

and the many ways in which objectivity can be compromised. Scientific integrity is hard work and often thankless or even costly to the scientist. Integrity is most critical, and most difficult to attain, when the evidence is uncertain or incomplete and the scientist is heavily invested in a particular policy outcome; in other words, scientific integrity is most important and most elusive under precisely the sorts of conditions typical of environmental-policy conflicts.¹⁴¹ It requires a kind of fierce honesty, and an accompanying constant self-consciousness and vigilant skepticism about one's own (and others') motives, biases, and shortcomings. It is motivated not by the fear of regulatory sanctions but by an ethic or sense of duty which "impels scientists to do their best to interrogate nature without distorting it, and to articulate the data with which nature responds with minimal interference from their own prejudices."¹⁴² That ethic, I believe, is in turn motivated by the sense, deeply ingrained over the course of a professional scientific education, that the scientific enterprise can succeed only if most of its practitioners act with integrity most of the time. Like other virtues, scientific integrity is an aspiration that every scientist falls short of from time to time. The conscious act of trying to achieve it, however, does much to ensure that information accumulated by and shared among scientists approximates a true picture of the world.

While scientific integrity as a positive concept is considerably more demanding than the avoidance of scientific misconduct, it shares one important feature with that regime. Scientific integrity allows for the honest difference of opinion. Different ways of imagining the world, different judgments about what current evidence may signify, and different intuitions about what new investigations might reveal are essential to the progress of scientific knowledge. Any attempt to evaluate the degree of scientific integrity behind a particular set of actions must therefore grapple with drawing difficult lines between professionally acceptable inferences, intuitions, and conclusions, and those that lie outside the relevant professional boundaries.

3. *Scientific Integrity in the Policy Arena.*—In order to be effective, environmental policy must be informed by the best current understanding of how nature works. The great strength of science is that its methods allow the closest approach to that understanding. Therefore, the best available scientific information is an essential input to environmental-policy decisions. Since scientific integrity provides the best assurance that scientific information is complete, accurate, and honestly presented, it is highly

141. See, e.g., David E. Adelman, *The Art of the Unsolvable: Locating the Vital Center of Science for Environmental Law and Policy*, 37 ENVTL. L. 935, 957–58 (2007) (noting the special concerns about objectivity in the face of highly uncertain or incomplete evidence that underlie conflicts about the science that informs environmental policy).

142. Freeland, *supra* note 140, at 383.

desirable in the production and presentation of information to the policy process. But the scientific treatment of information does not end at the policy gate. A great many judgments about the relative usefulness of competing data, the inferences to be drawn fairly from incomplete data, and the extent and nature of remaining uncertainties must be made in the course of translating data into the information needed to support policy decisions. Scientific integrity is a highly desirable trait for those acting in a scientific role throughout this process.

Just as there is nothing fundamentally exceptional about scientific inquiry as compared with other empirical reasoning,¹⁴³ there is nothing fundamentally exceptional about the need for integrity in the presentation of scientific information to the policy process, or its treatment within that process. This is just one example of a more general problem. In any situation where the facts matter to policy decisions, it is important that analysts honestly and forthrightly (that is, with integrity) bring their best understanding of the facts, and of the uncertainty surrounding their understanding of the facts, into the policy process.¹⁴⁴

The importance of scientific integrity has been recognized in a variety of regulatory and policy contexts. Perhaps the earliest formal recognition came from the Council on Environmental Quality (CEQ) in its 1978 implementing regulations for the National Environmental Policy Act.¹⁴⁵ Those regulations require that federal agencies “insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements.”¹⁴⁶ The Council provided little indication of what it meant by “scientific integrity” or how agencies were to insure it. The quoted regulation goes on to say only that agencies must identify their methodologies and information sources.¹⁴⁷ In the regulations’ supplementary information, CEQ also connected a separate provision, one requiring federal agencies to independently evaluate information provided by the applicant, to its concern for scientific integrity.¹⁴⁸ The federal courts have interpreted

143. See HAACK, *supra* note 138, at 94–98 (arguing that scientific inquiry is not categorically different from other types of empirical inquiry).

144. For example, a review of the intelligence leading up to the Iraq War describes the role of intelligence analysts in terms that could just as easily be applied to policy-relevant science: “Analysts must assess the available information and place it in context. They must clearly and concisely communicate the information they have, the information they need, the conclusions they draw from the data, and their doubts about the credibility of the information or the validity of their conclusions.” COMM’N ON THE INTELLIGENCE CAPABILITIES OF THE U.S. REGARDING WEAPONS OF MASS DESTRUCTION, REPORT TO THE PRESIDENT OF THE UNITED STATES 416 (2005), available at http://www.wmd.gov/report/wmd_report.pdf.

145. 42 U.S.C. §§ 4321–4347 (2000).

146. 40 C.F.R. § 1502.24 (2007).

147. *Id.*

148. Implementation of Procedural Provisions, 43 Fed. Reg. 55,978, 55,980 (Nov. 29, 1978). The independent-evaluation regulation is codified at 40 C.F.R. § 1506.5(a) (2007).

NEPA's scientific-integrity requirement to mandate that agencies disclose the shortcomings of the information, analytic methods, and models that underlie their decisions.¹⁴⁹

Federal agencies routinely endorse scientific integrity, even while they are accused of ignoring it. In its strategic plan for 2007–2012, for example, the Department of the Interior, the agency most criticized for poor use of science in recent years, explains: “Integrity must remain the foundation of all Department of the Interior science: impartiality, honesty in all aspects of scientific enterprise, and a commitment to making that information available to the public as a whole.”¹⁵⁰ In the plan, Interior asserts that it is “continu[ing] to refine a science code of conduct for all employees, contractors, consultants and managers who deal with science in their daily work.”¹⁵¹

While Interior has yet to issue a general code of scientific conduct, it has established one for the U.S. Geological Survey (USGS), a nonregulatory agency that is the Department's primary source of internal scientific advice and has a long-established reputation for quality science. In addition to requiring that all USGS employees comply with the federal policy on research misconduct, the code invokes the general aspirational norms of scientific practice by requiring (among other things) that USGS scientists conduct, interpret, and communicate the results of scientific activities honestly, objectively, thoroughly, and expeditiously; that they disclose methods and data fully “consistent with applicable laws and policy”; and that they “differentiate among facts, opinions, hypotheses, and professional judgment in reporting the results of scientific activities to others.”¹⁵²

Outside government, the question of what characterizes appropriate scientific conduct at the interface of science and policy has long troubled conservation biologists, who by-and-large chose their field out of devotion to the natural world. As Reed Noss, one of the founders of the discipline, has said, “the entire field rests on the value assumption that biodiversity is good and ought to be conserved. Human actions that protect and restore biodiversity are good; those that destroy or degrade biodiversity are bad.”¹⁵³ Most conservation biologists undoubtedly share this view, although they might not put it quite so starkly. Valuing the natural world highly does not necessarily compromise scientific integrity. However, strongly held personal

149. See, e.g., *Lands Council v. Powell*, 395 F.3d 1019, 1032 (9th Cir. 2005) (“NEPA . . . requires up-front disclosures of relevant shortcomings in the data or models.”).

150. DEP'T OF THE INTERIOR, GPRA STRATEGIC PLAN FISCAL YEAR 2007–2012 32, available at http://www.doi.gov/ppp/Strategic%20Plan%20FY07-12/strat_plan_fy2007_2012.pdf.

151. *Id.*

152. U.S. GEOLOGICAL SURVEY MANUAL, 500.25–SCIENTIFIC INTEGRITY, para. 7, <http://www.usgs.gov/usgs-manual/500/500-25.html>.

153. Reed F. Noss, *Values Are a Good Thing in Conservation Biology*, 21 CONSERVATION BIOLOGY 18, 18 (2007).

values can add one more stress to the already difficult task of maintaining scientific integrity. Of course, personal values are not the only thing that can affect a scientist's honesty or objectivity. Financial conflicts of interest, such as employment by developers, can certainly sway interpretations, and such conflicts occur often in conservation consulting.¹⁵⁴ But the threat posed by strong personal values may be more insidious because it is easier to overlook and, when detected, easier to rationalize as ethical.

There are two reasons why conflicts between personal values and good scientific practice can be difficult to uncover. The first is that it is easy to perceive one's own values as universal and noncontrovertible, that is, effectively not to see them as values at all. With respect to the specific values that underlie conservation biology—placing high importance on protection of the natural world relative to economic development—graduate education in a conservation-related science may exacerbate that natural tendency. Graduate students spend most of their time with others in their field or closely related fields, who are very likely to share that basic value system. In my experience as an occasional teacher of ecology graduate students, the assumption that there can be only one view about the relative value of conservation is widespread among them. If scientists do not recognize their values as such, and fail to concede the possibility that others might hold different values, they cannot consciously monitor the extent to which their values influence their scientific work.

Second, scientific judgments and value judgments are often closely intertwined, as demonstrated in the discussion of the *MacDonald Report* above.¹⁵⁵ Disputes about whether hatchery salmon should be considered in listing decisions under the Endangered Species Act provide an example. In 2001, a federal court called into question the NMFS's policy on treatment of hatchery fish, which was that hatchery fish, no matter how closely related to endangered wild runs, would not be treated as listed unless they were deemed essential to recovery.¹⁵⁶ In the course of developing a new hatchery policy, NMFS sought the advice of a panel of independent scientists.¹⁵⁷ The panel's view was that hatchery fish should never be considered in making listing decisions.¹⁵⁸ When its advice was neither followed nor made public, the

154. See, e.g., David H. Wright, Letter, *The Advocacy and Science Divide*, 21 CONSERVATION BIOLOGY 901, 901 (2007) (arguing that advocacy in favor of development is more pervasive in the scientific community than advocacy in favor of conservation); *supra* section II(C)(1) (discussing the Florida panther-habitat model).

155. See *supra* subpart II(A).

156. *Alsea Valley Alliance v. Evans*, 161 F. Supp. 2d 1154, 1162 (D. Or. 2001).

157. Craig Welch, *Salmon Panel Goes Public in Dispute Over Hatchery Fish*, SEATTLE TIMES, Mar. 26, 2004, at B1.

158. Ransom A. Myers et al., *Hatcheries and Endangered Salmon*, 303 SCIENCE 1980, 1980 (2004); Welch, *supra* note 157, at B1.

panel published its conclusions in the journal *Science*.¹⁵⁹ Members of the panel complained to the press that politics had been allowed to trump science.¹⁶⁰ In fact, science and values are nearly impossible to separate in this context. The advisory panel started from the value-based premise that wild fish must be protected.¹⁶¹ For them, the key scientific evidence dealt with the impact of hatchery fish on wild stocks. NMFS started from the premise that hatchery fish and wild fish should not be treated differently unless a detectable genetic difference justified the distinction.¹⁶² I believe that premise is both incorrect as a matter of law¹⁶³ and undesirable as a matter of policy, but it cannot be described as “scientifically” incorrect. Still, the science and values are sufficiently intermingled that the advisory group could easily miss the distinction, especially if its members thought the importance of protecting wild fish was simply beyond question. Congress often encourages this sort of confusion in natural-resource legislation by using scientific terminology or calling for decisions to be made on the basis of science without openly acknowledging or providing guidance for the accompanying value choices.¹⁶⁴

Finally, even if they do recognize the points at which values might influence scientific judgments, conservation scientists may not automatically view that sort of influence as unacceptable. Many no doubt agree with Reed Noss that they “have an ethical obligation to make a powerful case for the conservation of biodiversity to everyone, everywhere.”¹⁶⁵ That ethic could help scientists justify or rationalize exaggerating for emphasis, drawing conclusions that are not quite justified, or accompanying their publications

159. Myers et al., *supra* note 158, at 1980.

160. See, e.g., Timothy Egan, *Shift on Salmon Reignites Fight on Species Law*, N.Y. TIMES, May 9, 2004, at A1 (quoting Myers as saying, “This is a direct political decision, made by political people to go against the science.”); Kenneth R. Weiss, *Action to Protect Salmon Urged: Scientists Say Their Advice Was Dropped from a Report to the U.S. Fisheries Service*, L.A. TIMES, Mar. 26, 2004, at B1 (quoting various panel members who were upset that their findings were not afforded weight in the decision-making process); Welch, *supra* note 157, at B1 (quoting panel chair Robert Paine as saying, “[w]e felt our report was being censored”).

161. See Myers et al., *supra* note 158, at 1980 (criticizing the *Alsea Valley* decision on the basis that it could have the devastating consequence that “[w]ild salmon could decline or go extinct while only hatchery fish persist”).

162. *Alsea Valley Alliance v. Evans*, 161 F. Supp. 2d 1154, 1158 (D. Or. 2001).

163. See Holly Doremus, *Restoring Endangered Species: The Importance of Being Wild*, 23 HARV. ENVTL. L. REV. 1, 10–15 (1999) (explaining that the goal of the Endangered Species Act is the recovery of wild species).

164. See, e.g., Doremus, *supra* note 34, at 1035–36 (explaining that endangered-species legislation is often written in scientific terms, but many regulatory decisions call for both policy and scientific judgments). Scientists were recently charged with the task of developing a policy for maintaining the “biological integrity” and “environmental health” of national wildlife refuges. Brian Czech, Letter, *The Advocacy and Science Divide*, 21 CONSERVATION BIOLOGY 902, 902 (2007). Those management standards are mandated by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. § 668dd(a)(4)(B) (2000).

165. Noss, *supra* note 153, at 20.

with dramatic press releases. Scientists who care deeply about conservation outcomes will be especially tempted to stray from the path of integrity if they believe that the political system is failing to react quickly enough to a conservation crisis, and that their endorsement of action might help speed the adoption of conservation measures.¹⁶⁶

B. *Understanding Political Integrity*

Just as scientific integrity reflects an aspirational code of virtuous conduct for professional scientists, political integrity provides an aspirational code of virtuous conduct for professional political actors. That might sound like an odd thing in a country in which distrust of politicians and cynicism about politics is rampant to the point that “politics” is a dirty word in almost any context.¹⁶⁷ But the concept is neither new nor odd.

I use the term *political integrity* to refer to the professional obligations of agency personnel rather than elected representatives.¹⁶⁸ *Bureaucratic integrity*, therefore, might be a more accurate descriptive term. I prefer the term *political integrity* because, just as scientific integrity allows the scientific process to function the way it is supposed to do, political integrity is essential to the proper functioning of the political process.

Political integrity, like scientific integrity, requires the recognition and observance of role boundaries. Achieving political integrity requires that agency employees observe their assigned roles in the process of making and implementing policy. One aspect of this is adhering, in good faith, to governing legislative mandates. Another aspect is being explicit about places where the actor believes the governing law leaves room for the agency to make policy choices, and openly acknowledging the choices made. Only if political choices are apparent can the agency be held to account, either through the electoral process or by other mechanisms such as judicial review, oversight hearings, and budget control.

166. See *id.* at 19 (“If credible scientists go on record in support of a particular course of action, then that action may be more assured than if the scientists simply say to policy makers ‘here are the facts, you choose the action.’”).

167. See Jeffrey M. Jones, *Low Trust in Federal Government Rivals Watergate Era Levels*, GALLUP NEWS SERVICE, Sept. 26, 2007, <http://www.gallup.com/poll/28795/Low-Trust-Federal-Government-Rivals-Watergate-Era-Levels.aspx> (summarizing the results of a September 2007 poll of Americans regarding their trust of elected leaders).

168. My use of the term is distinct from Ronald Dworkin’s. In *Law’s Empire*, Dworkin speaks of political integrity as the obligation of the state to act on a consistent set of principles, implemented by legislatures enacting laws that are holistically coherent and judges enforcing the law as a coherent whole. RONALD DWORIN, *LAW’S EMPIRE* 165–67 (1986). My use of the term is more practical and pragmatic, and closer to that of Justice Souter, who listed “the capacity of this democracy to represent its constituents and the confidence of its citizens in their capacity to govern themselves” as the elements of political integrity. *FEC v. Wis. Right to Life*, 127 S. Ct. 2652, 2689 (2007) (Souter, J., dissenting). I use the term political integrity to refer to the type of conduct by agency personnel that maximizes both the fidelity of government to the will of the people and the people’s confidence in government.

1. *Bureaucracy and the Principal-Agent Problem.*—In representative democracies there is always a principal-agent problem between the people and their elected representatives, who may have different goals and who can only be imperfectly monitored. In the United States, the strong separation of powers between the Executive and Legislative Branches creates a second-level principal-agent problem between the legislature and the bureaucracy.¹⁶⁹ The bureaucracy is responsible for the lion's share of implementing policy, and also for a substantial share of policy development.

In a frictionless world, statutes would move seamlessly from enactment to implementation to enforcement. But the world does not operate that way. As Professor Daniel Farber has pointed out, "slippage" is pervasive, to the point that the law on the ground is often much different from the law on the books, and implementing regulations may only remotely resemble legislative expectations.¹⁷⁰ The principal-agent problem is an important factor in slippage. Agencies are unlikely to share the precise mix of goals that motivated the legislation they implement. In addition, they face budget constraints and focused political pressures that can push them in directions other than those intended by the legislature. In order to minimize slippage, legislatures must find or create mechanisms for controlling agencies.¹⁷¹

The structure of environmental law makes the principal-agent problem particularly daunting in environmental policy. One way Congress can control its agents is to draft narrow, highly specific statutes. Although mounting legislative frustration has led to a handful of extraordinarily specific provisions in environmental statutes,¹⁷² that is still the rare exception. Most environmental statutes delegate authority in highly general terms,¹⁷³ because the legislature either cannot settle on more specific terms or is unwilling to take the political heat for doing so. In addition, there is reason

169. See Sidney A. Shapiro & Rena I. Steinzor, *The People's Agent: Executive Branch Secrecy and Accountability in an Age of Terrorism*, 69 LAW & CONTEMP. PROBS. 99, 102–05 (2006) (applying agency theory to the public's relationship with the federal government and identifying agency costs in the implementation of legislation by the Executive).

170. See Daniel A. Farber, *Taking Slippage Seriously: Noncompliance and Creative Compliance in Environmental Law*, 23 HARV. ENVTL. L. REV. 297, 300–11 (1999) (documenting the damaging effects of widespread slippage in the implementation of environmental legislation).

171. Some observers view many legislative decisions about agency structure and administrative procedures as attempts to tighten control over bureaucratic agents. See, e.g., Terry M. Moe, *Political Control and the Power of the Agent*, 22 J.L. ECON. & ORG. 1, 3–4 (2005) (surveying the scholarship on the mechanisms employed by legislatures to regulate bureaucrats).

172. See, e.g., Clean Air Act, 42 U.S.C. § 7412(b)(1) (2000) (listing 189 hazardous air pollutants for which EPA must set emission standards).

173. See, e.g., *id.* § 7409 (directing EPA to set national ambient-air-quality standards that, in the judgment of the Administrator, are "requisite to protect the public health" and "allow an adequate margin of safety"); 43 U.S.C. §§ 1702(c), 1712(c) (2000) (directing the Bureau of Land Management to manage lands under its supervision under the "principles of multiple use," defined as the management of the lands and their resources "so that they are utilized in the combination that will best meet the present and future needs of the American people").

to suspect that agencies may be subject to capture by regulated industries in ways that enhance slippage from environmental goals.¹⁷⁴

Judicial review is another tool for keeping errant agencies in line, but two doctrines limit its effectiveness in environmental policy. First, the *Chevron* doctrine requires that courts defer to reasonable agency interpretations of ambiguous statutes.¹⁷⁵ Because environmental statutes are nearly always at least somewhat ambiguous, *Chevron* provides an opportunity for courts to avoid difficult oversight tasks. It is not clear that *Chevron* actually changes many decisions,¹⁷⁶ but at a minimum it complicates efforts to use the judiciary to rein in “disloyal” agents. Second, courts are reluctant to oversee agency technical judgments; as the Supreme Court has put it, when examining agency scientific determinations, “a reviewing court must generally be at its most deferential.”¹⁷⁷ Not surprisingly, given the scientific uncertainties that pervade environmental conflicts, this type of deference is often invoked in environmental conflicts.

174. For an excellent explanation of the factors that may promote and combat the capture of environmental-regulatory agencies, see Matthew D. Zinn, *Policing Environmental Regulatory Enforcement: Cooperation, Capture, and Citizen Suits*, 21 STAN. ENVTL. L.J. 81, 111–13, 132–37 (2002). Enforcement efforts may be particularly subject to slippage because of capture. *Id.* at 126. Citizen-suit provisions have been included in most environmental statutes to address precisely that problem. See Robert L. Glicksman, *The Value of Agency-Forcing Citizen Suits to Enforce Nondiscretionary Duties*, 10 WIDENER L. REV. 353, 354–58 (2004) (discussing citizen-suit provisions in the Clean Air Act, Clean Water Act, and Solid Waste Disposal Act). Citizen suits have been an important part of the environmental-law story from the outset, but they have a number of limitations, notably that they require significant resources, face judicial barriers such as standing doctrines, and can be precluded by even mild government enforcement efforts. See, e.g., 42 U.S.C. § 7604 (allowing for citizen suits under Clean Air Act, but requiring provision of sixty days notice to the Administrator, to the state in which the violation occurs, and to any alleged violator before commencing suit, and allowing for either side to recover attorney fees); *Pound v. Aerosol Co.*, 440 F. Supp. 2d 1241, 1247 (D. Kan. 2006) (noting a split among other circuits as to whether an award of attorney fees is appropriate if a citizen suit brought under the Clean Air Act is for the purpose of financial gain rather than the purpose of the statute, and denying attorney fees in such a case); ROBERT FISCHMAN, *THE NATIONAL WILDLIFE REFUGES: COORDINATING A CONSERVATION SYSTEM THROUGH LAW* 17, 18 (noting that with respect to actions brought under the Administrative Procedure Act, “[c]onstitutional principles of ‘standing’ that limit courts to a reactive role of simply responding to a particular dispute require that a citizen bringing a suit demonstrate concrete injury caused by the agency action,” and further that “[i]n public land law, courts almost always defer to agency determinations when the agency record displays a reasonable consideration of facts and arguments”).

175. *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 843–44 (1984).

176. In a different kind of principal-agent problem, empirical studies suggest that *Chevron* does little to limit the effect that the ideologies of reviewing judges have on decisions. See Thomas J. Miles & Cass R. Sunstein, *Do Judges Make Regulatory Policy? An Empirical Investigation of Chevron*, 73 U. CHI. L. REV. 823, 825–26 (2006) (finding a strong correlation between the ideological predispositions of Supreme Court justices and their tendency to approve agency decisions under *Chevron*); see also Jason J. Czarnecki, *An Empirical Investigation of Judicial Decisionmaking, Statutory Interpretation and the Chevron Doctrine in Environmental Law*, 79 U. COLO. L. REV. (forthcoming 2008), available at <http://ssrn.com/abstract=996955> (confirming the findings that judges vote in their perceived ideological direction).

177. *Balt. Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 103 (1983).

The behavior of the current Administration, and more generally the partisan overtones of environmental politics today, further intensifies the principal-agent problem. On one hand, presidential control of the bureaucracy supplies a form of national political accountability, and therefore of legitimacy.¹⁷⁸ On the other hand, accountability through the presidential election cycle is a thin reed indeed: “[T]here is no guarantee that the incumbent President will reflect the will of the people on particular policies simply by virtue of an electoral mandate, or respond to the will of the people for fear of an electoral check.”¹⁷⁹ Strong presidential control can just as easily undermine as enforce public goals. Congress cannot be counted on to respond. As Professor Neal Katyal has pointed out, judicial deference and veto threats can easily combine to leave Congress powerless to check a president who is intent on expanding Executive Branch powers.¹⁸⁰

While there has been a progression in recent administrations toward increased executive control, George W. Bush has notably exceeded his predecessors in pushing for that outcome. For example, he has publicly taken the position that he need not simply execute the laws enacted by Congress but can make his own judgments, announced in “signing statements,” about what elements of legislation are and are not binding.¹⁸¹ His Administration has also been highly committed to, and successful at, centralizing administrative decision making at the highest political levels,¹⁸²

178. See, e.g., Lisa Schultz Bressman, *Deference and Democracy*, 75 GEO. WASH. L. REV. 761, 781–82 (2007) (“[P]residential control means that there will be less worry about whether or to what extent regulatory policy actually reflects the will of the people or the preferences of their chosen representatives.”).

179. *Id.* at 782; see also Jide Nzelibe, *The Fable of the Nationalist President and the Parochial Congress*, 53 UCLA L. REV. 1217, 1233–34 (2006) (challenging the notion that the president is accountable to a broad electoral base).

180. See Neal Kumar Katyal, *Internal Separation of Powers: Checking Today’s Most Dangerous Branch from Within*, 115 YALE L.J. 2314, 2321 (2006) (“The combination of deference and the veto is especially insidious—it means that a President can interpret a vague statute to give himself additional powers, receive deference in that interpretation from courts, and then lock that decision into place by brandishing the veto. This ratchet-and-lock scheme makes it almost impossible to rein in executive power.”).

181. Although George W. Bush did not originate the signing statement, he has issued many more than his predecessors. Peter L. Strauss, *Overseer or “The Decider”?* *The President in Administrative Law*, 75 GEO. WASH. L. REV. 696, 719 n.107 (2007); see also Curtis A. Bradley & Eric A. Posner, *Presidential Signing Statements and Executive Power*, 23 CONST. COMMENT. 307, 316–21 (2007) (analyzing and categorizing George W. Bush’s frequent use of signing statements); Charlie Savage, *Introduction: The Last Word? The Constitutional Implications of Presidential Signing Statements*, 16 WM. & MARY BILL RTS. J. 1, 2 (2007) (“Bush ha[s] used signing statements to target more than 1,100 distinct sections of bills—nearly double the roughly 600 such laws challenged by all previous Presidents in American history combined.”).

182. As just one example, President Bush issued an Executive Order in January 2007 requiring that agency regulatory policy officers be presidential appointees, and that those officers or the head of the agency approve the commencement of any rulemaking. Exec. Order No. 13,422, 72 Fed. Reg. 2763, 2764 (Jan. 18, 2007). The aggressive consolidation of power in the Bush White House has triggered an outpouring of legal scholarship about the extent and boundaries of presidential

and limiting the extent to which information about the process of decision making is available to the public.¹⁸³ Centralization in this Administration seems primarily to serve partisan political purposes rather than any overarching vision of the public good. Political appointees throughout the Administration have proved willing to substitute the least attractive form of politics for principles.¹⁸⁴ Finally, there is special reason for concern in the

power. *E.g.*, Michael P. Allen, *George W. Bush and the Nature of Executive Authority*, 72 BROOK. L. REV. 871 (2007) (exploring the judiciary's proper role in responding to the Administration's attempts to expand the scope of executive power); Dawn E. Johnsen, *Faithfully Executing the Laws: Internal Legal Constraints on Executive Power*, 54 UCLA L. REV. 1559 (2007) (examining how internal processes and standards can enhance the quality of Executive Branch decisionmaking); Symposium, *The Most Dangerous Branch? Mayors, Governors, Presidents, and the Rule of Law: A Symposium on Executive Power*, 115 YALE L.J. 2215 (2006) (introducing a symposium issue addressing the proper role and reach of executives at all levels of government). It has also sparked comment from other perspectives. For example, New York University Professor of Public Service Paul Light has commented on the unusually tight coordination of this Administration: "I don't think anyone has met an administrative control structure like the Bush administration has put into place. The White House intends for federal employees to feel the presence of appointees." Stephen Barr, *Appointees Everywhere, but Try to Count Them*, WASH. POST, Oct. 17, 2004, at C2.

183. *See, e.g.*, *Cheney v. U.S. Dist. Court*, 542 U.S. 367, 373 (2004) (reviewing whether the Bush Administration's National Energy Policy Development Group had failed to comply with the procedural and disclosure requirements of the Federal Advisory Committee Act); Heidi Kitrosser, *Secrecy and Separated Powers: Executive Privilege Revisited*, 92 IOWA L. REV. 489, 491–92 (2007) (noting the reputation of the Bush Administration for secrecy and listing several recent controversies in which the Administration claimed executive privilege); Gia B. Lee, *The President's Secrets*, 76 GEO. WASH. L. REV. 197, 198 (2008) (discussing the Bush Administration's pattern of resistance to disclosure of information); Dean Scott, *Boxer Repeats Call for Testimony Details After White House Cites Executive Privilege*, 38 ENV'T REP. (BNA) 2393 (Nov. 9, 2007) (noting that the White House claimed executive privilege in response to a congressional request for details on the editing of testimony by the Director of the Centers for Disease Control and Prevention at a Senate committee hearing on climate change).

184. There are a number of examples of the George W. Bush Administration's engaging in self-interested political dealing, bypassing conventional procedures, and even apparently violating the law to do so. For example, at the Department of Justice, U.S. Attorneys were removed from their posts because they refused to use their positions to further the Administration's partisan political agenda and, even more troubling, applicants for supposedly nonpolitical entry-level positions were screened on the basis of their political affiliations. *See, e.g.*, Keith Perine, *Restoring Faith in 'Main Justice'*, CONG. Q. WKLY., Sept. 3, 2007, at 2508, 2509 (reporting on a congressional investigation that found Department of Justice aides used political considerations when deciding which prosecutors to fire, and a former White House liaison used political considerations when hiring people for career positions). At the State Department, the inspector general—who is supposed to be the politically independent Department watchdog—resigned in the face of allegations that he blocked fraud investigations by his office for partisan purposes. Paul Richter, *State Department Watchdog Resigns Amid Allegations*, L.A. TIMES, Dec. 8, 2007, at A13. Several other inspectors general have left office in recent months under similar clouds. *See* Danielle Knight, *Investigating the Investigators*, U.S. NEWS & WORLD REP., Dec. 31, 2007, at 23, 23–24 (describing various institutional controversies and investigations, which at the time of publication had already led to the resignations of State Department Inspector General Howard "Cookie" Krongard and Smithsonian Secretary Lawrence Small). In May 2007, a Special Counsel investigation concluded that the head of the General Services Administration had "engag[ed] in the most pernicious of political activity" by asking political appointees at a meeting how they could help Republican candidates; this was a violation of the Hatch Act, which limits the political activities of Executive Branch employees.

environmental context because the Bush Administration is widely regarded as hostile to the goals of environmental protection,¹⁸⁵ and it can impede those goals simply by declining to enforce or robustly implement environmental laws.¹⁸⁶

2. *Political Integrity and Control of the Bureaucracy.*—When statutory specificity cannot effectively control agency behavior, legislatures must turn to other mechanisms. Legislative oversight and rewards or punishment through the budget and appointments processes are indirect and reactive. Structural initiatives and procedural mandates can sometimes provide more effective control. Political scientist Matthew McCubbins has identified two general strategies for strengthening legislative control of agency actions: measures that cause the agency to respond to the set of political interests responsible for the legislation, and measures that delay action or provide early warning, allowing coalition members the opportunity to preempt agency actions inconsistent with their views.¹⁸⁷

The many mandates for reliance on science in agency decision making could be a form of the first kind of constraint. They could be intended to force agencies to confront facts they might otherwise choose to conveniently ignore, to shift political power in favor of scientists who might be expected to be strongly committed to conservation goals, and to limit the ability of the Executive Branch to evade its conservation obligations.¹⁸⁸ Certainly, the strongest science mandate in federal law, the ESA's requirement that FWS

Robert O'Harrow, Jr., *Bush Asked to Discipline GSA Chief in Hatch Act Inquiry*, WASH. POST, June 12, 2007, at A7.

185. See, e.g., Robert L. Glicksman, *From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law and Policy*, 41 WAKE FOREST L. REV. 719, 774 (2006) (noting the Administration's failure to protect wilderness areas from road construction and timber harvesting); Richard J. Lazarus, *A Different Kind of "Republican Moment" in Environmental Law*, 87 MINN. L. REV. 999, 1006 (2003) (noting the Administration's efforts to reverse environmental initiatives put forth in the 1990s); John D. Leshy, *Natural Resources Policy in the Bush (II) Administration: An Outsider's Somewhat Jaundiced Assessment*, 14 DUKE ENVTL. L. & POL'Y F. 347, 350 (2004) (noting the Bush Administration's abandonment of the Clinton Administration's "roadless rule," which protected national forest land); Martin Nie, *Governing the Tongass: National Forest Conflict and Political Decision Making*, 36 ENVTL. L. 385, 463-64 (2006) (discussing the Administration's environmental-litigation strategies); Patrick Parenteau, *Anything Industry Wants: Environmental Policy Under Bush II*, 14 DUKE ENVTL. L. & POL'Y F. 363, 366 (2004) (noting the Administration's refusal to believe evidence of global warming); Kirsten Uchitel, *PECE and Cooperative Conservation: Innovation or Subversion Under the Endangered Species Act?*, 26 J. LAND RESOURCES & ENVTL. L. 233, 262-63 (2006) (arguing that the policy of "cooperative conservation" demonstrates the Administration's hostility toward the Endangered Species Act).

186. See Johnsen, *supra* note 182, at 1591 (arguing that the Executive's refusal to enforce a statute is the most suspect context for acting on its own legal views).

187. Matthew D. McCubbins et al., *Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies*, 75 VA. L. REV. 431, 440-43 (1989).

188. See Doremus, *supra* note 1, at 435 ("By shifting power toward agency scientists, the best available science mandate may well help to counter the tendency of agencies to make politically easy decisions inconsistent with the law's purposes.").

make listing decisions “solely on the basis” of the best available scientific information,¹⁸⁹ was intended to constrain the discretion of the Reagan Administration, which “had brought the [ESA listing] process to a virtual standstill, primarily by requiring economic impact analysis of proposed listings.”¹⁹⁰ However, science mandates will be effective as constraint mechanisms only if and to the extent that scientific information is appropriately interpreted and faithfully incorporated into decisions.

The ability of science mandates to constrain agency action also depends upon the extent to which agency structures or processes draw effective boundaries between career scientific employees and political appointees. Congressional choices to assign special roles in agency decision making to career scientists will only push agencies toward more environmentally protective decisions if political appointees respect the boundaries of their roles or scientists can make their unvarnished views known. In other words, science mandates can fulfill their intended political functions only if they are implemented with both scientific and political integrity.

Congress can also push outcomes in desired directions or increase the power of certain interests by assigning tasks to agencies whose missions are aligned with those interests. One function of the ESA’s consultation process, for example, is to give wildlife agencies whose primary mission is conservation a stronger role in the decisions of development-oriented agencies.¹⁹¹ Agency judgments are inevitably affected to some extent by the values of their employees. Those values in turn tend to be aligned with the agency’s primary mission, either because potential employees look for a compatible agency¹⁹² or because they internalize the agency mission once hired.¹⁹³

189. 16 U.S.C. § 1533(b)(1)(A) (2000).

190. Doremus, *supra* note 34, at 1054; see H.R. REP. NO. 97-567, at 11–12 (1982), *reprinted in* 1982 U.S.C.C.A.N. 2807, 2811–12 (noting the decline in the pace of listing species that resulted from the economic-analysis requirement).

191. For a discussion of the extent to which the interpretation of incomplete scientific evidence and the policy judgments made on the basis of that evidence depend upon the identity of the decision maker, see Holly Doremus, *Science Plays Defense: Natural Resource Management in the Bush Administration*, 32 *ECOLOGY L.Q.* 249, 278–82 (2005).

192. Agency missions can be useful recruiting tools, particularly if agencies must compete with private-sector employers who offer higher pay and other benefits. See JAMES Q. WILSON, *BUREAUCRACY: WHAT GOVERNMENT AGENCIES DO AND WHY THEY DO IT* 157 (1989) (“The managers of government agencies, whose control of pecuniary rewards is much less than that of their business counterparts, presumably would have an even greater stake in making use of nonmaterial rewards.”); Eric Biber, *Too Many Things to Do: How to Deal with the Dysfunctions of Multiple-Goal Agencies*, 32 *HARV. ENVTL. L. REV.* (forthcoming 2008), available at <http://ssrn.com/abstract=1090313> (arguing that the Forest Service’s focus on timber production provided a clear mission for the agency that aligned well with the preferences of highly trained professionals who might otherwise have sought higher paying jobs in private industry).

193. See HERBERT KAUFMAN, *THE FOREST RANGER: A STUDY IN ADMINISTRATIVE BEHAVIOR* 176 (1960) (“Without realizing it, members of the Forest Service thus ‘internalize’ the perceptions, values, and premises of action that prevail in the bureau.”). Agency missions are not

The civil-service system can help ensure political integrity, but it currently does so only to a limited extent. In the United States, the civil service is the product of early battles between Congress and the president over control of the bureaucracy. As early as Jefferson, presidents felt the need to remove some bureaucrats in order to put their own political stamp on the bureaucracy.¹⁹⁴ Andrew Jackson proclaimed the principle that public servants should hold office only in rotation, turning over with every election.¹⁹⁵ By the time of the Civil War, patronage appointments were the rule; each change in power at the White House was accompanied by “a crescendo of partisan revenge” in the bureaucracy, even when the presidency did not change parties.¹⁹⁶ Finally in 1883, after a series of corruption scandals and in the wake of the assassination of President Garfield by a disappointed office seeker,¹⁹⁷ Congress passed the Pendleton Act¹⁹⁸ to limit the worst excesses of the patronage system. Although it introduced the notion of a merit-based professional civil service, the Act was hardly revolutionary. It created a limited “classified service” to which candidates were appointed by competitive examination without reference to political tests and protected classified employees against coerced political activity.¹⁹⁹ However, it placed only about 10% of the federal workforce in the classified service, leaving it up to the president to decide whether others should be covered.²⁰⁰

Since the Pendleton Act, the federal government has struck a balance between a merit-based career service, which takes advantage of the bureaucratic virtues of experience and expertise, and political appointments, which fight the bureaucratic vices of “inertia and torpor.”²⁰¹ By the 1980s,

an unvarnished benefit from a principal-agent perspective. They can become entrenched to the point where they put the agency at odds with updated social goals. *See, e.g.*, Biber, *supra* note 192 (discussing the Forest Service’s slow response to new congressional mandates that it expand its mission beyond timber production). To the extent that the president shares the new congressional goals, the ability to impose a new agenda through political appointments can help push the agency in new directions, but the process is inevitably slow.

194. Jefferson was largely reacting to a spate of late appointments by the Adams Administration, and for the most part he tried to balance his appointments between the major parties. *See* PAUL P. VAN RIPER, *HISTORY OF THE UNITED STATES CIVIL SERVICE* 22 (1958) (describing Jefferson’s doctrine that required equal division of offices between the parties).

195. *Id.* at 36–37.

196. *Id.* at 41, 41–42.

197. *See* ARI HOOGENBOOM, *OUTLAWING THE SPOILS: A HISTORY OF THE CIVIL SERVICE REFORM MOVEMENT, 1865–83*, at 209 (1961) (describing President Garfield’s assassination and the background of the assassin, Charles Guiteau). *See generally* VAN RIPER, *supra* note 194, at 89–94 (arguing that the Pendleton Act’s passage was spurred not only by President Garfield’s assassination, but also by controversies surrounding political assessments).

198. Civil Service Reform (Pendleton) Act, ch. 27, 22 Stat. 403 (1883) (codified as amended in scattered sections of 5 U.S.C.).

199. VAN RIPER, *supra* note 194, at 98–100.

200. *Id.* at 105.

201. Elena Kagan, *Presidential Administration*, 114 HARV. L. REV. 2245, 2263 (2001).

less than 1% of the civilian federal workforce was politically appointed.²⁰² However, that number may be a bit misleading. Under the Civil Service Reform Act of 1978,²⁰³ the line between career employees and appointees is not absolute. Career employees who choose to accept promotion to the Senior Executive Service give up some of the protections of the merit system,²⁰⁴ although views differ dramatically on the extent to which they become subject to effective presidential control.²⁰⁵ As of 2004, the most recent year for which statistics are readily available, there were 4,555 Senior Executive Service positions and 4,496 appointees government-wide.²⁰⁶ Of the appointed positions, 1,596 were “Schedule C” positions, which are mid-level positions for which the Office of Personnel Management deems a political appointment appropriate.²⁰⁷ Schedule C positions are supposed to be “policy-determining or . . . involve a close and confidential working relationship with the head of an agency or other key appointed officials.”²⁰⁸

Civil servants cannot be forced to support the political parties or individual political ambitions of their superiors, but they are not directly protected against political interference with or overriding of their professional judgments. There are very few legislative limits on the jobs to which political appointments may be made, or explicit requirements that political appointees have any form of technical training. It is conventional for presidents to appoint individuals with medical or scientific training to positions such as commissioner of the FDA, director of the CDC, and director of the Office of Science and Technology Policy, among others, but

202. RONALD N. JOHNSON & GARY D. LIBECAP, *THE FEDERAL CIVIL SERVICE SYSTEM AND THE PROBLEM OF BUREAUCRACY: THE ECONOMICS AND POLITICS OF INSTITUTIONAL CHANGE* 4 (1994).

203. Pub. L. No. 95-454, 92 Stat. 1111 (codified as amended in scattered sections of 5 U.S.C.).

204. See 5 U.S.C. § 3131(5) (2000) (enabling the head of an agency “to reassign senior executives to best accomplish the agency’s mission”).

205. Compare Peter W. Schroth, *Corruption and Accountability of the Civil Service in the United States*, 54 AM. J. COMP. L. (SUPPLEMENT) 553, 564 (2006) (arguing that “the Senior Executive Service . . . was established in a way that facilitated its politicization,” with compensation and continued tenure in office subject to appraisals by political superiors), with David Barnhizer, *Waking from Sustainability’s “Impossible Dream”: The Decisionmaking Realities of Business and Government*, 18 GEO. INTL. ENVTL. L. REV. 595, 656 (2006) (noting that “[t]he very powerful and generally invisible bureaucrats of the federal government’s Senior Executive Service . . . quietly endure the coming and going of individual administrations while controlling the Executive Branch institutions,” and describing these officials as “a core of master bureaucrats who can and do sabotage the ‘best laid plans’ of the fresh-faced ingénues and political contributors who receive” political appointments).

206. COMM. ON GOV’T REFORM, U.S. HOUSE OF REPRESENTATIVES, 108TH CONG., *UNITED STATES GOVERNMENT: POLICY AND SUPPORTING POSITIONS* (the “Plum Book”) app. 1, at 215 (2004).

207. *Id.*

208. 5 C.F.R. § 213.3301 (2007).

the statutes creating those offices do not impose any such qualifications.²⁰⁹ Nor are there legislative restrictions on direct contacts between political appointees like Julie MacDonald and career technical staff.

Congress typically simply assigns decisions to agencies or sub-agencies. It is uncertain whether, in the face of such direction, the president can lawfully step in and order the agency to make a particular decision.²¹⁰ Even without such direct involvement by the president, the appointees who head agencies have the opportunity and incentive to base their decisions on the president's personal political agenda rather than (or in addition to) the statutorily mandated factors or the agency's mission. In theory, judicial review should ensure that decisions remain within relevant statutory bounds, but decisions involving a complex mix of scientific and political judgments are especially challenging to review. As decisions are currently structured, it is difficult for courts, legislators, or members of the public to understand who made what judgments and on what basis. Political integrity, which requires acknowledgment of political decisions and some forthright explanation of them, would improve oversight.

Although political integrity is most obviously needed in regulatory decisions, it is also important in other contexts. Government research scientists can be leaders in their fields, and agency technical reports can take a more neutral view of controversial issues than reports from industry or environmental groups. That is why the current Administration has been so aggressive in seeking to control public statements about global warming by government scientists, and why environmental groups are so upset about those practices.²¹¹ The difference between forthright acknowledgement of

209. President Bush has objected to some seemingly innocuous legislative requirements for political appointees. In 2006, for example, in the wake of the Hurricane Katrina disaster, Congress adopted a new requirement that the Administrator of the Federal Emergency Management Administration "be appointed from among individuals who have (A) a demonstrated ability in and knowledge of emergency management and homeland security; and (B) not less than 5 years of executive leadership and management experience in the public or private sector." Department of Homeland Security Appropriations Act, 2007, Pub. L. No. 109-295, § 503(c)(2), 120 Stat. 1397 (codified at 6 U.S.C. § 313). Bush promptly issued a signing statement declaring his authority to ignore that provision on the grounds that it would rule out many qualified individuals. Statement on Signing the Department of Homeland Security Appropriations Act, 2007, 42 WEEKLY COMP. PRES. DOC. 1742 (Oct. 4, 2006).

210. For arguments that the president does not have the authority to dictate decisions Congress has entrusted to Executive Branch agencies, see Robert V. Percival, *Presidential Management of the Administrative State: The Not-So-Unitary Executive*, 51 DUKE L.J. 963, 966 (2001); Strauss, *supra* note 181, at 698. The latest flap about presidential interference involves reports that President Bush personally demanded that EPA soften its new ozone regulations on the day those regulations were to be announced. Juliet Eilperin, *Ozone Rules Weakened at Bush's Behest*, WASH. POST, Mar. 14, 2008, at A1.

211. See, e.g., *supra* notes 53–60 and accompanying text.

the available scientific evidence and deliberate overemphasis on uncertainties can significantly affect the political landscape.²¹²

C. *The Relationship Between Scientific and Political Integrity*

In the environmental-policy arena, scientific and political integrity are closely interdependent. Levels of distrust are high on all sides. Members of the public who do not get their preferred policy outcome often suspect that science has been misused in the decision-making process. So do participants, and that suspicion affects their behavior, adding to other temptations to stray from the path of professional virtue. Scientists (inside or outside agencies) who believe that political actors will distort or misuse the information they provide are tempted to shade it in ways they think will make misuse more difficult. At the same time, political appointees who believe that scientists are providing slanted advice in order to promote their own political agendas are tempted to discount or edit the advice they get, or to aggressively oversee the work of agency scientists.²¹³ Uncertainties (or at least the ability to claim uncertainties) in the available evidence provide political actors with a rationale for aggressive intervention.²¹⁴ Distrust and the lack of effective oversight mechanisms thus contribute to a kind of “race to the bottom” with respect to both scientific and political integrity.

IV. Enhancing Scientific and Political Integrity in Environmental Policy

Government cannot make good policy decisions unless the decision makers have access to, and appropriately use, the best available understanding of the relevant facts. At the same time, neither legislators nor the public can oversee the actions of the bureaucracy without access to both the facts and the policy choices made. Therefore, both scientific and political integrity are necessary to a competent and legitimate policy process.

212. In an April 2007 poll conducted by the *Washington Post*, ABC News, and Stanford University, 84% of respondents believed that global temperatures were increasing. *Washington Post-ABC News Poll: Environment Trends*, WASHINGTONPOST.COM, Apr. 20, 2007, http://www.washingtonpost.com/wp-srv/nation/polls/postpoll_environment_042007.html. However, more than half the respondents (56%) thought there was significant disagreement among scientists about whether it was occurring. *Id.* Interestingly, levels of trust in what scientists say about the environment were not extraordinarily high: only 5% trusted scientists completely, 27% trusted them a lot, and 43% trusted them a moderate amount. *Id.*

213. Such suspicions exist within the political branches, or at least they provide an excuse for discounting scientific evidence. *See, e.g., Climate Change Hearings, supra* note 56, at 245 (statement of Rep. Darrell Issa) (stating that he is “concerned that many scientists are increasingly engaging in political advocacy and that some issues of science have become increasingly partisan as some politicians sense that there is a political gain to be found on issues like stem cell, teaching evolution, and climate change”).

214. *See id.* at 250 (statement of Philip Cooney, former Chief of Staff, White House Council on Environmental Quality) (explaining that he “offered [his] comments in good faith reliance on what [he] understood to be authoritative and current views of the state of scientific knowledge, and for no other purpose”).

The litany of controversies discussed in Part II above shows that during the tenure of the current Administration there have been significant shortfalls in political integrity, inroads into the scientific integrity of regulatory agencies, and some problems with scientific integrity outside government agencies. I believe these problems are not limited to the current Administration. Complaints about political interference with scientific decisions began long before 2001.²¹⁵ The same is true of the trend toward centralized executive power that contributes to the lack of political integrity. Although it has reached a high point in this Administration, centralization of control and politicization of the bureaucracy are trends that go back at least thirty years.²¹⁶ A change of administration is unlikely to reverse them without an external push.

Given the importance of political and scientific integrity to achieving societal goals, and the strong temptations not to act with integrity, corrective action is justified. For both political and scientific integrity, the most important corrective measure is to encourage the recognition and observation of role boundaries.²¹⁷ Political integrity must be tackled first because it is the more serious problem, it is more readily susceptible to a prescriptive approach, and it is an essential predicate to providing incentives for scientific integrity.

A. Political Integrity Through Independent Scientific Advice

The single biggest contributor to the lack of political integrity in this Administration's environmental-policy decisions is the absence of barriers between political appointees who view their mission as the single-minded advancement of the President's policy agenda²¹⁸ and career employees charged with providing scientific advice or analysis. Because Julie MacDonald was regularly in the face of FWS field biologists, those biologists were not able to robustly perform the role assigned them by the ESA, and the courts and the public could not fully evaluate the regulatory

215. See *supra* note 3 and accompanying text.

216. See Kagan, *supra* note 201, at 2275–81 (tracing efforts to assert presidential control in agency decision making, from the more subtle attempts made by President Nixon to the more open strategies adopted by President Reagan).

217. The importance of role separation has been pointed out in other contexts where dispassionate analysis must precede policy choices. See, e.g., Johnsen, *supra* note 182, at 1562 (advocating independent legal analysis within the Executive Branch); Patricia M. Wald, *Analysts and Policymakers: A Confusion of Roles*, 17 STAN. L. & POL'Y REV. 241, 256–72 (2006) (exploring confusion surrounding the roles of intelligence analysts and policy makers).

218. Philip Cooney, for one, was quite frank about his view of his role. See *Climate Change Hearings*, *supra* note 56, at 24, 43–44 (statement of Philip Cooney, former Chief of Staff, White House Council on Environmental Quality) (describing how he participated in the review processes to align Executive Branch reports with administration policies, and stating, “When I came to the White House, my loyalties—my sole loyalties—were to the President and his administration.”).

decisions the agency ultimately made.²¹⁹ Because George Deutsch was screening requests for interviews with NASA scientists²²⁰ and Philip Cooney was editing government reports on global warming,²²¹ the public was denied access to the unvarnished views of government scientific analysts.

The key to enhancing political integrity is to enforce stronger role separation between career scientists, who should be encouraged and enabled to provide their best independent assessments of the facts, and political appointees, who should be required to take political responsibility for the choices they make among available policy options. This Administration has observed essentially no boundaries between politics and science,²²² and there is no guarantee that the next administration will be any different in that respect. Several steps could be taken to resurrect and strengthen appropriate boundaries.

1. Strengthening Whistle-Blower Protections.—I mention this first only because it is the focus of current legislative activity. As mentioned above, whistle-blower protection for federal scientists is currently a thin reed.²²³ Both the House and the Senate recently passed bills to strengthen whistle-blower protection in certain respects.²²⁴ The House version, introduced by Rep. Henry Waxman, includes a specific provision on whistle-blowing related to government science. It would provide protection for federal employees who disclose actions they reasonably believe “compromise[] the validity or accuracy of federally funded research or analysis”; lead to the dissemination of “false or misleading scientific, medical, or technical information”; or restrict the performance or publication of scientific research or analysis.²²⁵

While Waxman’s bill is well intended, it does not effectively address the problem of political integrity. Whistle-blowing protection is one aspect of protecting career employees against adverse employment consequences for doing their job as congressionally defined. But it is necessarily reactive,

219. See *supra* subpart II(A).

220. See *supra* note 56 and accompanying text.

221. See *supra* notes 72–75 and accompanying text.

222. Even the conservative *Wall Street Journal* objected to the Bush Administration’s practice of imposing political litmus tests on appointees to scientific advisory boards. See Sharon Begley, *Now, Science Panelists Are Picked for Ideology Rather Than Expertise*, WALL ST. J., Dec. 6, 2002, at B1 (“It goes without saying that every administration is entitled to appoint people who share its values and political views. But those appointees belong in policy jobs, not on panels charged with assessing science.”).

223. See *supra* notes 44–48 and accompanying text.

224. Federal Employee Protection of Disclosures Act, S. 274, 110th Cong. (2007); Whistleblower Protection Enhancement Act of 2007, H.R. 985, 110th Cong. (2007).

225. H.R. 985 § 13(a). The Senate version has no comparable provision.

and comes at high personal cost to the whistle-blower.²²⁶ Reducing undue or inappropriate pressure during the process would be far preferable to providing a (limited) remedy for such pressures later. Moreover, Waxman's bill could exacerbate the opposite problem, providing a high-profile avenue for complaints by agency scientists disgruntled by policy choices within the legitimate range of agency discretion. What exactly constitutes "false or misleading" information or compromises the "validity or accuracy" of analysis will frequently be difficult to determine. Although it is unlikely that publication of an incorrect weather forecast would be actionable, as some critics fear,²²⁷ many legitimate agency actions could become the subject of whistle-blowing disclosures.

2. *Limiting the Role of Political Appointees.*—Since the problem is that the Executive Branch is not placing adequate boundaries on the role of political appointees, a more direct remedy would be to enhance legislative or judicial constraints on that role. There are two aspects to the problem of excessive political penetration of the bureaucracy: the presence of political appointees in positions that should be handled by careerists, and the involvement of higher level appointees in analyses and judgments that should precede and, to the extent possible, be separated from political judgments.

Again, one might argue that nothing needs to be done. The Julie MacDonald investigation shows that there are already some remedies for improper interference—agency investigations triggered by anonymous complaints can embarrass an over-aggressive administration, and can contribute to close judicial review of suspect decisions.²²⁸ Those are not, however, sufficient remedies. Like whistle-blowing, they are too reactive, and too dependent on an attentive and dedicated set of outside eyes. It would surely be better to put in place structures that would help prevent the Julie MacDonald problem in the first place rather than to try to remedy it after the fact.

The *MacDonald Report* vividly illustrates the need for new structural restrictions on the actions of political appointees. More aggressive intrusion by political appointees into the technical work of agencies is hard to imagine, yet that aspect of MacDonald's behavior apparently violated no law or regulation. That suggests that the balance of power has shifted too far toward the political arm of the Executive Branch, and too far away from

226. See Russo, *supra* note 47, at 39–40 (describing the particular challenges faced by whistle-blowing scientists and other employees). The story of Andrew Eller, surely one of the more sympathetic scientific whistle-blowers imaginable, is an instructive, cautionary tale. See *supra* subpart II(C).

227. See Eli Kintisch, *House OKs Whistleblower Bill*, 315 SCIENCE 1649, 1649 (2007) (recounting a hypothetical, extreme interpretation of the law "in which an incorrect weather forecast could be labeled an abuse of authority because it contained false information").

228. See *supra* subpart II(A).

career employees and the agency missions they seek to implement. I recognize that shifting power back toward career employees could increase bureaucratic inertia and resistance to modernizing agency missions. While agency missions must periodically be modernized or reoriented, Congress seems better positioned than the president to do that work in a way that will accurately reflect broad societal goals.

There are a number of possible steps Congress could take to bring the balance back toward a healthy center.²²⁹ There is not room in this Article to explore them all exhaustively, but here are some ideas that deserve further consideration.

a. Limiting Political Appointments.—Congress ultimately controls the allocation of federal positions between the career and the excepted service.²³⁰ Congress has almost entirely ceded control of those choices to the Office of Personnel Management, which in turn is subject to the president's political control. Congress could retrieve its authority, limiting the extent to which political appointments are allowed to reach down into the management structure of agencies expected to provide neutral expert advice. That would not directly affect the Julie MacDonalds of this or future administrations because she held a legitimately policy-making position. But agencies like FWS might be required to have regulatory science divisions in their field offices, headed by career technical employees with the experience, career protection, and mission incentive to stand up to the Julie MacDonalds. Notably, the *MacDonald Report* found that once he was appointed FWS Director, Dale Hall acted as an effective intermediary between MacDonald and his Service biologists.²³¹ Empowering supervisory scientists in field and regional offices to take the same approach could provide an additional buffer.

Congressional limits on placement of political appointees could be even more effective against the censoring problem. An important aspect of that problem seems to be that even low-level public-affairs officers at many agencies are now Schedule C political appointees. Particularly at research

229. Many of these steps are also available to an Executive Branch willing to take a less aggressive position with respect to maximizing its own political power. For purposes of this Article, I assume that such self-limiting is unlikely in the current political climate, but it is certainly not impossible.

230. There is probably some constitutional limit on how far up the management ladder Congress could require that positions be filled by career civil servants, and on the qualifications which Congress could constitutionally require of political appointees. See, e.g., Strauss, *supra* note 181, at 721–24 (discussing varied congressional attempts—many successful—to control qualifications for and tenure of executive appointments, executive resistance to such actions, and judicial decisions partially limiting Congress's ability to do so). However, congressional discretion is surely quite broad.

231. See MACDONALD REPORT, *supra* note 6, at 7, 15–16 (stating that according to the California/Nevada Operations Manager, relations between his office and MacDonald improved after Hall's appointment, and detailing some attempts by Hall to intervene between field staff and MacDonald).

agencies like NASA (which has absolutely no regulatory mission) or on the research side of divided agencies like NOAA (where the research labs are organizationally distinct from the regulatory branches), there seems to be no legitimate reason for Schedule C appointments in public affairs offices. Schedule C appointments are supposed to be limited to positions which are “policy-determining or . . . involve[] a close and confidential working relationship with the head of an agency or other key appointed officials.”²³² Public-affairs officers are not “policy-determining,” especially when those positions are in agencies or units whose mission is strictly technical. In some circumstances, public-affairs officers might need to maintain a confidential relationship with policy-making officials, but that would seem to be limited to the highest levels of public-affairs offices in policy-making agencies. Overaggressive political penetration of public-affairs offices can substantially interfere with political integrity by limiting the extent to which federal scientific expertise is made available to Congress, to other agencies, and to the public. Young zealots like George Deutsch,²³³ invested with loyalty only to the President himself and his political agenda, are far more likely to limit the access of federal scientists to the media, and to do so on nakedly partisan bases, than career employees who have internalized the agency’s scientific mission. Congress should consider restricting the use of Schedule C appointments in public-affairs offices, at least below the very top positions in those offices. No constitutional complaint could be raised to such restrictions, which would in no way interfere with the president’s ability to make appointments to the true policy-making level.²³⁴

b. Enforcing Procedural Separation.—A second approach would be to limit contacts between political appointees and nonmanagement career technical staff during the technical stages of regulatory development. Although it is not easy to separate the technical from the value-based aspects of decisions like ESA listing and critical habitat designation, requiring that those elements proceed sequentially to the extent possible can enhance political integrity by enhancing awareness, both internally and externally, of

232. 5 C.F.R. § 213.3301 (2007).

233. Deutsch certainly seems to have been a young zealot at the time of the Hansen controversies. After his resignation, he said in an interview on a Texas A&M University radio program that NASA scientists were “out to get” Republicans, Christians, and “anybody they perceive as not sharing their agenda.” *Climate Change Hearings*, *supra* note 56, at 346 (statement of George C. Deutsch, III).

234. As noted earlier, President Busb has raised constitutional objections to Congress’s imposition of minor requirements on candidates for the position of FEMA director. *See supra* note 209. Peter Strauss has explained why those objections are not well taken. Strauss, *supra* note 181, at 721–24. Whatever the validity of presidential objections to the placement of such requirements on agency heads, they can have no validity with respect to low-level Schedule C appointees. Furthermore, the Legislature has no other way to defend itself against improper Schedule C appointments since those do not require Senate confirmation.

the distinctions. There is certainly a risk that agency scientists might overstep their role boundaries by conflating political and scientific judgments, but the political appointees to whom they hand the technical package should have the ability and the incentive (at least if their political views differ from those of the scientists) to make those political elements clear. But in doing so, they would have to take political responsibility for their decisions, as political integrity requires.

If the right technical leadership were put in place below the political appointee level, as proposed above, adequate procedural separation might be maintainable without any change in existing law. In order to protect against shortfalls in that leadership, however, more should be done. In theory, Congress might set out procedures for various science-intensive regulatory decisions that would preclude the kinds of overbearing contacts Julie MacDonald practiced. Legislation at that level of detail, however, seems unlikely to be easy, or to rise to the top of any sensible legislative priority list. A more feasible approach would be to require that each agency publish and justify regulations setting out procedures for making science-intensive regulatory decisions, as well as for the preparation of scientific reports to Congress and the public. In fact, procedural guidelines already exist for many regulatory decisions, including those MacDonald was involved in. One of the clear signs that her behavior departed from her proper role was that she frequently ignored established agency procedures. What I propose is simply to turn what are now procedural guidelines into regulations, which would have increased visibility and be judicially enforceable. That would at least force the agencies to be open about the extent to which they are allowing political appointees to participate in the technical stages of analysis. Requiring that such intrusions be acknowledged would give Congress and the public a better opportunity to object.²³⁵

Another way to bolster the role of career employees might be to provide a less adversarial avenue than whistle-blowing for reporting perceived political interference in technical decisions. One approach might be the institution of something like the State Department's "Dissent Channel," which allows embassy staff to forward their disagreements with their ambassador's decisions to an elite State Department office, where they are reviewed and evaluated.²³⁶ Since a culture of dissent seems so foreign to most of the current Executive Branch, Congress might have to take the lead. It could create one or more scientific ombudsmen to whom agency technical staff could forward their concerns about the scientific underpinnings of regulatory decisions or public communications. Those officers, who would be trained in the distinctions between and potentials for overlap of scientific

235. See McCubbins et al., *supra* note 187, at 441–43 (noting that measures providing Congress with notice and an opportunity to object to agency decisions can be effective oversight measures).

236. For a description of the Dissent Channel, see Katyal, *supra* note 180, at 2328–29.

and policy judgments, might be able to insist on review by agency staff, take their concerns directly to legislative oversight committees, or even prepare reports that would become part of administrative records available to reviewing courts. They should be independent of the leadership of any regulatory agency and, given the problems in this Administration with politicization of inspector generals' offices,²³⁷ even independent of the Executive Branch to the extent feasible. Congress could provide a legislative office to which career scientists could report their concerns, or could create an independent executive office for science oversight, headed by a director with a long term of office not subject to removal at the whim of the president.

c. Enhancing Transparency.—The regulatory changes advocated above would increase the transparency of science-laden policy decisions. Other steps could also increase transparency, which in turn could increase political integrity. Political appointees are likely to be less aggressive about pushing their views, either in a regulatory context or in revising technical documents, if their actions are apparent to Congress and the public.²³⁸ Even if appointees do not change their behavior, daylighting their actions will protect political integrity. It is only subterranean interference, which allows politics to masquerade as science, that threatens political integrity. The checks built into the political system are designed to counter visible political maneuvering, but they can be evaded if the maneuvering can be hidden.

There are many different ways to increase transparency. Protecting whistle-blowers is one, but as already explained, it is an unsatisfying approach. More proactive approaches could include requiring the preparation and release of reports signed by career technical employees at the outset of the regulatory process, or explicitly requiring that the inputs of scientific staff into decision-making processes be included in administrative records and made subject to FOIA.²³⁹ Currently, agency scientific recommendations may not even be discoverable in litigation; some courts have ruled that they are covered by the deliberative-process privilege,²⁴⁰ which protects internal pre-decision discussions in order to allow agencies to

237. See *supra* note 184.

238. Julie MacDonald, for example, backed off her demands with respect to the flow needs of the Kootenai Sturgeon when FWS Director Hall insisted that she put her demands in writing. MACDONALD REPORT, *supra* note 6, at 16.

239. For example, former NMFS biologist Michael Kelly suggested that a lead biologist be required to cosign final biological opinions or that a "biologist's draft" be included in the record in order to limit the ability of administrators to alter the biologist's conclusions without fully explaining the reasons for the change. *Political Influence Oversight Hearing*, *supra* note 35, at 110 (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA).

240. *Ctr. for Biological Diversity v. Norton*, 336 F. Supp. 2d 1155, 1161 (D.N.M. 2004); *Ctr. for Biological Diversity v. Norton*, No. Civ. 01-409 TUC ACM, 2002 WL 32136200, at *2-4 (D. Ariz. July 24, 2002).

engage in frank and complete consideration of decisions. Ideally, Congress would mandate public disclosure of the recommendations or reports of agency scientists. Failing that, courts could exclude such recommendations or reports from the deliberative process privilege. Where Congress has directed agencies to use the best available scientific information in their decisions, the public is entitled to know what agency scientists think of the scientific data, without filtering by political appointees.

While career technical staff need and deserve protection from the zealotry of the current Administration, care must be taken to avoid swinging the pendulum too far in the opposite direction. The work of regulatory agency biologists (like that of any scientist) *should* be subject to review, oversight, and challenge. That Julie MacDonald was, according to the Inspector General's report, sometimes right in her criticism of the work of field biologists,²⁴¹ suggests that at times agency scientists may not have cast a sufficiently skeptical eye on their own work. This is not surprising, nor does it undermine their work. It simply demonstrates that outside eyes can often catch errors or oversights that the author of a document does not. There should be sufficient opportunities within regulatory science agencies for internal "peer review,"²⁴² to ensure that the work is uniformly of high quality. External peer review can also be a helpful tool for increasing transparency by forcing agencies to distinguish between scientific and political judgments, as J.B. Ruhl and Jim Salzman have pointed out.²⁴³ The key distinction between helpful peer review and the type of review practiced by Julie MacDonald is that the former would be done by other qualified scientists, not by supervisors with a political axe to grind.

Outside of regulatory agencies, federal research units modeled along academic lines should allow scientists to speak out just as academic scientists are free to do. Within regulatory agencies, there is some justification for overseeing contacts with the press; at some level those agencies must speak with one voice. But no such concern exists with respect to research science units. NASA, for example, does not make U.S. climate policy. Public statements by NASA scientists are no more likely to undermine federal policy than public statements by university scientists. NASA scientists should be just as free to speak to the press and to Congress as university

241. See MACDONALD REPORT, *supra* note 6, at 15 (reporting that even a critic of MacDonald acknowledged she had been "correct on several occasions in her challenges of field research").

242. I use quotes around this phrase to signify that I am not suggesting that agencies should have an obligation to go through some kind of formal peer-review procedure, with attendant delays. I mean only that important scientific decisions should receive some form of review by persons not already invested in their correctness. I suspect most regulatory procedures already build in opportunities for such review. However, if errors in scientific judgment continue to slip through, those procedures may need to be enhanced.

243. J.B. Ruhl & James Salzman, *In Defense of Regulatory Peer Review*, 84 WASH. U. L. REV. 1, 45 (2006).

scientists are, subject to the same constraint that university scientists are—that they clearly identify their opinions as their own rather than those of their employers. It may be appropriate for government research units to review scientific papers before their submission for publication as a quality-control mechanism, although the fact that universities do not find such a screen necessary suggests that its usefulness may be limited. It is never appropriate for any political appointee or public affairs officer to screen submissions of scientific literature.

3. *Reinvigorating the Culture of Public Service.*—The morale of many career federal employees is low, and that problem is particularly acute for technical employees in conservation agencies, many of whom justifiably believe that political interference with their work is rampant.²⁴⁴ By reducing inappropriate political interference and clarifying the appropriate role of political appointees, the reforms suggested above should help morale. The morale of career employees, their ability to resist improper political intrusions into their realm, and understanding of role boundaries on both sides of the political-career divide could be further improved by requirements that both sets of employees attend mandatory educational programs on the respective roles of each, tailored to individual agencies or units.

244. In a series of surveys, the Union of Concerned Scientists has found that more than half of responding federal climate scientists, FDA scientists, NOAA fisheries scientists, and FWS scientists report knowing of inappropriate political interference with scientific research or analysis, and more than half of the climate scientists report personally experiencing such political interference. TIMOTHY DONAGHY ET AL., UNION OF CONCERNED SCIENTISTS, *ATMOSPHERE OF PRESSURE: POLITICAL INTERFERENCE IN FEDERAL CLIMATE SCIENCE* 52 (2007), available at http://www.ucsusa.org/assets/documents/scientific_integrity/Atmosphere-of-Pressure.pdf (reporting that 73% of climate scientists surveyed had perceived or personally experienced some sort of outside activity affecting climate science in the past five years and that 58% of climate scientists had personally experienced such activities in the past five years); UNION OF CONCERNED SCIENTISTS, NOAA FISHERIES SURVEY SUMMARY (2005), available at http://www.ucsusa.org/scientific_integrity/interference/survey-political-interference-at-noaafisheries.html (last revised Aug. 25, 2006) (reporting that 58% of NOAA Fisheries scientists knew of cases “where high-level U.S. Department of Commerce administrators and appointees have inappropriately altered NOAA Fisheries determinations”); UNION OF CONCERNED SCIENTISTS, U.S. FISH AND WILDLIFE SERVICE SURVEY SUMMARY (2005), available at http://www.ucsusa.org/scientific_integrity/interference/us-fish-wildlife-service-survey.html (last revised May 8, 2007) (reporting that 70% of staff scientists and 89% of scientist managers at the U.S. Fish and Wildlife Service knew of cases “where U.S. Department of Interior political appointees have injected themselves into Ecological Services determinations”); UNION OF CONCERNED SCIENTISTS, *VOICES OF SCIENTISTS AT FDA: PROTECTING PUBLIC HEALTH DEPENDS ON INDEPENDENT SCIENCE* (2006), available at http://www.ucsusa.org/assets/documents/scientific_integrity/FDA-Survey-Brochure.pdf (reporting that 61% of FDA scientists knew of cases in which “Department of Health and Human Services or FDA political appointees have inappropriately injected themselves into FDA determinations or actions”). While these surveys do not prove that political interference is as widespread as the respondents perceive it to be, they provide very good evidence of low morale among agency technical employees.

But more is needed. At least since the 1980s and the Reagan Administration, there has been a strong public perception, fed by the aggressively antigovernment rhetoric of the conservative movement, that government is a beast that must be strangled rather than an active participant in achieving the country's chosen goals. That perception seems to have changed a bit in the wake of the Hurricane Katrina disaster, which highlighted the kinds of services government alone may be positioned to provide, but it has not gone away. The recruitment to and retention in government service of bright, committed scientists (or other professionals) demands a more positive external perception of their work. Such a culture shift in turn could both help career scientists demand that political appointees act with political integrity and encourage career scientists to observe appropriate boundaries on their own roles. Career public employees understand that they do not ultimately control political decisions. They are far more likely to implement those decisions willingly if they believe that political appointees are doing their best to implement the public interest as articulated by the relevant political community.

Of course, changes in the public perception of government employees cannot be mandated by legislation. They will come only when the public sees more clearly that government, while certainly imperfect, is necessary to the achievement of many collective public goals, including environmental protection. Government leaders and academic commentators can contribute by highlighting the positive aspects of government, which does not mean ignoring the possibility that a variety of controls may be necessary to keep the bureaucracy on a positive path.

B. Scientific Integrity Through Role Awareness

Efforts to gain more reliable control over the political integrity of environmental-policy decisions must precede efforts to improve scientific integrity because failings of political integrity can push scientists (inside and outside of agencies) away from scientific integrity. If political actors with anti-conservation agendas refuse to observe their assigned roles, scientists with pro-conservation agendas can be expected to respond in kind.²⁴⁵ The first step in improving scientific integrity, therefore, is to increase political integrity.

The second step is to provide better education for agency scientists on their roles in the process, including specifically education on the distinction between scientific and value judgments and on the extent to which they

245. Michael Kelly, for example, may have felt that he had to take on the evaluation of the legal merits of the Klamath biological opinion in part because NMFS did not follow its typical procedure of seeking review by career lawyers. See *Political Influence Oversight Hearing*, *supra* note 35, at 104–07 (statement of Michael Kelly, former Fisheries Biologist, FWS & NOAA) (reporting Kelly's criticism of the atypical, politicized process that led to the Klamath Biological Opinion).

might be faced with intertwined judgments. Agency scientists also should be made aware of practical, professionally acceptable steps to take when they believe they are being subjected to improper political pressures. That might include contacting an ombudsperson or designated scientific supervisor, or using a dissent channel. It should not be limited to whistle-blowing.

The third step within regulatory agencies might be to hire scientific analysts with more education, at higher pay grades. A bachelor's degree in science (which is all the training that Michael Kelly had) can leave students with the inaccurate view that science offers clear right or wrong answers.²⁴⁶ Those who go on to design and carry out their own research projects gain a better understanding of the subtleties of scientific judgment. It is obviously a bit more costly to hire Ph.D.-level scientists, but they are produced in sufficient quantity, and seem to have sufficient interest in "real world" work, that if Congress provided funding, it would be feasible. Alternatively, regulatory agencies could hire at the bachelor's level, but offer employees the opportunity to pursue additional research training and experience while working.²⁴⁷

Outside of agencies, enhancing scientific integrity as it relates to policy will require persuading scientists that they ought to practice this particular virtue. That cannot happen unless conservation scientists are aware of the possible conflicts of their values with their roles as scientists. Students in conservation-relevant fields should probably be explicitly exposed to these sorts of conflicts during their education, since many of them will be involved at some level, at some point in their career, with issues in conservation policy. But many scientists and students are already acutely aware of these sorts of conflicts, which are, after all, regularly debated in professional journals like *Conservation Biology*.²⁴⁸

Michael Sissenwine has argued that a more formal governance structure is needed to control the activities of environmental scientists. As he puts it, environmental science:

246. For a recent discussion of the importance and difficulty of imparting a more accurate view of uncertainty and the nature of scientific understanding, see Fred Singer, *Dualism, Science, and Statistics*, 57 *BIOSCIENCE* 778, 780 (2007). Singer points out the difficulty of teaching students about uncertainties in science because instructors use the hypothetic-deductive method, which "present[s] a world in which hypotheses originate with two alternatives (true or false)." *Id.*

247. Many academic institutions have ties to agencies that could facilitate this kind of post-hiring training. Some have already experimented with recruiting agency personnel to spend sabbaticals in academia. The University of California, Davis, for example, for about ten years had a Natural Resources Fellowship Program which offered agency personnel three- to six-month placements at the University. UC Davis Public Service Research Program, http://psrp.ucdavis.edu/about/program_history.shtml (last updated Mar. 6, 2007). With a small amount of targeted federal funding, such opportunities could easily be expanded.

248. See, e.g., Gary K. Meffe, *Conservation Focus: Policy Advocacy and Conservation Science*, 21 *CONSERVATION BIOLOGY* 11, 11 (2007) (introducing four symposium articles on the issue of advocacy by scientists in public policy).

is now an extremely socially-relevant profession that lay-people and policy makers need in their daily lives. With this maturation, and heightened social importance, come additional responsibilities. There are many other disciplines that provide advice or service to lay-people that cannot judge for themselves the qualifications or motives of the advice of service providers. Medical doctors, engineers, lawyers, certified public accountants and even beauticians are examples of professionals that advise or service lay-people. What distinguishes these professionals from environmental scientists is that they are all governed by codes of conduct, standard practices and certification and licensing that goes well beyond the awarding of academic degrees and journal peer review. The governance usually comes from within the professions, with government oversight or affirmation.²⁴⁹

I am not convinced that a new, formal governance structure for the environmental-scientific professions is the answer to the scientific-integrity problem. For one thing, exactly which activities would be subject to new oversight or barriers to entry is unclear. Much scientific research has no discernible relevance to policy, and many actions by scientists that can affect policy, such as letter writing or public speaking, are essentially private actions that would fall outside the realm of the typical scheme of regulation of professional practices. For another, I am not sure that sanctions are the right answer to this problem—as already explained, the sorts of shortfalls of scientific integrity that are most common in the policy context are failures to act with perfect virtue rather than heinous sins.²⁵⁰ Virtue of this sort, I believe, must be internally driven; it cannot be forced by the threat of external sanctions. If they are to do the hard work of vigorously maintaining awareness of the overlap of scientific and policy judgments, and monitoring the extent to which their own policy preferences might affect their scientific judgments, scientists must be convinced that doing so is truly a matter of scientific virtue. That proposition will be accepted if, but only if, most conservation scientists come to view it as important both to the progress of science and to the effective incorporation of science into policy. Robust debate in classrooms, at meetings, and in journals is part of the ongoing process of deciding whether scientific virtue in fact should be interpreted to encompass that kind of integrity.

Another approach frequently touted as a mechanism for ensuring scientific integrity is external peer review.²⁵¹ It can surely play a role at the margins, but it is a very imperfect tool for that purpose. At its best, peer review bears only an indirect relationship to scientific integrity, which is an

249. Sissenwine, *supra* note 118, at 91.

250. *See supra* section III(A)(2).

251. *See, e.g.*, Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664, 2665 (Jan. 15, 2005) (“Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community.”).

individual and unverifiable virtue. No peer reviewer can know how hard the scientists under review actually worked to practice objectivity and skepticism. The best reviewers can do is to evaluate whether the judgments made fall within the broad range of professionally acceptable ideas. That can reveal extreme departures from acceptable norms, with sufficient devotion of time and effort,²⁵² and only if the reviewers themselves both have the requisite expertise and actively practice the virtues of objectivity and skepticism.²⁵³ Outside peer review should be employed when there is strong reason to doubt the scientific integrity or credibility of an agency decision with important conservation or economic consequences, but it should not be considered a panacea. Peer review may be more useful at the early stages of decision making, when it can highlight points that might otherwise be overlooked or underemphasized, without seeming like a hostile challenge to agency expertise.²⁵⁴ Whether it comes early or late in the process, effective peer review requires the devotion of extraordinary amounts of time by experts who face many competing demands on their time,²⁵⁵ and brings little in the way of professional rewards. It must therefore be reserved for those situations in which it is most likely to provide concrete improvements, and in which the reviewers are most likely to emerge from the experience confident that their time was well spent.

V. Conclusion

Concerns about the scientific integrity of environmental policy in the current Administration are well taken but easily characterized in a misleadingly narrow way. The problem is more complex than it is sometimes made to appear. Both scientific and political integrity are essential to

252. Outside peer review did, for example, eventually reveal the flaws in the panther-habitat model, but only because four dedicated reviewers were willing to devote an astonishing amount of time and effort to the job. See BEIER ET AL., ANALYSIS OF SCIENTIFIC LITERATURE, *supra* note 94, at 2 (noting that each member of the review team read 1,500 to 2,000 pages of primary literature for the first step in the review process); *supra* section II(C)(1).

253. As Hilborn points out, those virtues are not always in abundant supply among journal reviewers. Hilborn, *supra* note 121, at 554. They may be even scarcer among reviewers of policy decisions, particularly if those reviewers are not forcefully reminded of the political or value elements of the decisions under review. As Dan Tarlock and I have pointed out previously, for example, when the National Research Council committee convened to undertake an exhaustive (and resource-intensive) review of the biological opinions which triggered the Klamath water crisis, they may not have adequately policed their own biases. See Holly Doremus & A. Dan Tarlock, *Science, Judgment and Controversy in Natural Resource Regulation*, 26 PUB. LAND & RESOURCES L. REV. 1, 16 (2005) (noting the evidence that the Klamath review committee may have been affected by their views of the importance of the potential economic consequences of cutting irrigation deliveries).

254. See Lars Noah, *Scientific "Republicanism": Expert Peer Review and the Quest for Regulatory Deliberation*, 49 EMORY L.J. 1033, 1059–64 (2005) (proposing that peer review be used in the regulatory context as a tool for "collaborative brainstorming").

255. See *supra* note 252.

effective and legitimate environmental policy. Shortfalls occur on both sides of the equation, but the problems with political integrity are currently more pervasive and more pressing. Political integrity could be improved by measures that increase the visibility of the political judgments in policy decisions, or that help separate and protect the independence of the scientific elements of those decisions. Scientific integrity within agencies can also be addressed to some extent by structural and procedural mechanisms. Ultimately, though, both within and outside agencies, scientific integrity is a matter of the norms of the scientific community. Those norms can be modified by education, but only if the community is persuaded that in fact scientific integrity is desirable, either on its own account or by reason of its consequences. That is not likely to happen without increased confidence in the political integrity of environmental policy decisions. Therefore, measures to increase political integrity can have the added benefit of making scientific integrity more achievable.

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