

SCIENTIFIC PEER REVIEW AND ADMINISTRATIVE LEGITIMACY

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INTRODUCTION

[I]n a democracy, there is nothing worse than ignoring science, or marginalizing the voice of science for reasons driven by changing political winds.

—Former Surgeon General Dr. Richard Carmona¹

Since its inception, policymakers and commentators have hotly debated the legitimacy of the administrative state.² That legitimacy depends on agencies providing reasoned explanations for their decisions.³ Science, on the other hand, enjoys broad, relatively uncontroversial acceptance as a legitimate search for objective truth.⁴ Taken together, the use of scientific information to justify agency action appears to be an ideal tool for promoting administrative legitimacy.⁵ Scientific support for a policy position connotes objectivity and reliability in policymaking as well as a

1. *The Surgeon General's Vital Mission: Hearing Before the H. Comm. on Oversight and Government Reform*, 110th Cong. 31–32 (2007) (statement of Dr. Richard Carmona, Surgeon General).

2. See JAMES M. LANDIS, *THE ADMINISTRATIVE PROCESS* 49–50 (1938); Steven P. Croley, *Theories of Regulation: Incorporating the Administrative Process*, 98 COLUM. L. REV. 1, 3 (1998) (“The sheer power wielded by the administrative state . . . immediately raises questions about its efficacy and even its political legitimacy.”); Cynthia R. Farina, *The Consent of the Governed: Against Simple Rules for a Complex World*, 72 CHI.-KENT L. REV. 987, 987 (1997) (“Like an intriguing but awkward family heirloom, the legitimacy problem is handed down from generation to generation of administrative law scholars.”); Jerry L. Mashaw, *Small Things Like Reasons Are Put in a Jar: Reason and Legitimacy in the Administrative State*, 70 FORDHAM L. REV. 17, 23–25 (2001) (addressing the legitimacy of the administrative state through the role of reason-giving); Mark Seidenfeld, *A Civic Republican Justification for the Bureaucratic State*, 105 HARV. L. REV. 1511, 1512 (1992) (“Over the past century, the powers and responsibilities of administrative agencies have grown to an extent that calls into question the constitutional legitimacy of the modern federal bureaucracy.”).

3. See Lisa Schultz Bressman, *Disciplining Delegation After Whitman v. American Trucking Ass'ns*, 87 CORNELL L. REV. 452, 485 (2002) (“[Administrative law principles] require agencies in general to articulate a basis for their policy determinations and, in particular, to articulate the standards for those determinations.”); Cary Coglianese & Gary E. Marchant, *Shifting Sands: The Limits of Science in Setting Risk Standards*, 152 U. PA. L. REV. 1255, 1256 (2004) (“Administrative law aspires to bring reason to agency policymaking.”); Mashaw, *supra* note 2, at 24.

4. See LINUS PAULING, *NO MORE WAR!* 209 (1958) (“Science is the search for the truth . . .”); CHARLES SANDERS PEIRCE, *PRAGMATISM AS A PRINCIPLE AND METHOD OF RIGHT THINKING* 266 (Patricia Ann Turrisi ed., 1997) (“[T]here is one thing even more vital to science than intelligent methods; and that is, the sincere desire to find out the truth, whatever it may be . . .”).

5. See Dr. Bruce Alberts, President, Nat'l Acad. of Scis., *Science and Human Needs: Address at the National Academy of Sciences' 137th Annual Meeting* (May 1, 2000), <http://www.nasonline.org/site/DocServer/2000address.pdf?docID=982> (“Scientists, as practitioners, teach important *values*. These include honesty, an eagerness for new ideas, the sharing of knowledge for public benefit, and a respect for evidence that requires verification by others. These ‘behaviors of science’ make science a catalyst for democracy.”).

corresponding constraint on agency discretion⁶ that is consistent with our democratic principles. But what happens when the scientific information cited by the agency is not necessarily credible or, even worse, was manipulated by policymakers to support a predetermined political outcome?

In 2003, for example, the Environmental Protection Agency (EPA) chose not to promulgate additional regulations regarding the weed killer atrazine⁷ despite numerous corroborating studies by independent scientists showing that the compound was highly dangerous in test animals⁸ and the fact that the European Union had recently banned the compound on similar grounds.⁹ The EPA pointed to scientific uncertainty about the potential dangers of atrazine as the basis for its regulatory inaction.¹⁰ This uncertainty resulted from studies supporting atrazine's safety by atrazine's manufacturer, Syngenta, that were later deemed fundamentally flawed by an independent panel of experts convened by the EPA.¹¹ The result was an administrative process that may not only have been informed by unreliable science, but that was perceived as "manufacturing [scientific] uncertainty" in order to justify a predetermined policy position.¹²

A similar situation occurred in 2006 when the Food and Drug

6. See KENNETH CULP DAVIS, *DISCRETIONARY JUSTICE* 6 (Greenwood Press 1980) (1969) ("All policy-making, by its intrinsic nature, is discretionary . . ."); LANDIS, *supra* note 2, at 52 (discussing administrative authority in terms of discretion).

7. See Rick Weiss, "Data Quality" *Law Is Nemesis of Regulation*, WASH. POST, Aug. 16, 2004, at A1 (explaining that in the same month that the European Union banned atrazine, "the EPA decided to permit ongoing use in the United States with no new restrictions").

8. See *id.* (noting that the harmful effects of atrazine "have been echoed by at least four other independent research teams in three countries").

9. See *id.* ("[C]oncerns about the herbicide led the European Union to ban atrazine . . ."). In fact, more than one of the scientists who supported the conclusion that atrazine was dangerous was at one time hired by the chemical's manufacturer to study its effects. See also *id.* (noting that Syngenta team members Tyrone B. Hayes and James Carr each made statements regarding atrazine's harmful effects on frogs).

10. See *id.* (listing the scientific grounds on which further regulation of atrazine was challenged).

11. See FIFRA SCIENTIFIC ADVISORY PANEL MEETING, POTENTIAL DEVELOPMENTAL EFFECTS OF ATRAZINE ON AMPHIBIANS 20–22 (2003).

12. Professor David Michaels, the Energy Department's former Assistant Secretary for Environment, Safety, and Health under President Clinton, defined *manufacturing uncertainty* as "reanalyz[ing] the data to make [previously firm] conclusions disappear—poof. Then they say one study says yes and the other says no, so we're nowhere." Weiss, *supra* note 7. Concern about this type of agency behavior is not new to administrative law or limited to specific political administrations or parties. See, e.g., Adrian Vermeule, *The Parliament of the Experts*, 58 DUKE L.J. 2231, 2257–58 (2009) (providing an example from 2006 of the EPA citing scientific uncertainty that was not recognized by retained scientific experts); Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1628–50 (1995) (describing in 1995 three categories of "science charade": "unintentional," "intentional," and "premeditated").

Administration (FDA) approved Plan B, the “morning-after pill,” for over-the-counter (OTC) sale.¹³ Agency scientists and independent advisers determined that the pill was safe for OTC purchase by women of any age.¹⁴ FDA policymakers, however, only approved OTC sales of Plan B for women 18 years of age and older.¹⁵ In congressional testimony about this decision, the acting head of the FDA, Dr. Andrew von Eschenbach, stated that the decision was ultimately a medical rather than a political one,¹⁶ and that the scientific evidence of the pill’s safety for minors was unclear, leaving the FDA essentially no choice but to limit OTC sales of Plan B on the basis of age.¹⁷ Like the atrazine decision, the FDA’s explanation for its decision on Plan B was perceived as both substantively uninformed and based on “manufactured uncertainty.”¹⁸ A federal court reviewing a challenge to the Plan B decision vacated in part and remanded the decision to the agency.¹⁹ It ordered that the drug be made available for OTC sales to women age 17 and older on the grounds that the FDA’s decision to the contrary was unsupported by scientific evidence.²⁰

These examples highlight the dangers faced by agencies in supporting their policy decisions with unreliable scientific information;²¹ without

13. See Rob Stein, *Plan B Use Surges, and So Does Controversy*, WASH. POST, July 13, 2007, at A1, available at <http://www.washingtonpost.com/wp-dyn/content/article/2007/07/12/AR2007071202146.html> (reporting increased use of Plan B approximately one year after OTC sales were approved).

14. See Melissa McNamara, *FDA Pick Pressed on Morning-After Pill*, CBS NEWS, Aug. 1, 2006, http://www.cbsnews.com/stories/2006/08/01/health/main1856852.shtml?source=search_story (“The FDA’s own scientists say the [Plan B] pills are safe, and . . . a panel of independent advisors overwhelmingly backed nonprescription sales for all ages.”).

15. See Stein, *supra* note 13 (noting that the FDA permitted OTC sales of Plan B to women eighteen years of age and older in an August 25, 2006 ruling).

16. See McNamara, *supra* note 14 (quoting Dr. von Eschenbach as saying he made the decision to consider OTC sales of Plan B “not on a political ideology, but on a medical ideology”).

17. See *id.* (reporting that Dr. von Eschenbach said “[D]ata did not support the safe over-the-counter use [of Plan B] by minors.”).

18. Nancy Northrup, president of New York’s Center for Reproductive Rights, argued that “[t]here’s no medical basis for restricting teenagers’ access to emergency contraception.” Stein, *supra* note 13; see also Vermeule, *supra* note 12; Wagner, *supra* note 12; Weiss, *supra* note 7 (quoting Professor David Michaels’s description of the atrazine regulatory process as an example of “manufacturing [scientific] uncertainty”).

19. See *Tummino v. Torti*, 603 F. Supp. 2d 519, 550 (E.D.N.Y. 2009).

20. The court explained its reasoning as follows:

[N]o useful purpose would be served by continuing to deprive 17 year olds access to Plan B without a prescription. Indeed, the record shows that FDA officials and staff both agreed that 17 years olds can use Plan B safely without a prescription. The FDA’s justification for this age restriction, that pharmacists would be unable to enforce the prescription requirement if the cutoff were age 17, rather than 18, lacks all credibility.

Id. at 524.

21. It should be noted that although these examples occurred during the George W.

public confidence in the scientific underpinnings of a given decision, the political legitimacy of that decision is compromised. At least in part as a response to this concern, many agencies have adopted scientific peer review programs.²² Despite their prevalence, however, these programs rarely, if ever, specify the scope and nature of the relationship between peer reviewers and administrators.

This Article examines the relationship between peer reviewers and administrators as it pertains to the legitimacy of administrative decisions based on scientific information. Part I outlines the role of scientific information in policymaking. Part II defines the concept of “administrative peer review”—independent, scientific peer review employed in the administrative process.²³ Part III considers the potential relationships between peer reviewers and administrators and explores those relationships through four different models of administrative peer review. Part IV develops and applies a series of normative frameworks, including a cost–benefit analysis, through which those models are evaluated in the context of administrative legitimacy. The Conclusion provides some resulting observations about the theoretical basis for existing and future

Bush Administration, the problems associated with unreliable scientific information being incorporated—knowingly or otherwise—into agency policymaking are not limited to a particular administration or political party. See, e.g., Kathryn A. Watts, *Proposing a Place for Politics in Arbitrary and Capricious Review*, 119 YALE L.J. (forthcoming 2009) (manuscript at 40), available at <http://ssrn.com/abstract=1353519> (stating that the current technocratic model of administrative law incentivizes agencies “to dress up their decisions in technocratic terms and to hide political influences,” and that “[a]gencies, accordingly, may well be tempted to align facts and science with political choices rather than giving science its own rightful place that is separate from political or value-laden considerations”). Even after President Obama issued his “Memorandum for the Heads of Executive Departments and Agencies,” in which he stated that “[s]cience and the scientific process must inform and guide decisions of my Administration . . .” Press Release, The White House, Memorandum for the Heads of Executive Departments and Agencies (Mar. 9, 2009), the scientific integrity of administrative policy decisions in the Obama Administration have been drawn into question. See, e.g., Tom Doggett, *Obama Opposition to Nuclear Waste Site Questioned*, REUTERS.COM, Apr. 30, 2009, <http://www.reuters.com/article/environmentNews/idUSTRE53T7MH20090430> (describing the debate over whether the Obama Administration’s policy decision to not store nuclear waste at the Yucca Mountain depository is supported by scientific evidence).

22. See, e.g., U.S. GEN. ACCOUNTING OFFICE, FEDERAL RESEARCH: PEER REVIEW PRACTICES AT FEDERAL SCIENCE AGENCIES VARY 18–70 (1999) [hereinafter GAO PEER REVIEW REPORT] (describing varying peer review practices at twelve federal agencies).

23. For purposes of this discussion, *administrative process* will refer generally to administrative rulemaking, as that is the environment in which agencies most frequently rely on peer review. See J.B. Ruhl & James Salzman, *In Defense of Regulatory Peer Review*, 84 WASH. U. L. REV. 1, 15 (2006). There is no apparent reason, however, why the concepts employed here could not be applied to the entire range of agency functions, including the “universe of regulatory decisions involving the grant of permits and licenses.” *Id.* at 8 n.26 (quoting Wendy E. Wagner, *The “Bad Science” Fiction: Reclaiming the Debate over the Role of Science in Public Health and Environmental Regulation*, 66 LAW & CONTEMP. PROBS. 63, 73 (2003)).

manifestations of administrative peer review, and raises some issues for further consideration.

I. SCIENCE IN POLICYMAKING

Since the administrative expansion of the 1970s,²⁴ agencies have increasingly confronted policy questions that implicate the sciences.²⁵ Agencies such as the EPA, the FDA, and the Occupational Safety and Health Administration (OSHA) routinely engage in policy analyses²⁶ that are often driven by scientific “inputs”—relevant scientific information acquired by the agency for the purpose of informing the policymaking process.²⁷ These inputs can come from a variety of sources, including studies performed by agency scientists, studies conducted by independent or privately funded research groups, or from the scientific literature.²⁸

24. See CASS SUNSTEIN, *AFTER THE RIGHTS REVOLUTION* 242–44 (1990) (documenting the number and year of origin of federal regulatory agencies as of 1980 and explaining that the 1970s represented “by far the most explosive period of regulatory growth in the nation’s history”); MURRAY WEIDENBAUM, *CTR. FOR THE STUDY OF AM. BUS., PROGRESS IN FEDERAL REGULATORY POLICY, 1980–2000*, at 3–4 (2000) (noting that the federal government adopted a “plethora” of new and expanded regulatory programs in the 1970s and that the staffing and budgetary commitments of those agencies has risen since then).

25. See SHEILA JASANOFF, *THE FIFTH BRANCH: SCIENCE ADVISERS AS POLICYMAKERS* 2–3 (1990) (“The rapid expansion of social regulation in [the 1970s] created a host of new agencies and expanded the reach of federal regulatory activity Simultaneously, the nature of technical decisionmaking in the agencies underwent profound changes [F]ledgling agencies were asked to undertake ever more complex . . . analyses . . .”).

26. See Sidney A. Shapiro, *Scientific Issues and the Function of Hearing Procedures: Evaluating the FDA’s Public Board of Inquiry*, 1986 *DUKE L. J.* 288, 291 (describing the scientific analyses performed by the three agencies); see also JASANOFF, *supra* note 25, at 3 (noting the controversy created by the reliance on scientific information by the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Occupational Health and Safety Administration (OSHA) in setting policy).

27. A common example of this is the use by agencies in environmental risk assessments of scientific “inputs” to justify their political conclusions. See Coglianese & Marchant, *supra* note 3, at 1275 (distinguishing “risk assessment” from “risk management” and explaining that the former “is based extensively on scientific information, supplemented with what have been termed ‘risk assessment policy’ judgments to bridge gaps and uncertainties in the scientific evidence”); see also Fred Anderson et al., *Regulatory Improvement Legislation: Risk Assessment, Cost-Benefit Analysis, and Judicial Review*, 11 *DUKE ENVTL. L. & POL’Y F.* 89, 131–32 (2000) (distinguishing the “scientific inputs for a risk assessment”).

28. For purposes of this Article, the fact that scientific inputs can take on a wide variety of disparate forms is essentially irrelevant. Regardless of whether the scientific information at issue for administrators was obtained directly by the agency or through an independent study or literature search, administrative peer reviewers as defined herein will ask the same questions in the same way—Was the scientific information contained in that input acquired by the agency through sound methods and are the scientific conclusions rationally based on that information? Issues that arise directly from the specific form of the input, such as how a literature search was conducted or a particular study was chosen for consideration by administrators, are beyond the scope of this discussion because they do not, in and of

When agency activity is informed by scientific inputs, the agency's justification for that activity must also incorporate those inputs.²⁹ In most cases, scientific inputs will be credible, i.e., they will be developed using methods that are consistent with established norms of scientific investigation, and the agency's reliance on them will not be problematic.³⁰ Recently, however, as shown in the atrazine and Plan B examples above, accusations of politically expedient uses of unreliable science have created a dangerous cynicism about agency application of scientific information to policy questions and, more significantly, about the integrity of agency explanations for science-based policy decisions.³¹

Reliable scientific information serves two important functions in the administrative process. It provides substantive information that is relevant and helpful to policymakers, and it creates a rational foundation on which administrators may justify their policy determinations.³² The exclusion of

themselves, say anything about the credibility of the underlying scientific data or information. This definition of scientific inputs is even broad enough to include scientific information presented to the agency in the notice-and-comment process of informal rulemaking. See 5 U.S.C. § 553(c) (2006). Where an agency sought to rely on scientific information provided to it by public comment to justify a policy position, administrative peer review could be employed to review that input as well.

29. See, e.g., Bressman, *supra* note 3 (explaining the importance of agency explanations for policy decisions in administrative law).

30. See, e.g., Wendy E. Wagner, *The "Bad Science" Fiction: Reclaiming the Debate over the Role of Science in Public Health and Environmental Regulation*, 66 LAW & CONTEMP. PROBS. 63, 72 (2003) (explaining that in the EPA context, "there are surprisingly few examples of EPA using unreliable science or using science inappropriately to support a final regulation"). Among the available scientific inputs, those gathered from peer-reviewed scientific literature are most likely to provide reliable data.

31. See, e.g., U.S. HOUSE OF REPRESENTATIVES COMM. ON OVERSIGHT AND GOV'T REFORM, POLITICAL INTERFERENCE WITH CLIMATE CHANGE SCIENCE UNDER THE BUSH ADMINISTRATION, at i (2007) ("[T]he Bush Administration has engaged in a systematic effort to manipulate climate change science and mislead policymakers and the public about the dangers of global warming."); Gardiner Harris, *White House Is Accused of Putting Politics over Science*, N.Y. TIMES, July 10, 2007, <http://www.nytimes.com/2007/07/10/washington/11cnd-surgeon.htm> (reporting claims by former Surgeon General Richard H. Carmona that "top officials in the Bush administration repeatedly tried to weaken or suppress important public health reports because of political considerations"); see also John Derbyshire, *Will Obama Kill Science?*, NAT'L REV. ONLINE, Oct. 7, 2008, <http://article.nationalreview.com/?q=Y2U5YTJiMzhjNDNhZTcwZGYyZjcyMzQyZWNmNjJjN2E=> (raising questions about the scientific credibility of potential policy initiatives in the Obama Administration).

32. 5 U.S.C. § 553(c) (2006) (requiring new rules to include a "concise general statement of their basis and purpose"); Mashaw, *supra* note 2, at 24 (recounting the development of the "concise statement" requirement of section 553(c) of the Administrative Procedure Act (APA) "into the requirement of a comprehensive articulation of the factual bases, methodological presuppositions, and statutory authority that justifies any exercise of rulemaking"); Gary K. Meffe et al., *Independent Scientific Review in Natural Resource Management*, 12 CONSERVATION BIOLOGY 268, 268 (1998) ("Independent scientific review (ISR) can help ensure that environmental decisions and policy making reflect the best scientific knowledge of the day Also ISR can raise the level of public trust in the

unreliable information, however, may be even more important. Whereas a lack of reliable scientific information does not necessarily destroy an agency's ability to make a principled decision, the introduction of unreliable scientific inputs into the political process might. Unreliable scientific information could cause agencies using that information to make poorly informed policy decisions or, more cynically, to "manufacture uncertainty"³³ or otherwise mischaracterize scientific inputs in support of a policy decision that is not in fact sustained by scientific data.³⁴ This in turn creates significant systemic problems, as any weaknesses in the integrity of agency explanations for science-based policy decisions threaten the legitimacy of all administrative decisions based on scientific information.³⁵

A common response by agencies to the problems posed by unreliable scientific inputs is the adoption of peer review programs as a form of scientific quality control.³⁶ Peer review in turn promotes the political legitimacy of science-based agency decisions by enhancing the integrity of

process, alleviating fears that industries, environmental protection organizations, or government agencies are simply promoting their own interests . . . without benefit of relevant scientific information."); Wagner, *supra* note 30, at 66–67 (citing "bad science" impacting the quality and transparency of agency decisionmaking). As discussed *infra* in Parts IV.A and IV.C, reliable scientific information can also contribute to public confidence in the integrity of the administrative process.

33. Weiss, *supra* note 7 (quoting Professor David Michaels); see also Harris, *supra* note 31 (identifying areas in which scientific information became politicized).

34. MARK R. POWELL, SCIENCE AT EPA: INFORMATION IN THE REGULATORY PROCESS 38 (1999) ("The agency's official science advisers serve as important sources of scientific information, as a quality assurance mechanism, and as a source of scientific credibility and legitimacy for decisionmaking."). These phenomena are analogous to Professor J.B. Ruhl's "The Science Made Us Do It" violation. J.B. Ruhl, *Reconstructing the Wall of Virtue: Maxims for the Co-Evolution of Environmental Law and Environmental Science*, 37 ENVTL. L. 1063, 1067–68 (2007). The opposite problem, that of using unreliable scientific information to "manufacture certainty," is less of a concern, as it depends on the total absence of reliable scientific information rather than merely the presence of a single source of unreliable information as in the case of manufacturing uncertainty.

35. See, e.g., Bressman, *supra* note 3.

36. See, e.g., GAO PEER REVIEW REPORT, *supra* note 22 (describing varying peer review practices at twelve federal agencies); JASANOFF, *supra* note 25, at 84–180 (describing scientific advisory processes of the EPA and FDA); Lars Noah, *Scientific Republicanism: Expert Peer Review and the Quest for Regulatory Deliberation*, 49 EMORY L.J. 1033, 1052–57 (2000) (describing the different approaches to peer review employed at the EPA, FDA, and Consumer Product Safety Commission (CPSC)). As part of its quality control function, peer review performs two discrete tasks. It contributes to the substantive quality of agency decisions by promoting reliable scientific information, and it limits agencies' ability to rely on unreliable science as a politically expedient means of justifying a preferred policy outcome. The importance of peer review to the administrative process was reiterated as part of a recent expert panel on administrative law convened by the House Judiciary Committee. See *House Judiciary Convenes Expert Panel on Reviving U.S. Administrative Conference*, 77 U.S.L. WK. 2627 (2009) ("Another topic worthy of ACUS study is the use by agencies of scientific and technical analysis in rulemaking, including peer review and risk assessment . . .").

the explanations for those decisions.³⁷ More specifically, agency explanations based on reliable science are better suited to address the principles of expertise, accountability (including transparency),³⁸ and efficiency that are fundamental to legitimate administrative government.³⁹

Existing government peer review programs are varied in their specific approaches⁴⁰ but reflect a widely held belief within the scientific and regulatory communities that expert peer review of scientific work product is a useful tool in policymaking.⁴¹ In 2005, the White House Office of Management and Budget (OMB) mandated independent peer review for all important scientific information disseminated by administrative agencies.⁴² Like its predecessor policies at individual agencies, the OMB's mandate was somewhat open-ended, leaving the form and scope of peer review to the agencies' discretion.⁴³ This was done, according to OMB, out of

37. It is important to clarify that the contribution of peer review that is the focus of this discussion is its ability to identify and prevent agency use of "bad" or "unreliable" scientific information. This is distinguishable from the question of how peer review can influence the potential misuse by administrative agencies of "good" or "credible" science. See Ruhl & Salzman, *supra* note 23, at 35 (distinguishing between "cases in which an agency produces or employs 'bad science' and cases in which an agency misuses 'good science'"). Because this Article defines scientific peer review as pertaining only to the credibility of scientific inputs rather than to science-based policymaking as a whole, it does not consider cases where an agency misuses "good science." For an interesting discussion of the potential use of peer review in connection with agency misuse of credible science, see *id.* at 15.

38. See Molly Beutz, *Functional Democracy: Responding to Failures of Accountability*, 44 HARV. INT'L L.J. 387, 428 (2003) (describing transparency as a "precondition" to accountability).

39. See Jost Delbrück, *Exercising Public Authority Beyond the State: Transnational Democracy and/or Alternative Legitimation Strategies?*, 10 IND. J. GLOBAL LEGAL STUD. 29, 34 (2003) ("[W]e find several elements and criteria that are held to contribute to the legitimacy of the exercise of public authority [S]uch criteria are transparency and efficiency of government (or more broadly, public authority), and actions and accountability Finally, we may add expertise as a factor that can contribute to the acceptability of acts of public authorities."). The interrelationship between administrative peer review and these principles is addressed in Part IV, *infra*.

40. See GAO PEER REVIEW REPORT, *supra* note 22 (describing varying peer review practices at twelve federal agencies); Noah, *supra* note 36 (describing the different approaches to peer review employed at the EPA, FDA, and CPSC).

41. See Lars Noah, *Peer Review and Regulatory Reform*, 30 ENVTL. L. REP. 10,606, 10,606 (2000) ("[E]ssentially everyone applauds the idea of using independent peer review in the regulatory process."); see also Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664, 2666 (Jan. 14, 2005) [hereinafter OMB Bulletin] ("A wide variety of authorities have argued that peer review practices at federal agencies need to be strengthened."); Thomas S. Burack, Note, *Of Reliable Science: Scientific Peer Review, Federal Regulatory Agencies, and the Courts*, 7 VA. J. NAT. RESOURCES L. 27, 107 (1987) (identifying six case studies in support of the agency view that peer review can strengthen administrative decisionmaking).

42. OMB Bulletin, *supra* note 41, at 2665 ("This Bulletin establishes that important scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal government.").

43. See *id.* ("We recognize that different types of peer review are appropriate for different types of information. Under this Bulletin, agencies are granted broad discretion to

respect for existing peer review programs and the importance of preserving agency flexibility to develop programs best suited to agencies' particular needs and goals.⁴⁴ Despite this flexibility, administrative peer review programs do possess some common features.

II. ADMINISTRATIVE PEER REVIEW

Administrative peer review is similar to the more traditional applications of peer review in the publishing and grant-funding contexts⁴⁵ but includes some important differences due to its focus on a distinct type of scientific work product—"regulatory science."⁴⁶ Peer review has been an important part of scientific discovery and research for over three centuries.⁴⁷ Due to the highly specified and technical nature of scientific information and analysis, primary responsibility for evaluating scientific work has remained internal to the scientific community,⁴⁸ largely through the use of expert peer review.⁴⁹ As early as 1702, scientific journals instituted editorial peer review, in which independent experts in the relevant field screened submissions prior to publication.⁵⁰ This practice, although implemented in

weigh the benefits and costs of using a particular peer review mechanism for a specific information product Peer review may take a variety of forms").

44. *Id.*

45. See David Michaels, *Politicizing Peer Review: The Scientific Perspective*, in *RESCUING SCIENCE FROM POLITICS* 222–27 (Wendy Wagner & Rena Steinzor eds., 2006) (describing peer review in the editorial and grant-funding contexts).

46. See JASANOFF, *supra* note 25, at 76–79 (pointing out the distinctions between "regulatory" and "research" science). "Regulatory" science refers to both scientific information generated by agencies through their own work product and scientific information developed by nongovernmental actors and collected or identified by agency personnel as relevant to their policy agenda. Compare Ruhl & Salzman, *supra* note 23, at 47–48 (stating that "most regulatory agencies . . . are neither expected by law nor equipped by budget to conduct the original research necessary to evaluate a decision," and therefore must consult data sources from nongovernmental sources), with Wagner, *supra* note 30, at 74 (arguing that there is no evidence in support of the proposition that "EPA produces or relies upon bad science to support its decisions") (emphasis added).

47. Ruhl & Salzman, *supra* note 23, at 12 (stating that editorial peer review has been in use "for over 300 years" (citing ANN C. WELLER, EDITORIAL PEER REVIEW: ITS STRENGTHS AND WEAKNESSES 1–7 (2001))).

48. See Lars Noah, *Sanctifying Scientific Peer Review: Publication as a Proxy for Regulatory Decisionmaking*, 59 U. PITT. L. REV. 677, 695 (1998) ("Because scientific work often depends upon complex underlying assumptions and choices of methodology, probing and careful review by other scientists is indispensable.").

49. See JASANOFF, *supra* note 25, at 64 ("The institutionalization of peer review . . . was facilitated by the emergence of a professional scientific community concerned with upholding the interests of its members in recognition, authority, and above all, dependable knowledge."); Noah, *supra* note 36, at 1045 ("Peer review, in its broadest sense, represents the scientific community's effort to police itself and to assure a certain minimum level of quality so that scientists and others can rely on the results of reported scientific research.").

50. Susan Haack, *Peer Review and Publication: Lessons for Lawyers*, 36 STETSON L. REV. 789, 792–93 (2006) ("[B]y 1702 the *Journal de Scavans* . . . had assigned

varying forms over the years, remains the chief tool of scientific publications and, more recently, of scientific granting institutions for determining which scientific work is most worthy of publication or financial support.⁵¹ According to some commentators, peer review “does not merely reflect the scientific method; it is the scientific method.”⁵²

There is not a singularly accepted method of scientific peer review.⁵³ “Traditional” peer review—peer review in the editorial and grant-funding contexts—is defined generally as a nonbinding,⁵⁴ critical, objective analysis by one or more independent experts in the field of a project’s novelty, methods, rationality, and contribution to scientific knowledge.⁵⁵ It is subject to editorial discretion based on the needs and interests of the publication or, to a lesser extent, of the funding institution at the time of review.⁵⁶ Just as these affirmative criteria are instructive to understanding how peer review works, so too are the notable omissions. Traditional peer review is not concerned with nonscientific questions or methods.⁵⁷ It is not a means of verifying the accuracy of specific findings or data, nor is it a recreation of a particular study; peer reviewers do not “double-check” the correctness of scientific work product.⁵⁸ Traditional peer review is also not

responsibility for screening submissions in a given area to various members of the editorial board.”).

51. Noah, *supra* note 36, at 1044–45 (“Peer review . . . is generally an intrinsic part of the process by which institutions allocate research funds and scientific journals select manuscripts for publication.”); Ruhl & Salzman, *supra* note 23, at 12 (“Peer review is most strongly associated with scientific journal publication decisions . . . but it is also employed in . . . grant-funding decisions . . .”).

52. Noah, *supra* note 36, at 1045 (citing WILLIAM D. GARVEY, COMMUNICATION: THE ESSENCE OF SCIENCE 69 (1979) and JOHN ZIMAN, RELIABLE KNOWLEDGE: AN EXPLORATION OF THE GROUNDS FOR BELIEF IN SCIENCE 130–32 (1978)).

53. JASANOFF, *supra* note 25, at 64 (“Although peer review is ubiquitous in science, the term corresponds to no single, universally accepted set of practices.”); *see also* OMB Bulletin, *supra* note 41, at 2665 (“[D]ifferent types of peer review are appropriate for different types of information.”).

54. JASANOFF, *supra* note 25, at 64 (“[P]robably the most significant point of commonality among peer-review systems is that the ultimate decisionmaker . . . is seldom bound to follow the reviewers’ recommendations exactly.”).

55. *See id.* at 65 (noting that federal research-sponsoring organizations generally seek advice from panels of experts); *see also* Ruhl & Salzman, *supra* note 23, at 13 (noting the peer review standards of the scientific journal *Ecology*).

56. *See* JASANOFF, *supra* note 25, at 66 (“Unlike the jury verdict . . . peer review is not binding. Both journal editors and managers of federal research programs retain discretion to override the recommendations of their reviewers . . .”). Although not entirely lacking, the equivalent of editorial discretion is less prevalent in the funding context. *See* Michaels, *supra* note 45, at 226 (“In contrast to the ultimate power of editors to accept or reject the advice of editorial peer reviewers, agency funders have little discretion to diverge from the rankings of the evaluators.”).

57. *See, e.g.*, Noah, *supra* note 48, at 695 (“Because *scientific* work often depends upon complex underlying assumptions and choices of methodology, probing and careful review by other scientists is indispensable.”) (emphasis added).

58. *See* Haack, *supra* note 50, at 800–01 (“Many journals don’t check the statistical

a means of detecting fraud.⁵⁹ It is a higher level evaluation of a project's scientific methods and potential intellectual contribution—a form of scientific quality control more akin (in the legal vernacular) to an abuse of discretion, rather than a *de novo*, standard of review.⁶⁰

Like traditional peer review, administrative peer review may take on a variety of forms,⁶¹ is traditionally nonbinding,⁶² requires reviewers to be independent and expert, and limits itself to a review of the scientific (as opposed to policy-related) methods and inferences employed in the project under review.⁶³ It is thus distinguishable from the concept of “regulatory

calculations in accepted papers; and reviewers are in no position to repeat authors' experiments or studies”); Noah, *supra* note 41, at 10,607 (“[P]eer review as a mechanism differs from the broader notion of an unhurried dialogue among experts searching (usually in vain) for some ultimate truth.”); Ruhl & Salzman, *supra* note 23, at 13 (explaining that peer reviewers do “no independent research” as part of their review, nor does the review include “engaging in independent data verification”).

59. See, e.g., Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029, 1147 n.597 (1997) (citing recent studies in support of the position that “[p]eer review is . . . not an effective protection against outright scientific fraud”) (quoting DARYL E. CHUBIN & EDWARD J. HACKETT, *PEERLESS SCIENCE: PEER REVIEW AND U.S. SCIENCE POLICY* 20–24 (1990)).

60. See Noah, *supra* note 36, at 1045 (referring to peer review's “quality control function”); Ruhl & Salzman, *supra* note 23, at 13 (analogizing peer review to appellate, rather than *de novo*, review).

61. See OMB Bulletin, *supra* note 41, at 2665 (explaining that “agencies are granted broad discretion to weigh the benefits and costs of using a particular peer review mechanism for a specific information product,” and that “[p]eer review may take a variety of forms, depending on the nature and importance of the product”); GAO PEER REVIEW REPORT, *supra* note 22.

62. See OMB Bulletin, *supra* note 41 (stating that although “peer review reports are an important factor,” “[a]gencies are not expected to cede their discretion . . . to peer reviewers; accountable agency officials must make the final decisions”); Anderson et al., *supra* note 27, at 130–32 (stating that peer review in the administrative context “should not become a straightjacket for agency decisionmakers,” and that “agency officials must not cede their power to pursue rulemaking to independent and unaccountable peer reviewers”). Specific statutory review regimes do impose limits on agency action, but these limits are not binding in the sense that they do not *ex ante* preclude agencies from pursuing a desired policy direction. See, e.g., 42 U.S.C. § 300aa-14(c)(2) (2006) (mandating that the Secretary of Health and Human Services publish reasons for failing to conduct a rulemaking in accordance with recommendations from the Advisory Committee on Childhood Vaccines); *id.* § 7607(d)(3) (requiring the EPA to articulate its reasons for deviating from the recommendations of the Clean Air Scientific Advisory Committee). These limits also do not preclude agencies from relying on specific scientific inputs in justifying those decisions. See *infra* notes 103–07 and accompanying text (defining “binding” administrative peer review as precluding agency reliance on pieces of scientific information deemed unreliable by peer reviewers).

63. J.B. Ruhl, *Prescribing the Right Dose of Peer Review for the Endangered Species Act*, 83 NEB. L. REV. 398, 402 (2004) (“Peer review is generally described as a scientifically rigorous review and critique of a study's methods, results, and findings that is conducted by others in the relevant field who have the requisite training and expertise, who have no pecuniary or other disqualifying bias with respect to the topic, and who are independent of the persons who performed the study.”); see also GAO PEER REVIEW REPORT, *supra* note 22, at 4 (explaining that although there is “no written definition of peer review that applies

peer review,”⁶⁴ as well as from “science itself.”⁶⁵ Administrative peer review is not a means of validating or double-checking individual data points or specific conclusions;⁶⁶ it is a review of scientific process to determine if the work under consideration was performed within the bounds of accepted scientific norms.⁶⁷

across the federal government’ and that “all of the agencies’ definitions . . . contained the fundamental concept of a review of technical or scientific merit by individuals with sufficient technical competence and no unresolved conflict of interest”); OMB Bulletin, *supra* note 41, at 2669 (“[R]eviewers should be asked to provide advice on the reasonableness of judgments made from the scientific evidence. However, the charge should make clear that the reviewers are not to provide advice on the policy Such considerations are the purview of the government.”) (citing MARK R. POWELL, *SCIENCE AT EPA: INFORMATION IN THE REGULATORY PROCESS*, 139 (1999)).

64. See Ruhl & Salzman, *supra* note 23. Professors Ruhl and Salzman describe “regulatory peer review” as the process of reviewing an agency’s use of science to justify a policy or legal decision. *Id.* By contrast, *administrative peer review*, as defined here, does not in any way consider the political components of a policy decision—it is focused solely on the reliability of the scientific inputs to the policymaking process.

65. See Noah, *supra* note 36, at 1046 (“[P]olicymakers often seem to conflate peer review with science itself . . .”).

66. Administrative peer review is also (at least theoretically) distinct from other administrative processes such as notice-and-comment procedures under the APA and judicial review of agency action. Unlike the notice-and-comment process, peer review is limited to an unbiased, expert review of scientific information pertinent to a policy question; the public comments anticipated by the APA rulemaking procedures neither require nor expect expertise or objectivity on behalf of the commenters. See Ruhl, *supra* note 63, at 402–03 (distinguishing peer review from public comment procedures on the grounds that public comment “does not screen out biased members of the public and is not limited to experts”); see also U.S. ENVTL. PROT. AGENCY, *SCIENCE POLICY COUNCIL PEER REVIEW HANDBOOK* 12 (2d ed. 2000) [hereinafter *EPA HANDBOOK*] (“The critical distinction [between peer review and notice and comment] is that public comment doesn’t necessarily draw the kind of independent, expert information and in-depth analyses expected from the peer review process. Public comment is open to all issues, whereas the peer review process is limited to consideration of technical issues. While it may be an important component of the review process, public comment does not substitute for peer review.”); Anderson et al., *supra* note 27, at 130 (stating that peer review cannot replace notice-and-comment procedures); Noah, *supra* note 36, at 1071. *But see* Randolph J. May, *OMB’s Peer Review Proposal—Swamped by Science?*, *ADMIN. & REG. L. NEWS*, Spring 2004, at 5 (suggesting that in the Internet age, the opportunity for public comment is sufficiently broad to displace scientific peer review). Peer review is separate from judicial review in the sense that peer review is a more rigorous, expert, and substantive review than that performed by inexperienced judges who are generally required to defer to agency expertise. See Ruhl, *supra* note 63, at 403 (differentiating between peer review and judicial review on the basis that judicial review “does not ensure the same level of expertise” as peer review and is limited to “the review standards of the APA, not those of scientific peer review”); see also Anderson et al., *supra* note 27, at 130; Noah, *supra* note 36, at 1071 (stating that peer review cannot replace judicial review).

67. *EPA HANDBOOK*, *supra* note 66, at 10 (asking peer reviewers to assess the applicable “assumptions, calculations, extrapolations, alternate interpretations, methodology, acceptance criteria, and conclusions” associated with the scientific work product under review); OMB Bulletin, *supra* note 41, at 2665 (defining peer review as an evaluation of the “appropriateness of methods and the strength of the author’s inferences” and enumerating the items for peer reviewers of regulatory science to consider, including “the clarity of hypotheses, the validity of the research design, the quality of data collection

Administrative peer review is different from traditional peer review due to the nature of the information being reviewed. In general, administrative agencies engage in “regulatory science”—the collection or development of scientific information for the purpose of informing specific political decisions.⁶⁸ Regulatory science is aimed at specific gaps in scientific knowledge that are relevant to an issue of public policy.⁶⁹ As a result, it is often highly time-sensitive and vulnerable to political influence, and is generally not concerned with the originality of a particular scientific issue or with the prospects for advancing the pantheon of human knowledge.⁷⁰ Moreover, because regulatory science is both time-sensitive and targeted

procedures, the robustness [and appropriateness] of the methods employed . . . [and] the extent to which the conclusions follow from the analysis”); Anderson et al., *supra* note 27, at 131 (“[P]eer review has certain significant limitations. No matter how thorough their consideration, independent experts cannot certify the accuracy of an agency’s scientific judgments.”); Doremus, *supra* note 59, at 1147 (“Traditional peer review functions as a very coarse screen; reviewers ask whether an author’s conclusions are one plausible interpretation of the data, not whether they are the only or even the most plausible interpretation.”); Noah, *supra* note 41, at 10,607 (“[T]he scientific community’s various peer review techniques do not purport to anoint particular results as finally settling contested questions.”).

68. See JASANOFF, *supra* note 25, at 76–77 (“Regulatory [as opposed to research] science [has as its purpose] to produce ‘techniques, processes and artifacts’ that further the task of policy development.”); Ruhl, *supra* note 63, at 410 (“In regulatory settings . . . peer review would most often involve a review of how an agency used available scientific data in reaching a policy decision.”). There of course are agencies that are involved in scientific activity more akin to research science than regulatory science, but this is the rare exception among agencies that serve primarily a regulatory function. See GAO PEER REVIEW REPORT, *supra* note 22, at 63 (describing the National Science Foundation’s “goal of promoting and advancing scientific and engineering progress in the United States” through its funding of “basic and applied research”).

69. JASANOFF, *supra* note 25, at 77 (“[R]egulatory science includes a component of *knowledge production*. Studies designed to fill gaps in the knowledge base relevant to regulation may either be performed or sponsored by regulatory agencies”).

70. Professor Jasanoff provides the following account of some of the differences between regulatory and research science:

Regulatory agencies, moreover, are accountable to numerous nonscientific watchdogs: Congress, the media, the courts, and the interested public. Political demands imposed by these external supervisors can have an impact even on the consideration of technical issues. Regulators may be required, for instance, to speed up their timetables for gathering and assessing evidence in response to public concerns about risk. Time thus becomes an important differentiating factor in the environments for regulatory and research science. While scientists working in a “pure” research setting have relatively unlimited time . . . for testing hypotheses or proving conjectures, scientists working to meet policy needs are under constant pressure to deliver results quickly. In the regulatory context, a decision to wait for more data amounts to (or is perceived as) a decision not to act. Hence scientists involved in policymaking frequently find that they cannot credibly avoid accepting or rejecting a conclusion on the ground that the matter calls for further study.

JASANOFF, *supra* note 25, at 78; see also Michaels, *supra* note 45, at 228 (“[R]egulatory science is rarely innovative; although it may involve generation of new knowledge, it is generally designed to answer questions specific to regulatory requirements.”).

toward an audience that consists largely of nonscientists (e.g., administrators, Congress, and the public),⁷¹ any deficiencies in the scientific work product relied upon by an agency are unlikely to be identified and remedied by future research.⁷² This is very different from research science, which seeks to cultivate new knowledge for its own sake and on its own schedule, and which has as a primary audience other scientists.⁷³ That is not to say that the beneficial application of new knowledge or the timing of its discovery is of no moment to research scientists, but only that the impetuses for research and regulatory science are generally opposite; agencies seek scientific information in response to questions about a specific policy application and in time to implement that application, whereas research scientists seek first to acquire new knowledge and then (perhaps) to consider its potential applications.⁷⁴

The differences between regulatory and research science reflect the differences between administrative and traditional peer review.⁷⁵ In addition to considering the time pressures on regulatory science, administrative peer review must take care to separate scientific inputs to the administrative process as clearly as possible from the political issues and

71. JASANOFF, *supra* note 25, at 78 (noting the time-sensitive nature of regulatory, as opposed to research, science); Sidney Shapiro, *Politicizing Peer Review: The Legal Perspective*, in *RESCUING SCIENCE FROM POLITICS* 243–44 (Wendy Wagner & Rena Steinzor eds., 2006) (explaining that peer review of regulatory science “helps to support the legitimacy of the agency actions in the eyes of the White House, Congress, the courts, and the public”).

72. Professor Noah identifies the “inevitability of subsequent error correction” in scientific work product through postpublication review by the scientific community, Noah, *supra* note 48, at 700, but the opportunity for this form of review is largely lacking in the time-sensitive administrative peer review context. See JASANOFF, *supra* note 25, at 78. Once a scientific input is used in a policy decision, it becomes exponentially more difficult to alter that decision on the basis of a new scientific opinion than if the original policy conclusion had been put on hold pending a full vetting of the underlying science.

73. JASANOFF, *supra* note 25, at 76 (describing research science activities as being “ordered around the extension of knowledge and competence without any regard for practical application”) (quoting BARRY BARNES & DAVID EDGE, *SCIENCE IN CONTEXT* 147 (1982)).

74. In her comments regarding the proposed OMB Bulletin on agency peer review, Professor Jasanoff explained this difference as follows:

[T]he efficacy of regulatory science depends in part on its capacity to provide timely answers to pressing policy questions or, put differently, to produce “serviceable truths.” Research science operates under no comparable time pressures; in principle, it can wait indefinitely to produce results. Accordingly, the meanings of reliability and “doing well” are legitimately different for regulatory and research science. . . . Correspondingly, the procedures used to ensure reliability may reasonably differ from the one scientific context to the other.

Comment on Office of Management and Budget (OMB) Proposed Bulletin on Peer Review and Information Quality from Sheila Jasanoff, Harvard University, to Mabel Echols, OMB Peer Review (Dec. 16, 2003, 07:17:30 EST), <http://www.whitehouse.gov/omb/inforeg/2003iq/159.pdf> [hereinafter Jasanoff Comment].

75. *Id.*

influences associated with policymaking, and to limit its review to the scientific methods and inferences used in achieving those inputs.⁷⁶ Administrative peer review is not primarily concerned with a project's originality or potential contribution to the scientific canon,⁷⁷ nor is it limited to a single example of scientific work at any one time. Whereas peer review of research science is designed to evaluate the credibility of a piece of scientific work product in its own right, administrative peer review is meant to assist policymakers by evaluating the reliability of whatever scientific information they choose to consider in connection with a particular policy issue.⁷⁸ As a result, a single administrative peer review process may involve reviews of multiple scientific inputs.⁷⁹ In sum, and for

76. This is reflected explicitly in the language and structure of existing peer review policies. See OMB Bulletin, *supra* note 41, at 2669 (“[R]eviewers should be asked to provide advice on the reasonableness of judgments made from the scientific evidence. However, the charge should make clear that the reviewers are not to provide advice on the policy Such considerations are the purview of the government.”); EPA HANDBOOK, *supra* note 66, at 13 (“The rule or regulation itself is not subject to the Peer Review Policy. However, if the rule or regulation is supported by a *major* scientific and/or technical work product, that work product should be peer reviewed prior to its use in the rule.”) (emphasis added). The majority of commentators agree. See, e.g., Anderson et al., *supra* note 27 (distinguishing scientific inputs from policy issues); David L. Bazelon, *Risk and Responsibility*, 205 SCIENCE 277, 279 (1979) (“[A]t the interface of fact and value, courts can help ensure that the value component of decisions is explicitly acknowledged, not hidden in quasi-scientific jargon.”); Coglianese & Marchant, *supra* note 3, at 1275–76 (distinguishing between “risk assessments,” which are based “predominantly . . . on scientific evidence and analysis” and “risk management, which is “an agency decision-making process that entails consideration of political, social, economic, and engineering information with risk-related information to develop, analyze, and compare regulatory options and to select the appropriate regulatory response”); *id.* at 1348–49 (contending that “judges . . . should be able to determine where an agency’s science ends and its policy reasoning needs to begin”); Ruhl & Salzman, *supra* note 23, at 48 (distinguishing the contributions of science and policy considerations to the administrative process); Ruhl, *supra* note 63, at 410 (“Regulatory peer review thus must disentangle the policy judgment from the underlying science if it is to remain true to the underlying scientific spirit of peer review.”); Vermeule, *supra* note 12, at 2236–37 (assuming that policy issues are distinct from underlying scientific questions); *id.* at 2238 (“In many cases, one can untangle the policy questions and value choices from the [scientific] questions” in evaluating agency decisions.). There is, however, some support for the position that science and policy are irrevocably intertwined in administrative decisionmaking. See, e.g., Sidney A. Shapiro, *OMB’s Dubious Peer Review Procedures*, 34 ENVTL. L. REP. 10,064, 10,067 (2004) (“[I]t is virtually impossible to separate scientific and policy issues.”).

77. Michaels, *supra* note 45, at 228 (“[R]egulatory science is rarely innovative . . .”).

78. See Jasanoff Comment, *supra* note 74 (“[T]he procedures used to ensure reliability may reasonably differ from the one scientific context to the other,” at least in part because “the efficacy of regulatory science depends in part on its capacity to provide timely answers to pressing policy questions or, put differently, to produce ‘serviceable truths.’”).

79. An example of such a situation is the EPA decision regarding the pesticide atrazine, in which multiple studies of the chemical’s potentially dangerous effects were available to the agency. See Weiss, *supra* note 7 (noting the presence of at least “the dozen or so studies sponsored by Syngenta in addition to Hayes’s study,” as well as studies “by at least four other independent research teams in three countries” regarding atrazine’s potential health

purposes of the discussion to follow, administrative peer review is defined as an objective review by independent experts in the relevant field of the scientific methods, inferences, and deductions associated with the scientific input(s) to an administrative policy decision.

The wisdom of relying on some measure of administrative peer review in policymaking has been largely uncontroversial.⁸⁰ Although it is often pointed out that peer review is not a panacea in terms of freeing agencies from the difficulties accordant with incorporating regulatory science into policy decisions,⁸¹ the general consensus is nevertheless that peer review, understood for what it is, does more good than harm.⁸² Given this conclusion, it is unclear why neither the peer review programs adopted by individual agencies nor the academic literature on the subject have addressed in any significant detail what appears to be the next logical question: which model(s) of administrative peer review—i.e., which relationship(s) between administrators and independent peer reviewers—

effects).

80. See, e.g., OMB Bulletin, *supra* note 41 (“A wide variety of authorities have argued that peer review practices at federal agencies need to be strengthened.”); Anderson et al., *supra* note 27, at 130 (acknowledging the “general consensus that agency risk assessment and cost-benefit analyses benefit from scientific peer review”); Burack, *supra* note 41, at 107 (identifying six case studies in support of the agency view that peer review can strengthen administrative decisionmaking); Noah, *supra* note 36, at 1052 (“The agency’s official science advisers serve as important sources of scientific information, as a quality assurance mechanism, and as a source of scientific credibility and legitimacy for decision-making.”) (citing MARK R. POWELL, SCIENCE AT EPA: INFORMATION IN THE REGULATORY PROCESS 38 (1999)); Noah, *supra* note 41 (“[E]ssentially everyone applauds the idea of using independent peer review in the regulatory process.”); Ruhl, *supra* note 63, at 411 (“[T]here is no structural feature of regulatory decisionmaking that comes to mind that would prevent peer review from producing similar improving functions in the substantive quality of decisionmaking.”). Even more skeptical commentators find some potential value for administrative peer review. See Shapiro, *supra* note 76, at 10,072 (“Peer review has a useful role to play in promoting the quality of government information. In light of the delay and cost involved, however, OMB should restrict the use of peer review to instances where information is unlikely to be unreliable or where it is necessary to ensure objectivity.”); May, *supra* note 66 (“So, while I certainly agree that agencies should, to the maximum extent practicable, ensure their regulations are based on reliable information and sound science, I’m not convinced that OMB’s proposal, as currently formulated, makes sense.”). *But see* Doremus, *supra* note 59, at 1148 (arguing that peer review in the Endangered Species Act context is useless or redundant). The specific merits of the OMB Bulletin on peer review are more hotly debated. See Michaels, *supra* note 45, at 237 (questioning the ultimate utility of the Bulletin and suggesting that its requirements “will provide new and convenient opportunities for special interests to promote an antiregulatory agenda”); Shapiro, *supra* note 71, at 241–43 (suggesting, inter alia, that amendments to the Federal Advisory Committee Act (FACA) may be better suited to aid the administrative process than the OMB’s peer review requirements).

81. See, e.g., POWELL, *supra* note 34, at 4 ([P]eer review . . . [has] a reasonably good track record of ensuring some level of quality of regulatory analysis. However, given the scientific uncertainties involved in most environmental regulatory decisions, peer review and official science advisory panels are no panacea . . .).

82. See *supra* note 80.

are most consistent with legitimate administrative action?⁸³

III. MODELS OF ADMINISTRATIVE PEER REVIEW

Before tackling the issue of peer reviewers' relationship with policymakers, it is useful to highlight some assumptions. First, that administrative peer review in any form is better than no peer review at all. As explained in the preceding section, while this is not entirely uncontroversial, it is consistent with the perspective of a number of government officials and commentators⁸⁴ and is supported by empirical evidence of a general sense of confidence in peer review among practitioners of regulatory law.⁸⁵ Second, it is assumed that independent, unbiased, qualified individuals are available and willing to act as administrative peer reviewers.⁸⁶ It is important to the primary focus of this

83. Professors Lars Noah and J.B. Ruhl are among the first and most prominent commentators to discuss the utility of administrative peer review and have done significant work in indentifying and analyzing its strengths and weaknesses. Professor Noah has considered this balance in the context of different theories of political decisionmaking and has advocated (cautiously) for the introduction of peer review earlier in the administrative process. Noah, *supra* note 36, at 1078; Noah, *supra* note 41, at 10,608. Professor Ruhl has considered the viability of peer review with regard to listing decisions under the Endangered Species Act and has advocated for "focused, rigorous" review in high-cost regulatory circumstances and "random" peer review of scientific information in other contexts. Ruhl, *supra* note 63, at 430. Most recently, Professors Ruhl and Salzman performed an empirical study of the perceived effects of regulatory peer review and advocated for the use of peer review to consider "whether the agency's claims of scientific support for its decision are justified." Ruhl & Salzman, *supra* note 23, at 10. Notwithstanding this important and insightful treatment of peer review, there are a number of questions that may yet provide helpful perspectives on the issue. Among these questions is the focus of this Article—the nature of peer reviewers' relationship with administrators. See Anderson et al., *supra* note 27, at 130 (acknowledging the issue and suggesting that "legislators should clarify what form(s) of peer review they have in mind"); Ruhl & Salzman, *supra* note 23, at 60 (asking "how the agency should use the [regulatory peer] reviews," but limiting the choices to "treating the review no differently than a comment letter from the general public [and] to requiring an agency response explaining why it has or has not revised its decision consistent with the peer review results"); OMB Bulletin, *supra* note 41, at 2668 (providing agencies "broad discretion in determining what type of peer review is appropriate," and directing agencies to "chose a peer review mechanism that is adequate"); EPA HANDBOOK, *supra* note 66, at 10 ("Peer review is usually characterized by a one-time interaction or a limited number of interactions by independent peer reviewers.").

84. See *supra* note 80.

85. Ruhl & Salzman, *supra* note 23, at 31 (explaining that an empirical study of attitudes about peer review reveals that "demand for regulatory peer review is strong among experienced practitioners of regulatory law"). This assumption also enjoys the benefit of some intuitive appeal, as it is easy to imagine how an additional quality control mechanism such as peer review may contribute to the reliability of the scientific work product under review.

86. Noah, *supra* note 36, at 1066 ("Concerns about the identity of peer reviewers also seem misplaced. . . . Critics suggest that even [independent, nongovernmental, academic] researchers will harbor biases because the industry funds much of their work, but, absent evidence of direct support of research relevant to the particular regulatory questions under

Article that it not be eclipsed by concerns about reviewer bias. Reviewer independence and objectivity is a foundational feature of peer review generally and of existing government peer review programs in particular.⁸⁷ Furthermore, to the extent it may be conceded that human objectivity is at minimum possible,⁸⁸ it is consistent with common sense to say that somewhere in a nation of 300 million,⁸⁹ let alone a planet of over six billion,⁹⁰ there exists a group of experts in a particular field who are willing and able to be objective in their review of scientific information pertinent to that field.⁹¹

The next assumption is that scientific inputs are in fact distinguishable from the policy issues they are intended to inform. Although admittedly a complicated question, the validity of the assumption is supported by two prominent administrative peer review programs—the OMB Bulletin and EPA Handbook—both of which describe peer review as the evaluation of *scientific* information,⁹² as well as by examples from regulatory practice and academic commentary.⁹³ In environmental risk assessments, for instance, administrators and commentators distinguish between questions of what risks are present (scientific questions dependent on data correlating health effects to exposure) and political inquiries into what risks are

review, this represents a fairly tenuous ‘taint’ at worst.”); Noah, *supra* note 41, at 10,610 (“[C]ritics have overdrawn the claim [of reviewer bias] insofar as they suggest that essentially no scientists have the independence necessary to serve as referees.”).

87. OMB Bulletin, *supra* note 41, at 2669–70 (addressing the issues of reviewer selection, balance, independence, and conflicts of interest); EPA HANDBOOK, *supra* note 66, at 55 (discussing reviewer selection, including identifying and dealing with potential conflicts of interest); GAO PEER REVIEW REPORT, *supra* note 22, at 4 (defining peer review by administrative agencies generally as being performed only by “individuals with sufficient technical competence and no unresolved conflict of interest”).

88. To those who would contend that objectivity is either impossible as a matter of human nature or, even if attainable, impossible to foresee, see, for example, NORWOOD RUSSELL HANSON, PATTERNS OF DISCOVERY: AN INQUIRY INTO THE CONCEPTUAL FOUNDATIONS OF SCIENCE (1958). It should be considered that neither of those positions renders the following discussion any less relevant.

89. U.S. Census Bureau, U.S. and World Population Clock, <http://www.census.gov/main/www/popclock.html> (last visited Aug. 31, 2009) (estimating the current population of the United States at 307,323,945).

90. *Id.* (estimating the current world population at 6,781,205,040).

91. Noah, *supra* note 41, at 10,610 (“[C]ritics have overdrawn the claim insofar as they suggest that essentially no scientists have the independence necessary to serve as referees.”).

92. OMB Bulletin, *supra* note 41, at 2665 (“This Bulletin establishes that important scientific information shall be peer reviewed . . .”); EPA HANDBOOK, *supra* note 66, at xiii (“Major scientifically and technically based work products related to Agency decisions normally should be peer reviewed.”).

93. GAO PEER REVIEW REPORT, *supra* note 22, at 2 (defining *peer review* as “an independent assessment of the technical, scientific merit of research by peers who are scientists with knowledge and expertise equal to that of the researchers whose work they review”); Noah, *supra* note 36 (outlining the historical use of scientific peer review at the EPA, FDA, and CPSC); *see also supra* note 76.

socially acceptable.⁹⁴

In part due to this separation between science and policy, it is further assumed that judicial review⁹⁵ of agency action involving peer review will consider peer reviewer comments as part of the administrative record but will not afford those comments any “special weight.”⁹⁶ Judicial review is an intrinsic part of the administrative process⁹⁷ and as such is an important factor in any discussion of the impact of peer review on that process. Treating peer reviewer comments as just another feature of the administrative record is the best way to honor the distinction between the scientific inputs to agency decisions, which are subject to peer review, and the agency’s ultimate policy determinations, which are not.⁹⁸ Judicial review of these ultimate policy determinations must not depend solely on peer reviewer comments about the credibility of the underlying scientific information because to do so would effectively cede agency discretion to weigh political considerations to independent scientists without either the expertise or authority to make such decisions.⁹⁹ On the other hand, courts’

94. See, e.g., Coglianese & Marchant, *supra* note 3, at 1275–77 (describing the difference between “risk assessment” and “risk management”). While these questions may be treated as indistinguishable in the (unlikely) event of a zero-risk policy, they are nonetheless theoretically distinct. *Id.* at 1325–26 (discussing the weaknesses of a no-risk management principle in environmental law). In his important article on peer review, Professor Noah contends that one way of encouraging this separation is to conduct reviews early in the regulatory process so as to encourage “genuine and meaningful deliberation about scientific uncertainties without allowing independent experts to usurp the responsibility for resolving nonscientific questions” Noah, *supra* note 36, at 1078. *But see* Wagner, *supra* note 30, at 66 (“[T]he zigzag nature of science and science policy makes it easy to blur the respective roles of science and policy in regulatory decisionmaking . . .”).

95. Like agency policy decisions, the process of judicial review of these decisions is affected by the application of administrative peer review and will thus be an important part of the normative analyses of administrative peer review performed in Part IV of this Article.

96. Noah, *supra* note 36, at 1081 (comparing judicial consideration of peer review comments to review of ALJ decisions and concluding that “[a] better compromise would make the peer review panel’s report part of the record but also instruct courts not to assign it any special weight [T]hey should have no greater force than comments submitted by interested parties during the public comment period”).

97. 5 U.S.C. §§ 701–706 (2006) (describing judicial review under the APA).

98. See *supra* note 76 and accompanying text (supporting the distinction between scientific and political inputs in administrative decisions).

99. DAVID L. FAIGMAN, LEGAL ALCHEMY: THE USE AND MISUSE OF SCIENCE IN THE LAW 200 (1999) (“The principle danger of this sort of expert assistance is that policy makers will abdicate their responsibilities to it or will not have the ability to critically assess what their advisors give them. They would thus blindly follow scientific recommendations without really appreciating the value choices inherent in the recommendations.”); Anderson et al., *supra* note 27, at 130–32 (noting that peer review should not be treated as a substitute for agencies’ political judgment). The strength of this position is reflected in the APA’s arbitrary and capricious standard, which does not ask a court to decide if an agency was “correct” in its final policy decision, but only whether it acted reasonably in light of the relevant evidence. 5 U.S.C. § 706 (2006). By this measure, it is certainly plausible that agencies may be permitted to act in ways deemed inconsistent with applicable scientific

failure to consider peer reviewer comments altogether could permit agencies to defend their decisions in court without explaining why those decisions are based on unreliable scientific inputs.¹⁰⁰ Therefore, for purposes of this discussion, it is assumed that judicial review may be informed, but not controlled, by peer reviewer comments. Finally, it is assumed here that final reports by administrative peer reviewers will be publicly available.¹⁰¹ Such disclosure is mandated by the OMB Bulletin and is consistent with the general understanding of peer review reports and agency transparency.¹⁰²

These assumptions are the first step in identifying the theoretical underpinnings of peer reviewer involvement in the administrative process. Also preliminary to this inquiry is an understanding of the range of possibilities for that involvement. Peer reviewers' relationship with administrators can be described in terms of two variables: form and effect. The *form* of peer reviewers' relationships with administrators describes the scope and means of interaction between the two. It ranges from a single round of peer reviewer comments or recommendations regarding the reliability of scientific information (the "single-comment form") to a more collaborative dialogue where administrators and peer reviewers engage in an iterative process of deliberation and information exchange prior to peer reviewers submitting their comments to the agency (the "collaborative form").

information if the resultant policy decision is supported by valid political or other considerations. *See* *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 416 (1971) ("To make this finding [of arbitrary or capricious agency conduct] the court must consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency." (citing *L. JAFFE, JUDICIAL CONTROL OF ADMINISTRATIVE ACTION* 182 (1965))).

100. Ruhl, *supra* note 34, at 1077 (describing two scenarios, the "Science? What Science?" and "The Science Made Us Do It" scenarios, in which agencies use scientific information as a means to a predetermined political end); Ruhl, *supra* note 63, at 407 ("[P]eer review is subject to abuse if it is implemented in ways that allow agencies to manipulate the process and thereby rig outcomes so as to justify agency decisions that would not withstand legitimate peer scrutiny."); Weiss, *supra* note 7 (quoting Dr. David Michaels's account of agencies "manufacturing uncertainty" in regulatory science in pursuit of "scientific" support for a political end).

101. Noah, *supra* note 36, at 1065 ("[A]gencies will publish the comments prepared by their external advisors, which gives those persons excluded from the deliberations an opportunity to respond."); Ruhl, *supra* note 63, at 430 ("The results of peer review would be released to the public prior to conclusion of any notice and comment procedures applicable to the underlying decision.").

102. OMB Bulletin, *supra* note 41, at 2675; EPA HANDBOOK, *supra* note 66, at 75–77 (describing the required contents of the peer review record, including any "written comments" by reviewers, as well as the retention and disclosure requirements for such materials); *see also* Freedom of Information Act, 5 U.S.C. § 552 (2006).

The *effect* of those relationships refers to the limits that peer reviewer comments may impose on an agency's use of scientific information to justify or explain policy decisions—more specifically, it answers the question of whether peer reviewer recommendations about the credibility of scientific inputs have the power to bind administrators. “Nonbinding” models of administrative peer review leave administrators with complete discretion as to whether, and if so to what degree, they will adopt peer reviewer comments. “Binding” models preclude an agency faced with a negative peer reviewer recommendation about a scientific input from relying on that input in support of a policy decision.¹⁰³ Although peer review is generally understood to be nonbinding,¹⁰⁴ the binding effect described here is not inconsistent with peer review's concept or purpose.¹⁰⁵

103. See Ruhl & Salzman, *supra* note 23, at 35.

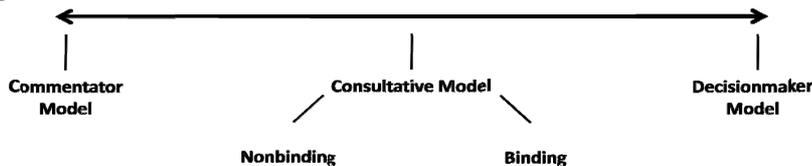
104. See JASANOFF, *supra* note 25, at 66 (“Unlike the jury verdict . . . peer review is not binding. Both journal editors and managers of federal research programs retain discretion to override the recommendations of their reviewers . . .”).

105. In fact, an even broader proposal for independent experts having authority to bind administrators has been raised in a similar context. See Vermeule, *supra* note 12, at 2234 (claiming that agencies that employ scientific advisory panels, which have similar but broader responsibilities than peer reviewers, “should be presumptively obligated to adopt the views of a majority or supermajority of experts” regarding a particular policy question). Nevertheless, there will undoubtedly be those who contend that by imposing a binding effect on administrators, a model of administrative peer review is no longer consistent with existing conceptions of peer review and therefore should not be included in a discussion of the relative impact of different models of administrative peer review on administrative legitimacy. This, however, is not a persuasive criticism of binding peer review. In fact, there is at least a *de facto* similarity between the binding effect of administrative peer review referenced here and peer review in the government-funding context. Michaels, *supra* note 45, at 226 (“In contrast to the ultimate power of editors to accept or reject the advice of editorial peer reviewers, agency funders have little discretion to diverge from the rankings of the evaluators.”). As explained in Part II of this Article, peer review is designed as a check on the methodology and reasonableness of the conclusions employed in scientific work product. A binding model of peer review provides administrators with precisely the same level of review and with precisely the same amount and depth of information as nonbinding models. Moreover, as with these other models, agencies employing a binding model would not be prohibited from reaching a policy decision, but only from presenting as support for that decision scientific information that did not meet the (deferential) threshold of peer review. See 5 U.S.C. §§ 553, 706(2)(A) (2006); Doremus, *supra* note 59, at 1147 (“Traditional peer review functions as a very coarse screen; reviewers ask whether an author's conclusions are one plausible interpretation of the data, not whether they are the only or even the most plausible interpretation.”). The only difference between binding and nonbinding models of administrative peer review is the level of authority associated with reviewers' conclusions as to the methodology and rationality of scientific inputs. A binding model is thus what it purports to be—a method (albeit a slightly different one) of peer review. See generally OMB Bulletin, *supra* note 41, at 2665 (“[Peer review] is a form of deliberation involving an exchange of judgments about the appropriateness of methods and the strength of the author's inferences. Peer review involves the review of a draft product for quality by specialists in the field who were not involved in producing the draft.”); GAO PEER REVIEW REPORT, *supra* note 22, at 2 (defining *peer review* as an “independent” expert review). In a normative analysis like this, such a difference alone cannot preclude consideration of models with a binding effect because to do so would transform this from a

Binding peer review does not require peer reviewers to perform any additional functions, nor does it dictate how agencies should treat science that survives peer review or how they should resolve a question of policy.¹⁰⁶ Therefore, to the extent a binding model of administrative peer review empowers peer reviewers more than other nonbinding models, it does so only in terms of peer reviewers' ability to shape an agency's explanation for a policy decision¹⁰⁷ by eliminating from consideration scientific information that fails to survive review.

These two variables can be incorporated into a peer review continuum that likens peer reviewers' relationship with administrators to commentators (the commentator model), consultants (the consultative model), and decisionmakers (the decisionmaker model).

Fig. 1. Administrative Peer Review Models



A. Commentator Model

The commentator model describes a relationship between independent scientific peer reviewers and policymakers with a single-comment form and a nonbinding effect. Peer reviewers acting as commentators are asked to evaluate the scientific inputs associated with a policy decision and to provide a single set of comments regarding whether those inputs are rationally and methodologically sound.¹⁰⁸ Upon receiving these comments,

normative discussion about the role of peer reviewers in the administrative process toward a positive critique of current peer review methods.

106. See OMB Bulletin, *supra* note 41 (stating that although “peer review reports are an important factor,” “[a]gencies are not expected to cede their discretion . . . to peer reviewers; accountable agency officials must make the final decisions”); Noah, *supra* note 36, at 1078 (suggesting that administrative peer review encourages “genuine and meaningful deliberation about scientific uncertainties without allowing independent experts to usurp the responsibility for resolving nonscientific questions . . .”).

107. By shaping an agency's explanation for a policy decision, administrative peer review also affects the political legitimacy of those decisions. See *infra* Part IV (highlighting the relationship between agency explanations for policy decisions and the political legitimacy of those decisions).

108. This single-comment approach to peer review has been adopted in earlier legislative proposals regarding administrative peer review, see Noah, *supra* note 41 (discussing the Regulatory Improvement Act of 1999, S. 746, 106th Cong. (1999), and noting that it requires “only one round of scrutiny” by peer reviewers), and in the funding context. See Michaels, *supra* note 45, at 226 (“Peer reviews of funding applications rarely have the iterative quality of editorial peer review, in which authors are offered and re-

administrators are free to choose whether to consider them in connection with their political decision.¹⁰⁹ For example, recall the EPA decision not to further regulate atrazine.¹¹⁰ Without question that decision implicates scientific information regarding the public health risks of atrazine. The ultimate regulatory decision, however, involves a much broader policy analysis taking into account not only the likelihood of risk to public health, but also atrazine's potential public benefits and any harm that may occur from additional regulation. If peer reviewers acting as commentators were to conclude that the scientific data submitted to the agency regarding the risk to public health did not pass scientific muster, they would express this opinion in writing to the agency. Policymakers would then be free to ignore the comments and base their political decision regarding whether to regulate the chemical on the technical information at hand, or to go the other way and use the peer reviewer comments as a reason to discount or otherwise ignore the criticized scientific information. Peer reviewers under the commentator model have no ability to engage administrators in dialogue about scientific inputs or to compel agency compliance with peer reviewer recommendations; they are an additional, passive source of information for administrators.¹¹¹

B. *Nonbinding and Binding Consultative Models*

The consultative model involves a collaborative form of peer review. As with editorial peer review, administrative peer reviewers acting as consultants are able to engage agency officials in an iterative dialogue about the credibility of scientific inputs.¹¹² In some instances, this dialogue may occur through a formal, public hearing similar to that required under the Federal Advisory Committee Act.¹¹³ Regardless of the precise

offered the opportunity to refine their manuscript until a point at which the paper is either accepted for publication[,] rejected, or withdrawn.”).

109. This nonbinding feature of peer review is common in the editorial, grant, and administrative contexts. *See* OMB Bulletin, *supra* note 41, at 2666 (“Agencies are not expected to cede their discretion with regard to dissemination or use of information to peer reviewers; accountable agency officials must make the final decisions.”); JASANOFF, *supra* note 25, at 64 (“[P]robably the most significant point of commonality among peer-review systems is that the ultimate decisionmaker . . . is seldom bound to follow the reviewers’ recommendations exactly.”). *But see* Michaels, *supra* note 45, at 226 (“In contrast to the ultimate power of editors to accept or reject the advice of editorial peer reviewers, agency funders have little discretion to diverge from the rankings of the evaluators.”).

110. *See supra* notes 7–12 and accompanying text.

111. This is consistent with both traditional forms of peer review and current practices in administrative peer review. *See, e.g.,* OMB Bulletin, *supra* note 41; JASANOFF, *supra* note 25, at 64.

112. *See* Michaels, *supra* note 45, at 226 (noting the “iterative quality of editorial peer review”).

113. 5 U.S.C. app. § 2 (2006).

circumstances of the dialogue, however, the criteria for exchanging information under the consultative model is limited to the standards of administrative peer review—peer reviewers would not be asked or permitted to comment on the political applications of scientific inputs,¹¹⁴ nor would they seek to participate in the actual collection or development of scientific information.¹¹⁵

In addition to its collaborative form, the consultative model has two potential effects, each of which results in an independent model of consultative peer review. Under the nonbinding consultative model, peer reviewer comments are advisory only; after their dialogue with peer reviewers, agency personnel are free to choose whether or not to adopt peer reviewer comments. This nonadversarial, collaborative approach is the one most often employed by agencies and endorsed by commentators.¹¹⁶ The

114. See Ruhl & Salzman, *supra* note 23, at 49 (explaining that regulatory peer review is designed to ask, “Did the agency consult appropriate sources of data and scientific research on the issue for decision?”); *id.* at 52 (“Regulatory peer review . . . would not apply to any step designated as a policy [as opposed to science] question.”).

115. In this way, peer review under the consultative model differs from the open, public, wide-ranging discourse required by FACA. 5 U.S.C. §§ 9–10 (2006) (regarding the establishment of and procedures governing federal advisory committees); see also Noah, *supra* note 36, at 1063 (noting that even a consultative form of peer review “would differ from many of the agency advisory committees currently in use,” including those under FACA).

Although some commentators have advocated for the benefits of a close collaboration between peer reviewers and agency officials, including agency scientists, STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION* 68 (1993) (“Those who have studied the work of these [scientific advisory] committees find that they have led to significant improvements . . . [at least in part because] consultation is often private and nonadversarial.”); Noah, *supra* note 36, at 1060–61 (“[W]hen agencies consult outside experts before publicly committing themselves to a particular course of action, the proceedings become less adversarial and more productive Indeed, one might say that soliciting expert input at the front-end of the regulatory process more closely resembles peer collaboration than peer review.”), it is important to avoid the temptation to conflate the consultative peer review model with a scientific partnership because such a partnership is neither consistent with, nor is it a productive amendment to, the peer review process. Expanding the role of reviewers to include partnering with agency officials in scientific research would not only be likely to discourage independent experts from becoming peer reviewers due to the additional investment in time and energy required, POWELL, *supra* note 34, at 139 (“[M]ost of the scientists [performing peer reviews] are serving essentially on a pro bono basis and have a very limited amount of time that they can sacrifice”); Ruhl & Salzman, *supra* note 23, at 14 (“[P]eer review would grind itself . . . to a screeching halt were it to require peer reviewers to engage in independent testing and data analysis.”); Ruhl, *supra* note 63, at 430 (noting the potential benefits of compensating peer reviewers so as to “attract competent experts and improve timely performance”), but would ultimately only defer the need for peer review to a subsequent group of experts. Rather than making peer review more robust, treating peer reviewers as substantive scientific partners only creates an additional step in the research process—it neither satisfies nor alleviates the need for administrative peer review. See generally Ruhl & Salzman, *supra* note 23, at 6 (describing administrative peer review).

116. See Anderson et al., *supra* note 27, at 130 (“Commentators generally have endorsed the use of scientific advisory committees or panels by federal administrative

binding consultative model also permits peer reviewers to engage in an iterative exchange of information with policymakers but differs from the nonbinding model in that peer reviewer recommendations are compulsory for administrators. In cases where peer reviewers deem a scientific input unreliable, administrators are forbidden from relying on that input to justify or support their policy decision.¹¹⁷

C. Decisionmaker Model

Finally, the decisionmaker model envisions a sort of hybrid between the commentator and binding consultative models. It shares the single-comment form of the commentator model¹¹⁸ but has the compulsory effect of the binding consultative model. The distinctions between these four models will be explored further as part of a normative analysis of administrative peer review.

IV. PEER REVIEW AND LEGITIMACY

Defining the potential relationships between peer reviewers and administrators is necessary, but not sufficient, to address the larger question of which of these relationships best promotes administrative legitimacy. In order to adequately engage that question, it is important to establish the normative framework(s) within which to consider the issue. This in turn requires some discussion of the principles governing administrative peer review. As explained above, the preeminent issue in administrative law is the question of legitimacy:¹¹⁹ the circumstances under which administrative agencies may exercise discretion within the bounds of our constitutional democracy,¹²⁰ where ultimate authority resides with “the people” rather

agencies.”); Noah, *supra* note 41, at 10,612 (“Regulatory peer review is best understood as a collaborative process where scientists from different disciplines are able to hash out disagreements with agency staff prior to the publication of a proposed rule.”); Ruhl & Salzman, *supra* note 23 (“There is a strong tradition of expert advisory panels advising agencies on specific policy topics”); *see also* 5 U.S.C. app. § 2 (2006).

117. The closest precedent for this binding approach to peer review is in the government funding context. *See* Michaels, *supra* note 45, at 226.

118. *See supra* note 108 for further discussion of the single-comment format of administrative peer review.

119. According to Habermas, “Legitimacy means that there are good arguments for a political order’s claim to be recognized as right and just *Legitimacy means a political order’s worthiness to be recognized.*” Gerald E. Frug, *The Ideology of Bureaucracy in American Law*, 97 HARV. L. REV. 1276, 1285 (1984) (quoting J. HABERMAS, COMMUNICATION AND THE EVOLUTION OF SOCIETY 178 (Thomas McCarthy trans., Beacon Press 1979)).

120. Lisa Schultz Bressman, *Beyond Accountability: Arbitrariness and Legitimacy in the Administrative State*, 78 N.Y.U. L. REV. 461, 462 (2003) (“From the birth of the administrative state, we have struggled to describe our regulatory government as the legitimate child of a constitutional democracy. That is, we have sought to reconcile the

than the institutions of government.¹²¹ Administrative legitimacy depends on agencies providing rational explanations for their conduct.¹²² These explanations must in turn reflect principles that are consistent with sound public administration.¹²³ Because administrative peer review seeks to influence the reasons given by agencies for policy choices involving scientific information, the most useful method of peer review will be that which leads to the best explanations and thus best promotes administrative legitimacy. Put another way, the questions to be asked in comparing the four models of administrative peer review developed above—the commentator, nonbinding consultative, binding consultative, and decisionmaker models—are which principles associated with the legitimate exercise of administrative authority are implicated by the use of administrative peer review and which of the peer review models introduced here best advances those principles?¹²⁴

administrative state with a constitutional structure that reserves important policy decisions for elected officials and not for appointed bureaucrats.”); Farina, *supra* note 2 (“The nature of our attempts . . . to reconcile the reality of regulatory government in the United States with the ideals of American constitutional democracy [] has varied with the times.”).

121. See *Cohens v. Virginia*, 19 U.S. 264, 389 (1821) (“The people made the constitution, and the people can unmake it. It is the creature of their will, and lives only by their will.”); see also Farina, *supra* note 2, at 989 (describing the concept of popular sovereignty as central in recent literature regarding administrative legitimacy); Lord Irvine of Lairg, *Sovereignty in Comparative Perspective: Constitutionalism in Britain and America*, 76 N.Y.U. L. REV. 1, 9 (2001) (“Thus, the state and federal institutions acquire their legitimacy from the popular consensus which the constitutional texts evidence. In this sense, popular sovereignty is the *fundamental* principle, while constitutional supremacy is its *derivative*.”).

122. The significance of reason-giving is exemplified by the procedural requirements of § 553 of the APA: “[T]he agency shall incorporate in the rules adopted a concise general statement of their basis and purpose.” 5 U.S.C. § 553(c) (2006); see also Bressman, *supra* note 3; Coglianese & Marchant, *supra* note 3 (“Administrative law aspires to bring reason to agency policymaking.”); Wagner, *supra* note 30, at 66 (“The administrative system, which includes judicial review, is grounded in a commitment to provide the public, interest groups, congressional officials, and the President and his staff with an accessible and understandable explanation for regulatory decisions.”).

123. See Mashaw, *supra* note 2, at 26 (“Administrators must not only give reasons, they must give complete ones. We insist that they be authentic by demanding that they be both transparent and contemporaneous. ‘Expertise’ is no longer a protective shield to be worn like a sacred vestment. It is a competence to be demonstrated by cogent reason-giving.” (citing *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402 (1971))); John Rawls, *The Domain of the Political and Overlapping Consensus*, 64 N.Y.U. L. REV. 233, 250 (1989) (tying political legitimacy to governmental conduct that reflects “fundamental political and constitutional values” and is understood by all citizens as reasonable and rational).

124. It is possible to consider administrative peer review without discussing specific theories of administrative government because administrative peer review as such is generally not incompatible with the range of predominant theories. Theoretical models of administrative law can be roughly divided into two broad categories: technocratic and pluralist. While in one way a gross oversimplification of the individual theories themselves, this distinction is nevertheless useful in demonstrating the relevance of administrative peer

review to all modes of administrative government. The technocratic model of administrative governance rose to prominence during the New Deal and relied on expert administrators to set policy based on their own understanding of a specific issue or topic. See Robert L. Rabin, *Federal Regulation in Historical Perspective*, 38 STAN. L. REV. 1189, 1252 (1986) (“As in its initial phase, the New Deal continued its propensity to address particularized areas of unrest through regulation by experts . . .”); *id.* at 1266 (“With the final legitimation of the New Deal came the acceptance of a central precept of public administration: faith in the ability of experts to develop effective solutions . . .”); see also LANDIS, *supra* note 2, at 23 (“With the rise of regulation, the need for expertness became dominant . . .”). Starting in the 1940s, however, and marked by the advent of the APA, concerns about accountability and actual agency expertise gave rise to new theories of administrative government focused on proceduralism and deliberative decisionmaking. See MORTON J. HORWITZ, *THE TRANSFORMATION OF AMERICAN LAW, 1870–1960: THE CRISIS OF LEGAL ORTHODOXY* 233 (1992) (“The APA is a prominent example of the dialectical relationship between expertise theory and proceduralism . . . A declining faith in the ability of experts . . . led in turn to a re-emergence of proceduralism.”). This focus on proceduralism has manifested itself in numerous ways, see generally Croley, *supra* note 2 (describing and critiquing “the public choice theory,” “the neopluralist theory,” “the public interest theory,” and “the civic republican theory” of administrative law), but retains as a unifying principle its departure from the technocratic model’s reliance on expert administrators in favor of a more inclusive policymaking process involving interest groups or the general public. Regardless of which of these theories may be used as a backdrop for administrative peer review, its relevance to administrative government remains unchanged. The primary points of departure among the aforementioned theories focus on the method by which policy determinations are made, not the means by which the scientific (or other) information underlying those determinations should be identified or evaluated. Because administrative peer review does not seek to directly influence the content or manner of policy decisions, its potential usefulness to the administrative process remains consistent across divergent theories of administrative government. In a technocratic context, peer review can work both to help ensure the credibility of scientific information available to policymaking experts and to further educate those experts in specific technical areas. Similarly, in a pluralist conception, peer review may not only help to ensure that nonexpert constituent groups have access to reliable technical information from which to inform their policy positions, but also to minimize barriers to participation created by a lack of technical understanding. In both cases, administrative peer review is able to make a contribution that is relevant to the preferred mode of policymaking. Professor Noah described this concept as follows:

Like the New Deal’s confidence in administrative expertise, calls for peer review of regulatory science have a decidedly technocratic cast, even though they reflect some loss of confidence in home-grown administrative expertise. With peer review, agency officials would face the added scrutiny of experts who are external to the regulatory process. In this respect, regulatory peer review may promote improved deliberation, insofar as citizens with no stake in the process would meet to discuss among themselves contested technical questions alongside agency officials. Even though it would do so by limiting public participation, and it would not focus on a search for the common good, civic republicans should embrace peer review as one part of an administrative process that also invites the broad-based public participation and scrutiny championed by adherents of the pluralist tradition . . . [R]egulatory peer review may help agencies straddle the line between technocratic and democratic impulses. In their respective spheres of competence, both experts and lay persons can play a valuable role in supervising agencies’ choices. Many regulatory agencies must depend on scientific expertise, but, in the end, their decisions do not and cannot turn exclusively on scientific judgments.

Noah, *supra* note 36, at 1042–44; see also Noah, *supra* note 41, at 10,607 (explaining that although regulatory peer review “represents something of a throwback to the New Deal’s

A. Principles of Administrative Legitimacy

The principles of administrative legitimacy most directly implicated by administrative peer review are expertise, accountability, and efficiency.¹²⁵ Agency expertise is a foundational principle of administrative law.¹²⁶ It reflects the often highly specific and technical mission of administrative agencies and the corresponding need for government officials with compartmentalized knowledge and experience in their delegated policymaking arena.¹²⁷ It is most pronounced in the technocratic model of administrative law that arose during the New Deal,¹²⁸ but is nonetheless important in more deliberative forms of administration—such as those advocated by public choice or “civic republican” theorists¹²⁹—that,

enthusiasm for decision-making by expert regulators . . . by harnessing nongovernmental expertise and retaining current mechanisms for review by nonexperts, regulatory peer review may [also] help administrative agencies aspire to the deliberative ideal recently espoused by civic republican scholars”). For these reasons, a discussion of the various relationships between peer reviewers and administrators may focus on broader principles associated with administrative legitimacy rather than specific conceptions of administrative government.

125. See *supra* notes 38–39 and accompanying text; see also JERRY L. MASHAW, *DUE PROCESS IN THE ADMINISTRATIVE STATE* 102 (1985) (pointing to the courts’ due process analysis after 1970 as promising “transparency, generality, and simplicity,” which “made the guarantee of due process a guarantee of accurate and cost-effective decision making”); SUNSTEIN, *supra* note 24, at 166 (stating that “political accountability” is a foundational constitutional principle with regard to statutory interpretation); Lawrence Lessig & Cass R. Sunstein, *The President and the Administration*, 94 COLUM. L. REV. 1, 94 (1994) (“The Vesting Clause of Article II—by placing the executive in one rather than many presidents—embodied this judgment. It is therefore clear that the constitutional text and structure reflect commitments to the unitary virtues of coordination, accountability, and efficiency in government.”).

126. See Lessig & Sunstein, *supra* note 125, at 99–100 (“To be sure, many insist on technocratic rationality—on the importance of expertise in helping people to make informed judgments about the relations between means and ends. This is an enduring theme in administrative law [T]he absence of expertise, or the distortion of expert judgment through anecdote and interest-group power, is an important obstacle to a well-functioning system of regulatory law.”). Professors Freeman and Vermeule contend that concerns about the importance of administrative expertise have been reflected in recent Supreme Court decisions. See Jody Freeman & Adrian Vermeule, *Massachusetts v. EPA: From Politics to Expertise*, 2007 SUP. CT. REV. 51, 52 (2008) (citing the Court’s decision in *Massachusetts v. EPA* as an example of its “increasing worries about the politicization of administrative expertise”).

127. See *Int’l Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 652 (D.C. Cir. 1973) (Bazelon, C.J., concurring) (noting “cases of great technological complexity” in administrative law); Noah, *supra* note 36, at 1043 n.37 (referring to the “questions of ever-increasing scientific complexity” faced by administrative agencies).

128. See LANDIS, *supra* note 2, at 23 (“With the rise of regulation, the need for expertness became dominant”); Rabin, *supra* note 124, at 1252 (“As in its initial phase, the New Deal continued its propensity to address particularized areas of unrest through regulation by experts”); *id.* at 1266 (“With the final legitimation of the New Deal came the acceptance of a central precept of public administration: faith in the ability of experts to develop effective solutions”).

129. See generally Croley, *supra* note 2; Seidenfeld, *supra* note 2.

although they rely on the resolution of competing interests and viewpoints rather than on expert opinions to set policy, they must still have access to reliable information to better inform those interests and positions.¹³⁰

Accountability, which includes as a prerequisite transparency,¹³¹ is also important to administrative legitimacy.¹³² Accountability refers to the public's ability to retain control over its government—even its administrative institutions—by judging its representatives on their performance in office.¹³³ In order for the public to make that judgment in the administrative context, it must be privy to an agency's explanations for its exercise of authority. Rather than simply accepting the proffered reasons for government action at face value and evaluating whether those reasons support the agency's position, transparency enables members of the voting public to access the same (or similar) information considered by the agency and thus to make a more informed judgment regarding the agency's reasoning.¹³⁴ Transparency is thus a precondition to accountability in that

130. Noah, *supra* note 36, at 1042–44.

131. Beutz, *supra* note 38 (describing transparency as a “precondition” to accountability and explaining that “[t]ransparency and access to information facilitate accountability because citizens need information to know when to hold which leaders accountable for what decisions”).

132. SUNSTEIN, *supra* note 24, at 187 (“The principle of political accountability has an unmistakable foundation in Article I of the Constitution, and it is an overriding structural commitment of the document. The principle has foundations as well in assessments of institutional performance. At the same time, it operates to counteract characteristic failures in the regulatory process.”); Lessig & Sunstein, *supra* note 125, at 94 (“Accountability and avoidance of factionalism, then, are two central values of the framers’ original executive.”); *id.* at 119 (arguing that a unitary executive “fits well with important political and constitutional values, including the interests in political accountability”). See generally Steven G. Calabresi, *Some Normative Arguments for the Unitary Executive*, 48 ARK. L. REV. 23 (1995) (noting the constitutional importance of accountability).

133. Professor Bressman describes the principle of accountability as follows:

Perhaps the best understanding of accountability is not that it requires elected officials to make policy decisions simply because they are responsive to the people. Rather, it requires elected officials to make policy decisions because they are subject to the check of the people if they do not discharge their duties in a sufficiently public-regarding and otherwise rational, predictable, and fair manner. Thus, accountability can be understood to enable voters not only to consider whether elected officials have maximized popular preferences in making or executing the law, but also, and equally importantly, whether those officials have inappropriately favored narrow interests in doing so.

Bressman, *supra* note 120, at 499 (citing Rebecca L. Brown, *Accountability, Liberty, and the Constitution*, 98 COLUM. L. REV. 531, 565–71 (1998)). In administrative law, this typically involves voters expressing their dissatisfaction with elected officials who appointed or otherwise supported particular administrators or agencies.

134. See Mark Fenster, *The Opacity of Transparency*, 91 IOWA L. REV. 885, 899 (2006) (“The most significant consequences [of government transparency] flow from the public’s increased ability to monitor government activity and hold officials . . . accountable for their actions.”); see also *Common Cause v. Nuclear Regulatory Comm’n*, 674 F.2d 921, 928 (D.C. Cir. 1982) (describing Congress’s purpose in enacting the Sunshine Act as to “enhance citizen confidence in government, encourage higher quality work by government

it is necessary for the public to have access to information upon which administrators base their judgments in order to monitor the conduct and competency of those administrators.¹³⁵ The principles of agency expertise and accountability are primarily relevant in the policymaking arena. To the extent they impact judicial review of agency action, they do so only indirectly; where administrative peer review enhances an agency's expertise or accountability, judges have the opportunity to reinforce those values through judicial review.¹³⁶

The efficiency principle acknowledges the importance of responsive, timely government.¹³⁷ In the case of administrative law, this includes efficiency in both agency action and judicial review thereof. It is an important feature of administrative government generally and of decisions based on scientific information in particular, as regulatory science and peer review are often costly and aimed at addressing time-sensitive issues of public policy.¹³⁸ Any administrative peer review process must be attentive to these concerns in order to maintain its effectiveness and legitimacy.

B. Normative Analyses

There are three different normative approaches through which this

officials, stimulate well-informed public debate about government programs and policies, and promote cooperation between citizens and government. In short, it sought to make government more fully accountable to the people”).

135. *Common Cause*, 674 F.2d at 928; Beutz, *supra* note 38; Fenster, *supra* note 134.

136. Unlike efficiency, which is an animating principle of administrative government generally—including judicial review of agency action—expertise and accountability are only relevant for purposes of this discussion to the extent they apply specifically to agency action. Peer review only impacts the expertise of judges to the extent it affects the level of expertise of the administrators and the administrative record being reviewed. The concept of political accountability is entirely inapposite to judicial review. Judges are not permitted to hold agencies accountable for their political judgments, *see, e.g.*, *Marbury v. Madison*, 5 U.S. (1 Cranch) 137, 170 (1803) (“Questions, in their nature political, or which are, by the constitution and laws, submitted to the executive, can never be made in this court.”), nor are judges part of a political branch of government and thus are not—absent impeachment—themselves politically accountable. *See* Elena Kagan, *Presidential Administration*, 114 HARV. L. REV. 2245, 2373 (2001) (“The assignment of policymaking functions, on this understanding, appropriately tracks political accountability . . .”). Any discussion of accountability in the administrative process must therefore focus on the accountability of administrators and agencies, not the judges who review them.

137. Glen O. Robinson, *The Making of Administrative Policy: Another Look at Rulemaking and Adjudication and Administrative Procedure Reform*, 118 U. PA. L. REV. 485, 516 (1970) (“The goal of efficiency needs no explanation or defense. If it cannot be considered an ultimate concern of administrative law that tasks be accomplished with the minimum expenditure of time and resources, it is nevertheless a matter of large importance.”).

138. *See* JASANOFF, *supra* note 25, at 77–78; Ruhl & Salzman, *supra* note 23, at 40 (“Indeed, the statutory and regulatory deadlines frequently placed on agency decision making acknowledge the pressing need in many cases to intervene on policy problems. Agencies already have difficulty meeting those deadlines.”).

Article seeks to evaluate the interactions between scientific peer reviewers and administrative agencies in the light of administrative legitimacy. These approaches together encompass the range of principles associated with administrative peer review—expertise, accountability, and efficiency—and consider the relationships between peer reviewers and administrators in terms of the ability of those relationships to advance those principles. They are referred to here as the “public welfare analysis,” the “public service analysis,” and the “balancing analysis.”

1. *Public Welfare Analysis*

The public welfare analysis measures the effect of peer review on the administrative process by focusing solely on peer review’s contributions to agency expertise and accountability.¹³⁹ It represents the normative viewpoint that agency expertise and accountability should be maximized independent of concerns about the financial or logistical burdens created by administrative peer review; for the public welfare analysis, “money is no object.”¹⁴⁰

Because administrative peer review considers only scientific inputs,¹⁴¹ its most powerful influence over agency expertise and accountability lies in its identification of unreliable scientific information.¹⁴² Peer review directly impacts agency expertise by increasing the likelihood that scientific inputs are credible and thus that policymakers are better informed.¹⁴³ This increased credibility also promotes accountability by making it less likely that administrators will—knowingly or otherwise—

139. See *supra* notes 126–35 and accompanying text for a discussion of the importance of agency expertise and accountability to administrative legitimacy.

140. See CAMBRIDGE DICTIONARY OF AMERICAN IDIOMS 275 (Cambridge Univ. Press 2003) (defining the phrase as meaning “how much something costs is not important”). This approach is analogous to the “no risk” principle in risk management. See, e.g., Coglianese & Marchant, *supra* note 3, at 1326–28. If it appears unrealistic, it is worth noting that this normative approach is still important to the larger theoretical inquiry. Each of the different normative analyses advanced here provides its own set of useful information about the relationship between the models of administrative peer review and the political legitimacy of the policymaking processes they support. See *infra* Part IV.

141. See *supra* note 76 (citing peer review policies and commentary acknowledging that peer review is only applicable to scientific information).

142. Michaels, *supra* note 45, at 219 (“Peer review plays an important role in the production and shaping of the scientific knowledge that is the product of the current scientific enterprise.”).

143. See *id.*; Noah, *supra* note 36, at 1045 (“[P]eer review contributes to the advancement of science not merely through the screening of scientific work (its quality control function), but also by helping proponents of new hypotheses improve their research and interpretations, and by engaging others in a dialogue about important new discoveries.”).

base their policy decisions on unreliable scientific information.¹⁴⁴ Without peer review, unreliable information could lead policymakers to make decisions they otherwise would not have made or, even worse, to use “bad” science either to pretextually justify a politically expedient policy decision¹⁴⁵ or to retroactively excuse (truthfully or not) a policy decision on the ground that they were led astray by flawed information.¹⁴⁶ In any case, the public’s ability to judge the performance of government officials is compromised.¹⁴⁷ Conversely, peer review assists the public in accurately judging agency decisions; without the same ability to blame “bad” scientific information, the public can evaluate policy conclusions as true reflections of the political and social values of the individuals and institutions that make them.¹⁴⁸

In addition to promoting the use of reliable scientific inputs in particular policy decisions, administrative peer review also advances administrative expertise and accountability on a systemic basis. Administrative peer review promotes agency expertise by educating administrators about the sciences.¹⁴⁹ It creates a forum for information exchange between independent scientific experts and agency officials that gives administrators

144. The justification of policy decisions on the basis of unreliable science has been described as “manufacturing uncertainty.” Weiss, *supra* note 7 (quoting Dr. David Michaels). This is different from the problem of evaluating whether agencies are using credible science in defensible ways. Administrative peer review as defined here is less useful in addressing this problem because it is not dependent simply on scientific quality, but on the strength of agency application of scientific inputs to a policy question. For a discussion of how regulatory peer review may be useful in evaluating government uses of credible science, see Ruhl & Salzman, *supra* note 23, at 35.

145. Weiss, *supra* note 7 (quoting Dr. David Michaels).

146. See Ruhl & Salzman, *supra* note 23, at 20–21 (“It can raise concerns, however, if an agency justifies its decision to the public, courts, and legislature as being driven chiefly by the science when it is in fact based on a policy judgment informed by inconclusive science.”); *id.* at 22–23 (acknowledging the potential for agencies to “present scientific data as supporting a policy decision more than is justified,” and referring to theories of “agency mission focus . . . a variant on the theories of agency capture and public choice” as a possible explanation for this practice).

147. See Wagner, *supra* note 30, at 66 (“Agencies . . . can even hide controversial policy judgments by failing to delineate the aspects of their decisions determined by science and those determined by value choices.”)

148. That is not to say that it will be readily apparent in every policy decision what specific values an agency espouses or that a clear set of values will be inherent in any one decision. The point to be made here is that the increased likelihood that the underlying scientific information is reliable eliminates one more variable from the calculus of evaluating administrative government.

149. This is true even in cases where a significant number of policymakers are political appointees or otherwise likely to serve at the agency for a relatively short time. In addition to providing useful educational opportunities for career administrators and agency scientists, peer review can contribute to the institutional knowledge of an agency through, for example, its influence on the administrative record and on long-term policy platforms developed in accordance with peer reviewer comments.

an opportunity to expand their substantive knowledge through contact with leading minds in the field.¹⁵⁰ Peer review also provides administrators and the public with an ongoing evaluation of agency competence in developing or identifying relevant scientific information.¹⁵¹ By tracking peer reviewer comments over a period of time, government officials and the public can monitor an agency's record of producing and seeking out credible scientific information. This positively affects agency accountability by creating a consistent measure of agency performance in using scientific information and may contribute to agency expertise by incentivizing administrators to avoid repeating previous mistakes.¹⁵² Finally, peer review—through its promotion of consistent scientific standards—can create a public *perception* of agency expertise and accountability that is important¹⁵³ to counteract public opinion that agencies may be using unreliable scientific information as a politically expedient means of justifying policy decisions.¹⁵⁴

150. OMB Bulletin, *supra* note 41, at 2669 (“The most important factor in selecting reviewers is expertise: ensuring that the selected reviewer has the knowledge, experience, and skills necessary to perform the review.”); EPA HANDBOOK, *supra* note 66, at 55 (“It is important that peer reviewers be selected for independence and scientific/technical expertise.”). The advancement of agency expertise and accountability through exposure to independent experts in the field does not depend on those experts arriving at scientific consensus; in cases where experts have an honest, reasoned disagreement on a scientific topic, witnessing that disagreement can still promote administrators’ expertise through their improved understanding of the debate.

151. See Noah, *supra* note 36, at 1051 (describing as an incentive for agencies to pursue independent peer review the desire of senior managers to receive “confirmation of the quality of their subordinates’ work”).

152. To the extent an ongoing record of agency competence impacts the judicial review process, it does so only tangentially and in limited circumstances; judges must be careful not to overemphasize the significance of prior misuses of scientific information and to focus their review on the agency action before them. Judges may feel justified in treating information regarding an agency’s historic record of competence as relevant to the question of witness or agency credibility where an agency previously used unreliable scientific information in a situation involving the same individuals or substantive science as the one being reviewed, but any other inference or extrapolation from the record likely would (and should) be considered irrelevant to the question of whether the policy decision at hand is viable.

153. See Farina, *supra* note 2, at 1023 n.146 (“[C]itizens’ personal experience with the practice of government power has important implications for legitimation of the regulatory state.”).

154. See Wagner, *supra* note 30, at 79 (“Agencies might have numerous reasons to rely on weak or valueless studies to support regulation.”); see also Harris, *supra* note 31 (identifying areas in which scientific information became politicized and reporting claims by former Surgeon General Richard H. Carmona that “top officials in the Bush administration repeatedly tried to weaken or suppress important public health reports because of political considerations”); Weiss, *supra* note 7 (quoting Professor David Michaels’s description of the phenomena of “manufacturing uncertainty”).

In contrast to peer review furthering administrative accountability, there is also potential for the opposite effect on the public psyche if peer review were to inspire unmerited public confidence in scientific inputs. As explained in Part II of this Article,

The public welfare analysis considers which model of administrative peer review is best suited to promote agency expertise and accountability in the ways mentioned above. The commentator model advances agency expertise by providing government officials with some information regarding the credibility of scientific inputs¹⁵⁵ but falls short due to its nonbinding effect. Because agency officials may disregard peer reviewer comments, any predictable gains in expertise from the commentator model are severely limited.¹⁵⁶ The commentator model is similarly ineffective with regard to promoting agency accountability. Its failure to compel agencies to adhere to peer reviewer recommendations makes it more difficult for agency watchdogs to determine whether a policy decision is based on reliable scientific inputs¹⁵⁷ and in turn to evaluate policy decisions

administrative peer review is not a means of confirming that the specific conclusions of a piece of scientific work product are accurate; it instead looks at the quality of the methods and deductions used to reach those conclusions. While it does lend credibility to the scientific information that passes review, it is not designed to identify for time immemorial an unconditional truth. See Noah, *supra* note 41, at 10,607 (“[P]eer review as a mechanism differs from the broader notion of an unhurried dialogue among experts searching (usually in vain) for some ultimate truth.”). To the extent that peer review incites the public to believe in the immutability of science-based policy decisions, it works counter to the goal of accountability by creating a perception that policymakers’ hands are tied by the scientific information before them. Despite the potential practical impact of this scenario, it assumes a fundamental misunderstanding of the definition and function of scientific peer review and is thus outside the bounds of this analysis.

155. See *supra* notes 108–11 and accompanying text (describing the commentator model).

156. JASANOFF, *supra* note 25, at 98 (“[S]ince EPA is under no compulsion to go along with [peer reviewers’] judgment, [peer reviewers] are sometimes faced with the frustrating experience of seeing their views ignored or flouted by the agency.”). Admittedly, this conclusion is theoretical and is thus less concerned with a measure of the actual rate of agency compliance with reviewer comments. Even where an agency routinely adopts peer reviewer comments, this does little to support a theoretical basis for a particular method of peer review. Not only does the model itself do nothing to ensure compliance, but the desired effect of increasing agency accountability may be even less in cases where an agency has a past practice—but no mandate—of compliance with peer reviewer recommendations. An agency that usually adopts reviewer suggestions but is not required to do so can create an even more difficult situation for agency watchdogs seeking to hold administrators accountable; such an agency may have an institutional reputation that blurs the ability of public observers to identify when a break with peer reviewers has occurred. Moreover, in cases where deviations from peer reviewer comments are rare, it is more likely that agency watchdogs will overlook a single departure, causing agency accountability to suffer. In either event, a single unnoticed departure from peer reviewer recommendations could lead to serious consequences for the wisdom and validity of an important public policy, while simultaneously diminishing the presence of democratic safeguards such as administrative accountability and transparency. For these reasons, each peer review model must be evaluated on its theoretical merits so as not to arrive at a false sense of security based on agencies’ current track records for following peer review recommendations.

157. See *supra* note 109 and accompanying text (describing the nonbinding nature of the commentator model); JASANOFF, *supra* note 25, at 225 (“Others questioned the wisdom of a procedure in which FDA is totally free to accept or reject the findings of the board of inquiry. Clearly, this discretion makes it possible for the agency to manipulate the authority

on their merits; any critique of administrative performance under the commentator model must consider the contradictory possibilities that administrators either relied on credible scientific inputs, were genuinely persuaded by unreliable scientific information, used such information to falsely justify a particular outcome, or “manufactured uncertainty” in support of regulatory inaction.¹⁵⁸ In any of these cases, agency accountability depends on the public’s ability to sort through the various sources of scientific information and determine for itself which are sufficiently credible to merit consideration. The role of peer reviewers in advancing agency accountability is effectively lost.¹⁵⁹

As for its systemic contributions, the commentator model provides some educational benefits for administrators and a long-term record of agency scientific competence, but it is limited in its educational mission due to its single-comment form. Because peer reviewers and administrators do not engage one another in a dialogue under the commentator model, the ability of peer reviewers to educate agency officials is limited to the instructive quality of the peer reviewers’ written comments.¹⁶⁰ Although potentially

of science to its own advantage.”).

158. Weiss, *supra* note 7; *see also* Harris, *supra* note 31.

159. A likely counter to this position is that administrative watchdogs will not necessarily be hampered by nonbinding peer review because they will still have access to peer reviewer comments. *See supra* notes 101–02 and accompanying text (discussing public availability of peer reviewer comments). The mere availability of reviewer comments, however, does not result in the same measure of agency accountability as binding peer review and in fact may lead to little or none at all. Peer reviewer comments involve a technical evaluation of scientific method and rationality; they are written by scientists for scientists. *See* Noah, *supra* note 36, at 1045 (“Peer review, in its broadest sense, represents the scientific community’s effort to police itself . . .”); Noah, *supra* note 48 (“Because scientific work often depends upon complex underlying assumptions and choices of methodology, probing and careful review by other scientists is indispensable.”). It is therefore unreasonable to expect members of the general public to digest these comments such that they can accurately determine if scientific information is adequate for consideration in connection with a particular policy issue. Even if the public were asked only to look at the proverbial “bottom line” to see if reviewers voted “yes” or “no” with regard to a particular piece of scientific work product, the translation problem persists. Reviewers may find portions of a study valid and others fatally flawed or find the conclusions to be unjustified but the data collection reliable. Whereas agencies have their own scientists to read and implement reviewer comments, the (nonscientist) public does not. This helps to explain why problems of agency interpretation of peer reviewer comments are described below as minor. *See infra* notes 191–94 and accompanying text. On the other hand, where only information deemed credible by reviewers is available for consideration by agency decisionmakers, public overseers are spared any need to evaluate scientific credibility and can focus on the explanations provided by administrators for their decision. To the extent that the decision relies on preferring one piece of scientific information over another, it is far easier and more familiar for the public to judge the soundness of that decision where it is confident that all of the information meets the same minimum standard of competency.

160. *See supra* notes 108–11 and accompanying text (describing the commentator model).

useful in shaping administrators' understanding of the scientific information at hand, the educational opportunities of this approach are far inferior to those presented by the collaborative form of the two consultative models. The commentator model also improves public perception of administrative accountability over that which would exist without peer review,¹⁶¹ but like its other systemic contributions, its impact is severely limited due to its single-comment form and nonbinding effect.¹⁶² A system where administrators receive only a single set of comments from peer reviewers and are not obligated to incorporate those comments will likely not create the same degree of public confidence in the administrative peer review process as a model with a more collaborative form or with the ability to commit policymakers to using only credible scientific inputs.¹⁶³

The two consultative models are better suited to promote agency expertise and accountability. Their collaborative form enables peer reviewers not only to inform administrators about scientific credibility, but to persuade those administrators to rely only on credible scientific information when making policy.¹⁶⁴ These dual functions represent a potentially significant advantage in promoting agency expertise over the commentator model, but this advantage is ultimately limited by the consultative models' effects. The nonbinding consultative model's influence is defined by administrators' willingness to listen and peer reviewers' ability to persuade. Peer reviewers are powerless under this model to contribute to agency expertise without the consent of agency personnel, and agency discretion to disregard reviewer comments dilutes agency accountability; without any assurance that the underlying scientific information is credible, the overseeing public's ability to fulfill its political watchdog function is badly compromised.¹⁶⁵ Conversely, in the binding

161. Richard Shelby, *Accountability and Transparency: Public Access to Federally Funded Research Data*, 37 HARV. J. ON LEGIS. 369, 379 (2000) ("Public confidence in the accuracy and reliability of information being used to drive public policy ultimately is in the best interest of scientific research. Increasing access to such data promotes the transparency and accountability that is essential to building public trust in government actions and decision-making.").

162. JASANOFF, *supra* note 25, at 225 ("Seeking expert advice under such flexible ground rules [the ability to accept or reject that advice in forming policy] does little to improve the quality of the agency's scientific determinations . . ."); *id.* at 228 ("If agencies retain complete discretion [to overrule peer reviewers], then consultation with [peer reviewers] could easily become a counterproductive exercise, creating yet another focal point for contention and adding to the complexities of an already overloaded administrative process.").

163. Shelby, *supra* note 161.

164. See *supra* notes 112–17 and accompanying text (describing the collaborative form of the consultative model).

165. See *supra* notes 112–16, 157–59 and accompanying text (describing the consultative model and the impact of a nonbinding effect on accountability).

consultative model, the advantages of its collaborative form are largely lost. The persuasive component of peer reviewer comments is rendered moot by the requirement that administrators comply with reviewer recommendations.¹⁶⁶ The result is that agency expertise and accountability are advanced to the degree dictated by binding peer reviewer comments but do not necessarily experience an immediate corresponding benefit from collaborative exchanges between administrators and reviewers.¹⁶⁷

The systemic contributions of both consultative models are more positive. Due to their collaborative form, the consultative models are substantially better at educating agency officials than the commentator model and are at least as effective in providing a long-term record of agency competence in identifying scientific information.¹⁶⁸ Academic commentary reflects the common-sense notion that a system of cooperation among peer reviewers and administrators creates a perception of greater openness, professionalism, and competence in government.¹⁶⁹ This perception is further enhanced where the results of the consultation are binding on administrators.¹⁷⁰

By way of comparison, the benefits of the binding consultative model's compulsory effect outweigh the advantages offered by the nonbinding consultative model. Peer reviewer influence over agency knowledge and accountability under these two models is controlled by peer reviewers' ability to either persuade or compel agency officials to adopt peer review

166. This is less so in cases where *administrators* are able to persuade *peer reviewers* of the soundness of their methods, but such cases must be assumed to be rare, or else the widely accepted support for peer review—and for its educational benefits for administrators—would seem misplaced.

167. While there will still be a long-term educational benefit from the collaborative form of the binding consultative model, this is distinct from the educational benefit provided to administrators in the context of the immediate policy determination to which the model of administrative peer review is being applied. In terms of the deliberations at hand, agency officials that are bound to comply with peer reviewer comments can only use any newly acquired wisdom in considering scientific inputs that survived peer review. To the extent an input failed to pass peer review, that input is excluded from agency consideration by the model's binding effect and any knowledge gained by administrators about that input from discussion with peer reviewers will be rendered moot for purposes of that policy discussion, unless the agency decides to take on the enormous (and highly unrealistic) task of delaying its policy decision pending the re-creation of the input in accordance with this "new" information.

168. The consultative models' collaborative form could lead to a more robust record of agency competence than the single-comment form of the other models, but this will depend on the clarity of the record of peer reviewer-administrator interactions.

169. For a collection of articles advocating the benefits of collaborative peer review, see *supra* note 116.

170. See *supra* notes 162–64 and accompanying text; Shelby, *supra* note 161; Shapiro, *supra* note 71 (explaining that peer review of regulatory science "helps to support the legitimacy of the agency actions in the eyes of the White House, Congress, the courts, and the public").

recommendations regarding unreliable scientific inputs. Because compulsion is (almost always) more dependable than persuasion,¹⁷¹ and because it presents a better case for public confidence in administrative process,¹⁷² the binding model of consultative peer review is better positioned to contribute to agency expertise and accountability than the nonbinding model.¹⁷³

As with the binding consultative model, the compulsory effect of the decisionmaker model promotes administrative expertise by creating an environment in which policy decisions are better informed¹⁷⁴ and advances accountability due to increased public confidence that agency officials based their decision on reliable scientific information.¹⁷⁵ In terms of its systemic benefits, however, the decisionmaker model falls short of the binding consultative model. The single-comment form of the decisionmaker model makes it significantly less effective as a tool for agency education,¹⁷⁶ and despite the fact that its binding effect does allow for a long-term record of agency competence and increased public confidence in the administrative process, both of these benefits are realized to a lesser degree than they would be through the collaborative form of the binding consultative model.¹⁷⁷

In sum, the decisionmaker and binding consultative models are most likely to promote agency expertise and accountability due to their ability to preclude administrators from supporting policy decisions with unreliable

171. This point of view may seem to run afoul of the time-honored saying that “you can catch more flies with honey than with vinegar,” THE NEW DICTIONARY OF CULTURAL LITERACY 58 (E.D. Hirsch, Jr. et al. eds., 3d ed. 2002), but is nonetheless true, particularly in the context of systems based on the rule of law, where legal compulsion is more likely to be honored. See Richard H. Fallon, Jr., “The Rule of Law” as a Concept in Constitutional Discourse, 97 COLUM. L. REV. 1, 8–9 (1997) (discussing the five elements that constitute the rule of law, including efficacy—the concept that “[t]he law should actually guide people”); see also FRIEDRICH A. HAYEK, THE ROAD TO SERFDOM 72 (1944) (defining the “rule of law” as a set of circumstances under which “government in all its actions is bound by rules fixed and announced beforehand—rules which make it possible to foresee with fair certainty how the authority will use its coercive powers in given circumstances and to plan one’s individual affairs on the basis of this knowledge”).

172. See *supra* note 170 and accompanying text.

173. JASANOFF, *supra* note 25, at 225 (“Seeking expert advice under such flexible ground rules [the ability to accept or reject that advice in forming policy] does little to improve the quality of the agency’s scientific determinations . . .”).

174. *Id.* at 225–26; see also Michaels, *supra* note 45, at 219.

175. JASANOFF, *supra* note 25, at 228 (“In particular, the extent of the agency’s discretion to overrule [peer reviewers] on its technical findings should be clarified. If agencies retain complete discretion in this regard, then consultation with [peer reviewers] could easily become a counter-productive exercise, creating yet another focal point for contention and adding to the complexities of an already overloaded administrative process.”); Shelby, *supra* note 161.

176. See *supra* Part III (describing the single-comment format of peer review).

177. See *supra* text following notes 162 and 168.

scientific information. The binding consultative model, however, has additional systemic benefits due to its collaborative form—a greater ability to enhance long-term agency knowledge, to create a more robust record of agency competence in dealing with scientific inputs, and to further public perception of administrative legitimacy—that make it more attractive under the public welfare analysis.

2. *Public Service Analysis*

The public service analysis focuses on government efficiency by identifying the relationship between peer reviewers and administrators that will be least burdensome on administrative government. It assumes that peer review in any form will further agency expertise and accountability by providing agencies and the public with information regarding the credibility of scientific inputs,¹⁷⁸ and thus it directs its energy to ensuring that peer review interferes as little as possible with the administrative process.¹⁷⁹ It can also be described as an “anti-ossification” analysis.¹⁸⁰

To apply the public service analysis as a measure of the relative value of the different models of administrative peer review, it is first helpful to identify the six—three direct and three indirect—ways in which administrative peer review may affect administrative efficiency. The three direct impacts on administrative efficiency are peer reviewers’ actual review of scientific work product,¹⁸¹ interaction between peer reviewers and administrators based on that review,¹⁸² and peer review’s impact on judicial review.¹⁸³ Each of these represents an immediate threat to efficient

178. See *supra* note 80 for a list of sources arguing in support of the utility of administrative peer review generally.

179. This viewpoint is analogous to the “cost assessment” or “regulatory budget” approach in risk management theory. See, e.g., WILLIAM F. FOX, JR., UNDERSTANDING ADMINISTRATIVE LAW 221–24 (3d ed. 1997) (citing LESTER B. LAVE, THE STRATEGY OF SOCIAL REGULATION (1981)).

180. There has been much discussion of the “ossification” of the administrative process, largely through the addition of costly procedural mechanisms. See generally Thomas O. McGarity, *Some Thoughts on “Deossifying” the Rulemaking Process*, 41 DUKE L.J. 1385 (1992).

181. Sarah Grimmer, *Public Controversy over Peer Review*, 57 ADMIN. L. REV. 275, 280 (2005) (“The majority of negative comments [regarding the OMB Bulletin] argue that peer review adds expense and delay to the use or distribution of information.”); see Noah, *supra* note 41, at 10,610.

182. See Anderson et al., *supra* note 27, at 131 (“[P]eer review cannot function as effectively if the process becomes overly proceduralized.”).

183. See JASANOFF, *supra* note 25, at 241 (arguing that peer review “certifies that the agency’s scientific approach is balanced and rational and that its conclusions are sufficiently supported by the evidence”); Noah, *supra* note 41, at 10,610 (“[P]eer review of regulatory decisionmaking may become an ominous hurdle for agencies to surmount, both in terms of the difficulty of undergoing that scrutiny and because of the prospect of judicial invalidation triggered by the inevitable criticisms from expert peer reviewers.”).

administration by creating extra or more-burdensome steps to the administrative process. The impact on administrative efficiency of the first two, the added processes of reviewing scientific inputs and of collaboration between peer reviewers and administrators, is relatively straightforward. The third, peer review's impact on efficient judicial review, occurs in two ways. It first depends on the form of the peer review. Single-comment peer review models simplify judicial review in a way that models with a collaborative form do not by creating a record of peer reviewer comments that is not cluttered by accounts of deliberations between administrators and peer reviewers.¹⁸⁴ It is also dependent on the effect of the particular peer review model. A nonbinding effect aids efficient judicial review by only requiring judges to determine if agencies acted rationally in light of the evidence (including peer reviewer comments) before them;¹⁸⁵ peer review models with a binding effect require judges to make an additional determination as to whether the agency satisfied the requirement that it comply with peer reviewer recommendations.¹⁸⁶

In addition to these three direct threats, there are three other features of administrative peer review that have a more indirect influence on administrative efficiency: advancing reliable scientific inputs, instigating agency interpretation of peer review comments, and potentially interfering with the administrative process via negative comments about the credibility of scientific inputs. Through the first of these, assisting agencies in identifying credible scientific information, peer review can make the administrative process more efficient by reducing the likelihood that administrative decisions will have to be revisited or amended due to flawed inputs. Any positive contribution on these grounds is limited, however, due to the fact that in the absence of administrative peer review, any unreliable scientific inputs that go undiscovered will likely remain so, and therefore will never have the opportunity to create inefficiencies in administrative process. In order for a scientific input to be identified as flawed without administrative peer review, it would have to be discovered in what is referred to as the "inevitability of subsequent error correction."¹⁸⁷

184. See *supra* notes 108–11 and accompanying text (describing the commentator model).

185. See *supra* notes 96–100 and accompanying text (explaining the assumption that judicial review of agency action involving administrative peer review will consider peer reviewer comments but will not provide those comments with any special weight as part of that review).

186. *Id.*; see also 5 U.S.C. § 553(c) (2006) (requiring an agency promulgating new rules to provide "a concise general statement of their basis and purpose").

187. Noah, *supra* note 48, at 700–04. There is of course also the possibility that the original source of the scientific information or the agency itself could identify a flaw in a scientific input without the assistance of peer reviewers. This scenario is highly unlikely, however, as there is no official review mechanism for the reliability of scientific inputs

This “inevitability” is dependent on “the consideration of the reported results by the scientific community.”¹⁸⁸ In the administrative context, however, agencies use regulatory science to inform their policy decisions.¹⁸⁹ Work of this type is less likely to be subject to consideration by research scientists due to its specific, policy-related purpose.¹⁹⁰ Any subsequent determination that an unreviewed scientific input is unreliable will therefore have to result from a future regulatory science endeavor that happens to overlap with the subject and conclusions of the earlier project. Even assuming that all of these coincidences exist, the end result of improved administrative efficiency is still dependent on the newly discovered flaws in the scientific input being serious enough that they make the agency’s policy determination based on that input no longer viable or supportable. For these reasons, the potential for peer review to promote administrative efficiency through the identification of unreliable scientific inputs is at best attenuated.

Administrative peer review can also indirectly hinder administrative efficiency where agencies become involved in interpreting peer reviewer comments, but any delays associated with such an interpretation are not likely to create serious problems.¹⁹¹ As an initial matter, interpretation of

outside of the peer review process and therefore any such discovery would have to be the result of scientific serendipity. It also tells us nothing about the subject of this discussion—the potential for peer review to further agency efficiency—as it is entirely independent of the peer review process.

188. *Id.* at 700 (quoting Brief for New England Journal of Med. et al. as Amici Curiae Supporting Respondent at 3, *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993) (No. 92-102)).

189. See JASANOFF, *supra* note 25, at 76 (describing in general terms research science activities as being “ordered around the extension of knowledge and competence without any regard for practical application”) (quoting BARRY BARNES & DAVID EDGE, *SCIENCE IN CONTEXT* 147 (1982)).

190. *Id.* at 77.

191. The other potential source of delay under the commentator and nonbinding consultative models is in the judicial review context. The nonbinding effect of these models could make judicial review less efficient by requiring judges to consider whether administrators gave peer reviewer comments proper weight in applying them to their ultimate decision about the credibility of scientific inputs. There are two reasons why this potential delay is of no concern to this analysis. First, it is rendered moot by the above assumption—based on Professor Noah’s argument—that peer reviewer comments will not be given “special weight” in the judicial review process. See *supra* notes 96–100 and accompanying text. Second, even if additional judicial review is necessary to evaluate administrators’ treatment of peer reviewer comments, such “weight of the evidence” reviews are sufficiently familiar to judges that they should not incite serious delays. See, e.g., *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 488 (1951) (“The substantiality of evidence must take into account whatever in the record fairly detracts from its weight.”); *Leatherbury v. Dep’t of Army*, 524 F.3d 1293, 1300 (Fed. Cir. 2008) (“On appeal, [w]e must determine whether, considering the record as a whole, the agency’s evidence is sufficient to be found by a reasonable factfinder to meet the evidentiary burden applicable to the particular case.” (quoting *Bradley v. Veterans Admin.*, 900 F.2d 233, 234 (Fed. Cir.

reviewer comments is most likely to be relevant in nonbinding peer review regimes, where administrators enjoy more discretion in choosing which scientific inputs are credible.¹⁹² Within those nonbinding regimes, because administrators are not required to consider peer reviewer comments, the impact of peer review on administrative efficiency remains entirely within the hands of the administrators themselves, and thus may be minimized.¹⁹³ Additionally, where a peer review model has a single-comment form, it incentivizes peer reviewers to take advantage of their lone opportunity to communicate with administrators by stating their conclusions clearly, thereby further reducing the need for extensive interpretation.¹⁹⁴

Finally, administrative peer review may indirectly interfere with administrative efficiency where negative peer reviewer comments require changes in the policymaking process that lead to additional delays or expenditures.¹⁹⁵ Where administrative peer review excludes scientific inputs that the agency already relied on or intended to rely on in support of

190))). Therefore, even if judicial review under the commentator or nonbinding consultative models required some additional considerations of the appropriate light in which to view peer reviewer comments, this determination is not likely to cause significant or unreasonable delays in the judicial review of agency action.

192. JASANOFF, *supra* note 25, at 225 (stating that discretionary use of peer review by agencies may lead to “regulatory uncertainty and delay”). By contrast, where peer reviewer comments are binding on administrators, it is safe to assume that any comments by peer reviewers include a final determination as to an input’s credibility, thereby eliminating the need for similar deliberations. For a description of the binding effect of administrative peer review and the models that incorporate it, see *supra* notes 103–05, 117–18 and accompanying text.

193. A binding peer review model does not offer the same degree of control for administrators over the efficiency of their deliberations. Because agencies are barred from using any scientific inputs identified as unreliable by peer reviewers, administrators are forced to spend time and money deliberating as to which inputs are indeed precluded from use. As explained in note 192, *supra*, the deliberations associated with a binding peer review model will likely be relatively simple and, in most cases, elementary due to the high likelihood that reviewers operating within such a system will make their ultimate conclusions regarding the credibility of scientific information explicit.

194. To the extent peer reviewer comments are not stated clearly, the need for agency interpretation is not limited to nonbinding peer review. Even in binding peer review regimes, unclear recommendations will require deliberations within the agency to determine what conclusion an agency must adopt regarding scientific credibility. Moreover, while these interpretive processes may seem more starkly ossifying in single-comment peer review models like the commentator and decisionmaker models, they are in actuality no less so in the consultative model; interpretive deliberations occur in addition to, but will not obviate the need for, exchanges about the scientific methodology and rationality of the relevant inputs.

195. See Noah, *supra* note 36, at 1069 (“Even if a negative peer review does not discourage an agency from pursuing an initiative, the process may lead to delays in rulemaking. Indeed, agency officials may invite external reviews in order to defer making a decision.”); see also EPA HANDBOOK, *supra* note 66, at 74 (“Peer review comments and recommendations may entail significant impacts on the planned project schedule, budget, or other resource requirements. Management decisions related to revisions in one or more of these areas may be appropriate.”); JASANOFF, *supra* note 25, at 225.

its policy decision,¹⁹⁶ agencies could experience serious financial costs or policymaking delays as additional information is collected or new analyses are performed.¹⁹⁷ This impact will likely be rare due to the deferential nature of peer review and the fact that agencies often have access to multiple sources of corroborating data in support of their decisions,¹⁹⁸ but could nonetheless be significant in cases where it does occur.¹⁹⁹

The public service analysis requires consideration of these possible influences on administrative efficiency with respect to each model of administrative peer review. The commentator model is overall highly efficient because it minimizes the three direct sources of drag on the administrative process. Its single-comment form spares administrators the additional burdens of multiple rounds of reviewer comments and of peer reviewer–administrator collaboration. It also streamlines judicial review by creating a simpler administrative record²⁰⁰ and by saving judges from deciding whether an agency actually complied with peer reviewer recommendations.²⁰¹ In terms of the indirect sources of inefficiency, the commentator model is less effective than the other models to the extent it fails to adequately encourage agencies to identify reliable scientific information²⁰² and creates circumstances under which agencies may need to interpret peer reviewer comments, but it is more effective insofar as its nonbinding effect makes it relatively unlikely that the policymaking process will be delayed or interrupted by negative peer review reports.²⁰³

196. Noah, *supra* note 36, at 1069; *see also* JASANOFF, *supra* note 25, at 82 (“Agencies subject to supervision by scientific experts will seldom feel confident enough to act unless their scientific assessments survive peer review.”).

197. Noah, *supra* note 41, at 10,610 (describing as an “added administrative burden” for agencies the fact that a “critical peer review may amount to a de facto veto and derail a rulemaking proceeding”).

198. This problem may be altogether avoidable by adopting Professor Noah’s suggestion that peer review be introduced early in the administrative process. *See* Noah, *supra* note 36, at 1060, 1062 (advocating procedures whereby agencies “consult outside experts before publicly committing themselves to a particular course of action,” and “attempt to improve rulemaking by eliciting feedback early in [their] decisionmaking process”).

199. *See* Ruhl & Salzman, *supra* note 23, at 13; Doremus, *supra* note 59, at 1147; Weiss, *supra* note 7 (noting the availability of multiple studies from multiple sources in the EPA’s evaluation of atrazine).

200. *See supra* notes 108–11 and accompanying text (describing the commentator model).

201. *See supra* notes 96–100 and accompanying text (outlining assumption that peer reviewer comments will be part of the administrative record on judicial review, but will not carry any special weight); *see also* 5 U.S.C. § 553(c) (2006) (requiring that agencies provide a “concise general statement of their basis and purpose” for promulgating a regulation).

202. *See supra* notes 160–62 and accompanying text (describing the weaknesses of the single-comment form and the nonbinding effect in promoting the use of credible scientific information by agencies).

203. *See supra* notes 108–11 and accompanying text.

The nonbinding consultative model does less to promote administrative efficiency due to its collaborative form. Collaboration between administrators and peer reviewers requires a much greater investment of time and resources than the single-comment form of the commentator (and decisionmaker) model.²⁰⁴ It is also likely to result in a complex record of deliberations between reviewers and administrators that could be burdensome on the judicial review process; judges faced with such a record may find it more difficult to evaluate an agency's treatment of peer reviewer recommendations.²⁰⁵ There is some improvement where the indirect influences on administrative efficiency are concerned. The nonbinding consultative model may be slightly better than the commentator model at assisting agencies in identifying noncredible scientific inputs due to its collaborative form,²⁰⁶ but its nonbinding effect results in the same impact as the commentator model in terms of agency interpretation of peer reviewer comments and protection against policymaking delays resulting from negative conclusions by peer reviewers.

Under the binding consultative model, the direct burdens on administrators from administrator–peer reviewer collaboration and on judicial review from the resulting complex administrative record are generally the same as those under the nonbinding consultative model. An exception is the additional burden on judicial review associated with binding peer review regimes; judges reviewing agency action under the binding consultative model must address the issue—unique to binding peer review—of whether administrators actually complied with peer reviewer recommendations.²⁰⁷ There are additional differences where indirect sources of inefficiency are concerned. For instance, the binding consultative model promotes administrative efficiency where the nonbinding model does not because it makes it more likely that agencies will use only reliable scientific information,²⁰⁸ and because it is less likely to result in reviewer comments that require agency interpretation.²⁰⁹

204. For a discussion of the ossification of regulatory activity, see McGarity, *supra* note 180, at 1387.

205. See *supra* text accompanying note 184; see also JASANOFF, *supra* note 25, at 249 (“[A]rguments for close judicial scrutiny [of agency action] are likely to be strongest when . . . the agency acts contrary to the recommendations of a peer-review panel . . .”).

206. See *supra* notes 164–73 and accompanying text (describing how the collaborative form of the nonbinding consultative model is better able to promote agency reliance on credible scientific information).

207. See text accompanying note 186 (discussing the inefficiencies created in the judicial review process by binding peer review).

208. See *supra* notes 167–77 and accompanying text (explaining why binding peer review models are better equipped to promote agency reliance on dependable scientific inputs).

209. See *supra* notes 192–94 for an explanation of why nonbinding peer review models

Administrative efficiency may suffer significantly under the binding consultative model, however, where it excludes scientific inputs that the agency already relied on or intended to rely on in support of its policy decision.²¹⁰ Therefore, while the binding consultative model offers some limited opportunities for improved efficiency over the nonbinding model, it also presents its own occasion for delay. In either case, the collaborative form of the binding and nonbinding consultative models renders them more burdensome than either of the single-comment models.

The single-comment form of the decisionmaker model makes it nearly as efficient as the commentator model in terms of the direct sources of inefficiency.²¹¹ The only exception lies in the judicial review context, where the decisionmaker model's binding effect makes judicial review slightly less efficient by requiring judges to consider whether administrators actually complied with peer reviewer recommendations.²¹² The decisionmaker model's binding effect promotes efficiency indirectly, however, by helping to ensure that agencies rely only on credible inputs²¹³ and by virtually eliminating any need for agency officials to interpret peer reviewer comments,²¹⁴ but could result in far greater burdens to administrators where peer reviewers' negative comments exclude scientific inputs.²¹⁵

All told, the public service analysis appears to favor the commentator model. The collaborative form of the two consultative models renders them least efficient, particularly in terms of their direct influence on administrative efficiency.²¹⁶ The relative impact of the commentator and decisionmaker models on administrative efficiency, however, is less clear. In terms of direct influences, the commentator model has the advantage. Both models advance administrative efficiency through their single-comment form. The commentator model's nonbinding effect, however, makes it more efficient than the decisionmaker model because the commentator model excludes from judicial review an issue which the

are more likely to create inefficiencies based on administrators' discussions about the meaning of reviewer comments.

210. JASANOFF, *supra* note 25, at 82; Noah, *supra* note 36, at 1069.

211. Because they share a single-comment format, the two models are able to limit both the resources required for the peer review itself and the size and complexity of the peer review record on judicial review. See text accompanying notes 200–01 regarding these benefits of administrative efficiency.

212. See text accompanying note 186.

213. See *supra* notes 167–77 and accompanying text.

214. See *supra* notes 192–94 and accompanying text.

215. JASANOFF, *supra* note 25, at 82; Noah, *supra* note 36, at 1069.

216. When compared to the commentator and decisionmaker models, the consultative model adds ossifying features to the administrative process while failing to provide judges with a more efficient means of evaluating agency conduct.

decisionmaker model's binding effect does not: the question of agency compliance with reviewer comments. The balance then shifts somewhat with regard to the indirect influences on efficiency. The nonbinding effect of the commentator model may interfere with administrative efficiency more than the binding decisionmaker model because the commentator model offers fewer assurances that administrators will rely on credible scientific inputs²¹⁷ and may require administrators to interpret peer reviewer comments.²¹⁸ On the other hand, unlike the decisionmaker model, the nonbinding effect of the commentator model protects agencies from the potentially serious interruptions in policymaking caused by peer reviewers precluding agencies from using unreliable scientific inputs. Balancing the two, it appears that the commentator model does better to advance administrative efficiency because it does so more directly than the decisionmaker model. This is supported by the fact that the decisionmaker model falls short on what may be perceived as the most significant indirect factor—the delay or interruption of administrative process due to negative peer review comments. For these reasons, the commentator model appears to be the more desirable model of administrative peer review under the public service analysis.

3. *Balancing (Cost–Benefit) Analysis*

The balancing analysis does what the public service and public welfare analyses do not—it incorporates all of the principles associated with peer review and administrative legitimacy into one normative framework. This approach weighs the costs and benefits of each peer review model in terms of agency expertise, agency accountability, and government efficiency, and measures which model succeeds in greatest measure in using peer review to promote these principles. Balancing the costs and benefits of

217. *See supra* notes 155–62, 175–77 and accompanying text (describing the abilities of the commentator and decisionmaker models, respectively, to promote reliable regulatory science).

218. *See supra* notes 192–94 and accompanying text for an explanation of why nonbinding peer review models are more likely to create inefficiencies based on administrators' discussions about the meaning of reviewer comments. Although the commentator model's nonbinding effect is a source of inefficiency as it creates a need for agency interpretation of peer reviewer comments, that same effect is also the reason why this source of inefficiency is not unduly disruptive; because administrators are not required to comply with reviewer comments under the commentator model, they are likewise not required to engage in discussions regarding their meaning. Inefficiencies associated with voluntary deliberations cannot therefore be attributed entirely to the commentator model itself. *See supra* notes 193–94 and accompanying text. Moreover, to the extent interpretive delays exist, they require at most meetings within the agency to resolve any internal confusion and may be stopped at any time (regardless of whether they have reached a resolution) without running afoul of the commentator model's requirements.

administrative peer review is problematic because they are inherently qualitative. As any attempt to attach quantitative values to them would likely appear arbitrary and would threaten to transform this discussion into a debate about the accuracy of those valuations,²¹⁹ it is more useful to consider the costs and benefits of the proposed models in relative terms.

a. Weighing the Costs of Administrative Peer Review

The costs of administrative peer review²²⁰ lie primarily in peer review's potential to ossify the administrative process directly through the review of scientific work product, the exchange of information between reviewers and administrators, and more complex processes of judicial review, and indirectly by causing agencies to interpret peer reviewer comments and by creating delays in the policymaking process through negative peer review comments.²²¹ An additional cost of administrative peer review is the possibility—advanced by some commentators—that requiring agencies to pursue peer review will cause them to avoid scientific inputs altogether.²²² Faced with the burdens of required peer review procedures and the additional possibility that those procedures could prohibit the use of a scientific input to defend a policy judgment, agencies may simply choose not to consult scientific inputs at all in reaching their decision.²²³ Avoiding

219. See, e.g., David M. Driesen, *The Societal Cost of Environmental Regulation: Beyond Administrative Cost-Benefit Analysis*, 24 *ECOLOGY L.Q.* 545, 558–59 (1997) (noting the difficulty in quantifying variables associated with environmental regulation in a cost-benefit analysis); Duncan Kennedy, *Cost-Benefit Analysis of Entitlement Problems: A Critique*, 33 *STAN. L. REV.* 387, 389 (1981) (“Numerous problems arise in trying to value various kinds of costs and benefits.”).

220. Many of these costs are discussed in greater detail in Part IV.B.2, *supra*, in connection with the public service analysis.

221. See discussion *supra* notes 195–99 and accompanying text for an additional explanation of how negative peer review comments can interfere with the administrative process.

222. See Stephen M. Johnson, *Junking the “Junk Science” Law: Reforming the Information Quality Act*, 58 *ADMIN. L. REV.* 37, 67 (2006) (“In order to avoid allocating additional resources to . . . prepare peer reviews, agencies are likely to reduce the amount and type of information that they make available . . . in rulemakings . . .”); Noah, *supra* note 36, at 1067–68 (“[I]f agencies sense that the blessing of outside scientists is necessary before proceeding with a rule, they may decide to settle for second-best regulatory options . . .”).

223. See JASANOFF, *supra* note 25, at 225 (“Others questioned the wisdom of a procedure in which FDA is totally free to accept or reject the findings of the board of inquiry. Clearly, this discretion makes it possible for the agency to manipulate the authority of science to its own advantage.”); Noah, *supra* note 36, at 1067–68. This may not be a viable option in cases where science plays a crucial role in the policy determination due to the applicable standards of judicial review, see 5 U.S.C. § 706(2)(A) (2006) (articulating the APA’s arbitrary and capricious standard for judicial review), but it is a theoretical problem for administrative peer review generally and in particular for the many instances of agency action that are not wholly dependent on science. See Coglianese & Marchant, *supra* note 3,

scientific inputs could compromise agency performance by depriving policymakers of important information and obscuring the rationales for policy decisions that implicate scientific information.²²⁴ While on its face this seems like a clear drawback, closer scrutiny reveals that it is not entirely a fair criticism of administrative peer review, and that the cost associated with ignoring scientific information would at worst only impact agency expertise.²²⁵ Nevertheless, due to the possibility that outright exclusion of scientific inputs could damage agency expertise, it will be included (albeit cautiously) here.

The costs of administrative peer review are not realized uniformly across the four models. For example, the commentator model's single-comment form presents few obstacles to administrative efficiency except for its potential to indirectly burden the process through agency interpretation of peer reviewer comments.²²⁶ Its relative efficiency also makes the commentator model less likely to result in agencies completely excluding scientific information.²²⁷ Agency incentives to avoid scientific inputs are driven largely by the procedural or substantive obstacles created by

at 1263–64 (arguing that at least in the EPA context, “[r]elying exclusively on science . . . is as misguided as it would be to disregard relevant scientific information altogether”). The nonbinding model, however, does not encounter the same potential pitfall—where agencies are not required to comply with peer reviewer comments, there is far less need to protect against them.

224. See *supra* note 223.

225. As an initial matter, the claim that administrative peer review could result in the exclusion of scientific inputs from the administrative process is not a critique of the peer review process itself but of the political incentives created by a peer review requirement. This issue may be appropriate to a more general discussion of whether peer review is useful to the administrative process but is far less relevant to the present analysis of specific peer review methods. As discussed above, commentators and government officials generally agree that peer review has some measure of value to administrative government. See, e.g., OMB Bulletin, *supra* note 41 (“A wide variety of authorities have argued that peer review practices at federal agencies need to be strengthened.”); Noah, *supra* note 41 (“[E]ssentially everyone applauds the idea of using independent peer review in the regulatory process.”). For additional sources, see *supra* notes 80–81. Second, due to the limits put on administrative action by judicial review under the APA, 5 U.S.C. § 706 (2006), it is unlikely that administrators would risk foregoing scientific information in any but the most costly of circumstances. Finally, although an agency's decision to exclude relevant scientific information from a policy analysis may negatively impact agency expertise, it does not impact agency accountability. The general public is no less capable of evaluating an agency's political judgment because relevant scientific information was excluded from the process. In fact, the public has two reliable grounds on which to judge government officials in that instance: the quality of their judgment as demonstrated in the substantive policy decision and the quality of their judgment in deciding to exclude relevant scientific information.

226. See *supra* notes 200–03 and accompanying text (describing the effect of the commentator model on administrative efficiency).

227. See *supra* notes 212–25 and accompanying text (describing the potential of administrative peer review to incite agencies to completely exclude scientific information from their policy analyses).

administrative peer review of those inputs.²²⁸ A procedurally efficient and substantively nonintrusive regime like the single-comment, nonbinding commentator model presents few if any such incentives.

The two consultative models are a somewhat different story. They both require a potentially significant amount of time and money as a result of their collaborative form, which may also further complicate judicial review by creating a more complex administrative record.²²⁹ Moreover, the individual effects of the two consultative models create some additional potential costs. The nonbinding consultative model may create delays by requiring agency interpretation of peer reviewer comments,²³⁰ but it is not likely to delay the administrative process with negative peer review comments or to discourage agencies from using scientific information because it does not prohibit administrators from reaching their own conclusions regarding the usefulness of scientific inputs.²³¹ The binding consultative model is less vulnerable to interpretive delays, but it threatens to create its own problems by forcing agencies to amend or correct their decisions based on negative peer reviewer comments and reviewing judges to address the additional question of whether agencies met their burden of complying with peer reviewer recommendations.²³² Finally, its collaborative form and binding effect create precisely the type of procedural and substantive obstacles to policymaking that could discourage

228. *Id.*

229. See *supra* notes 204–05, 207, and accompanying text; see also EPA HANDBOOK, *supra* note 66, at 2; Noah, *supra* note 41, at 10,608 (“Many of the existing mechanisms for peer review, at least those that federal agencies have established on their own initiative, serve . . . a consultative function.”); *id.* at 10,612 (“Regulatory peer review is best understood as a collaborative process where scientists from different disciplines are able to hash out disagreements with agency staff prior to the publication of a proposed rule.”); Wagner, *supra* note 30, at 81 (noting that “[s]cience advisory boards . . . require time and resources” and citing to studies of their actual costs).

230. For further discussion of the lack of interpretive drag in binding models of peer review, see *supra* notes 192–94.

231. It is true that the procedural inconveniences resulting from the collaborative form of the nonbinding consultative model do create some incentive for administrators to avoid using scientific inputs, but these incentives are tempered by the fact that peer reviewer comments are merely advisory under this model and thus cannot derail or otherwise delay administrative process without agency consent.

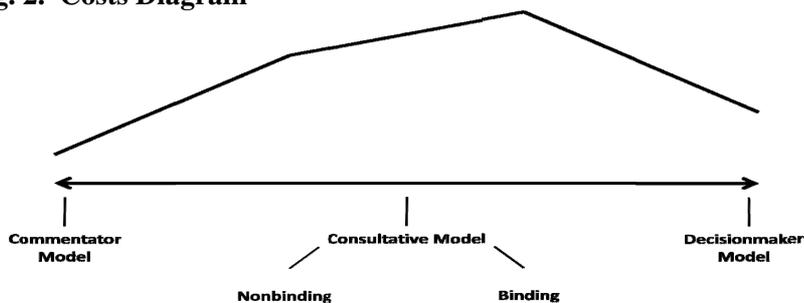
232. See *supra* notes 205, 207, 210, and accompanying text; see also EPA HANDBOOK, *supra* note 66, at 74 (“Peer review comments and recommendations may entail significant impacts on the planned project schedule, budget, or other resource requirements. Management decisions related to revisions in one or more of these areas may be appropriate.”); Noah, *supra* note 36, at 1069 (“Even if a negative peer review does not discourage an agency from pursuing an initiative, the process may lead to delays in rulemaking. Indeed, agency officials may invite external reviews in order to defer making a decision.”). While the nonbinding version of the consultative model largely avoids this by making agency adoption of reviewer comments voluntary, it is not immune; the use of procedures such as formal, public hearings could hinder efficiency through public pressure to amend policies that were based on unreliable inputs.

agencies' use of scientific information.²³³

The single-comment form of the decisionmaker model is like the commentator model in terms of the minimal resources required by the peer review process itself and its minimal impact on judicial review.²³⁴ As with the binding consultative model, however, the decisionmaker model's binding effect makes it potentially more burdensome for agencies when considered in connection with the costs of amendment or correction of a policy position, additional burdens on reviewing judges, and the potential to discourage agency use of scientific information.²³⁵

Taken together, the costs of administrative peer review can be expressed as a function of the various models as illustrated in the following diagram.

Fig. 2. Costs Diagram²³⁶



The commentator model represents the fewest costs compared to the other models; its only measurable drag on administrative efficiency is the (indirect) burden associated with agency interpretation of peer reviewer comments. The nonbinding consultative model is also likely to incite agency interpretation as well as significant additional costs due to the added procedural requirements of its collaborative form, including the potential for complications in judicial review. Costs peak in the binding consultative model, where interpretive costs disappear, but the remaining procedural requirements of the nonbinding consultative model are joined by an additional burden on judicial review and the costs of mandatory compliance with reviewer recommendations, as well as the possibility of

233. See *supra* note 231 and accompanying text (explaining how a peer review regime with a nonbinding effect is less likely to discourage agency use of scientific information).

234. For a more detailed discussion, see *supra* notes 226–28 and accompanying text.

235. For a more detailed discussion, see *supra* notes 232–33 and accompanying text.

236. The reason that the change in costs from the commentator to binding consultative model is nonlinear is because different variables change over the two segments included in that portion of the curve. The commentator and nonbinding consultative models are distinguished by their form, while the nonbinding and binding consultative models have different effects. Because a change in form represents a greater increase in costs to the administrative process than a change in effect, costs cannot be represented as growing linearly through those three points on the curve.

foreclosing agency use of scientific information. Lastly, the decisionmaker model embodies fewer costs than the binding or nonbinding consultative models because its single-comment form creates fewer procedural burdens, but more than the commentator model due to the costs associated with its binding review, namely complying with reviewer recommendations, introducing an additional issue for judicial review, and potentially excluding scientific information from the administrative process.

b. Weighing the Benefits of Administrative Peer Review

The benefits of administrative peer review stem from its promotion of reliable scientific information.²³⁷ This advances agency efficiency by preventing the need to revisit policy decisions based on the discovery of inaccurate scientific inputs and, in the judicial review context, by focusing judicial inquiry on familiar legal issues rather than complex technical issues of scientific credibility.²³⁸ It increases agency expertise by better informing agencies about their scientific inputs²³⁹ and is consistent with agency accountability.²⁴⁰ Peer review benefits administrative government on a systemic level by providing a mechanism to educate agency officials and evaluate agency competence, and by creating a perception of government-wide accountability that is not based on individual administrative decisions.²⁴¹

As with its costs, the benefits of administrative peer review are not achieved equally through each model. The commentator model is consistent with the notion that administrative peer review contributes in some regard to agency expertise and accountability through its promotion of reliable scientific inputs,²⁴² but it is inherently constrained by its nonbinding effect.²⁴³ Its single-comment form allows for a limited

237. These benefits are discussed in greater detail in Part IV.B.1, *supra*, in connection with the public welfare analysis.

238. See *Int'l Harvester Co. v. Ruckelshaus*, 478 F.2d 615, 652 (D.C. Cir. 1973) (Bazelon, C.J., concurring) (“[I]n cases of great technological complexity, the best way for courts to guard against unreasonable or erroneous administrative decisions is not for the judges themselves to scrutinize the technical merits of each decision. Rather, it is to establish a decision-making process which assures a reasoned decision . . .”).

239. See *supra* notes 126–30 and accompanying text (discussing the principle of agency expertise).

240. Without the corrupting influence of unreliable scientific inputs, the public may more confidently evaluate agency action as the product of the principles and judgment of the individuals and institutions making them. For a more detailed discussion about the importance of reliable scientific information to agency accountability, see *supra* notes 144–48, 153–54, and accompanying text.

241. For a more detailed discussion about the systemic benefits of administrative peer review, see *supra* notes 149–54 and accompanying text.

242. See discussion *supra* notes 80, 82, 84, and accompanying text.

243. See *supra* notes 155–59 (discussing the impact of a nonbinding effect on scientific

educational benefit for administrators and a record of agency competence, but because its nonbinding effect does not ensure that unreliable information is excluded from the administrative process, any resultant benefit from the commentator model in the public perception of government accountability is at best contingent and unpredictable.

The nonbinding consultative model goes further in promoting reliable regulatory science by permitting peer reviewers to exchange information and ideas with administrators in hopes of curing any problems before they may contribute to a political decision.²⁴⁴ This exchange helps reviewers persuade administrators about the credibility of scientific information, educate agency officials, and create a record of the agency's scientific competence, all of which advance not only the agency's substantive expertise, but also the public's confidence in administrative competency.²⁴⁵ Like the commentator model, however, the nonbinding consultative

reliability).

244. See Noah, *supra* note 36, at 1060 (explaining that peer review is best utilized by agencies "before publicly committing themselves to a particular course of action").

245. See *supra* notes 164–65, 168–70, and accompanying text. This statement may seem to beg the question whether peer reviewers acting as consultants are not in fact the most useful to government officials precisely because they are in a position to collaborate with agency scientists and policymakers about the scientific issues relevant to the pending policy decision. This collaboration could create the type of open, cooperative, professional environment in which scientific inquiry thrives. See Noah, *supra* note 36, at 1060 (noting that consultation between administrators and outside experts may encourage "proceedings [that are] less adversarial and more productive"). Two (or more) heads may indeed be better than one. THE NEW DICTIONARY OF CULTURAL LITERACY 57 (E.D. Hirsch, Jr. et al. eds., 3d ed. 2002) (explaining the meaning of the phrase as "[s]ome problems may be solved more easily by two people working together than by one working alone"). The problem with this viewpoint is that it requires a level of interaction between reviewers and government officials that is beyond the boundaries of peer review and that is much closer to scientific collaboration. See Noah, *supra* note 36, at 1061 (noting that consultation between administrators and outside experts may be better described "as peer collaboration than peer review"). Peer review is a form of scientific quality control—it is designed to evaluate the methodology and rationality of scientific work product, not to troubleshoot existing studies or develop new data. See, e.g., Ruhl & Salzman, *supra* note 23, at 13 (citing to a definition of peer review from the scientific journal *Ecology*: "the reviewer should examine the methods, data presentation, and statistical design and analyses of the paper, but the instructions do not include engaging in independent data authentication"). As we begin to imagine peer reviewers "educating," "correcting," or "assisting" administrators with their development and interpretation of scientific information, we enter into a substantive discussion about the correct answer to the scientific issue at hand. This is a very different inquiry from the higher level review provided by peer review and is in no way exclusive of peer review; while scientific collaboration may be a useful method of enhancing policymaking in areas dealing with scientific questions, it does not eradicate the need for peer review of the work product resulting from that collaborative effort. See *id.* at 14 ("Indeed, peer review would grind itself and journal publication to a screeching halt were it to require peer reviewers to engage in independent testing and data analysis."). As a result, any discussion about the strengths of the consultative model of administrative peer review should by definition be limited to the contributions of peer review, not of a substantive scientific partnership.

approach stops short of requiring policymakers to comply with peer reviewers' determination that scientific information is not credible, and is thus flawed in terms of promoting scientific reliability.²⁴⁶ Although the collaborative form of the nonbinding consultative model may be potentially more effective than the commentator model's single-comment form in influencing agency use of scientific information, it too offers no more than a contingent benefit.²⁴⁷

The binding consultative model, on the other hand, excels where the nonbinding version succeeds and fails. It enables reviewers to ensure that only credible scientific information will be used in setting policy, thereby advancing administrators' ability to make informed decisions and the public's ability to hold those administrators accountable for their judgments,²⁴⁸ while at the same time providing an opportunity for reviewers to educate administrators and to create an ongoing account of agency competence.²⁴⁹ The binding consultative model can also improve public perception of the administrative process by promoting confidence in the overall competency of agency decisionmaking in a way that the contingent benefits of the commentator and nonbinding consultative models cannot.²⁵⁰

The decisionmaker model promotes scientific credibility similarly to the binding consultative model.²⁵¹ By limiting government officials to information that survives peer review, the decisionmaker and binding consultative models are best equipped to ensure that agency officials are adequately informed and thus prevent administrators from—consciously or not—basing their explanations for policy decisions on unreliable scientific

246. See discussion *supra* notes 164–65 and accompanying text for a discussion of the nonbinding consultative model's strengths and weaknesses in promoting agency expertise and accountability. Without compelling agency compliance with peer review recommendations, the value of peer review to the administrative process is limited to the effectiveness of the collaborative form, i.e., to administrators' receptiveness to reviewer comments and reviewers' ability to persuade. This exposes the regulatory process to the dangers of "manufactured uncertainty" or other politically expedient uses of scientific information. Weiss, *supra* note 7. A similar phenomenon is described above in the atrazine and Plan B regulatory examples and in Professor Ruhl's "The Science Made Us Do It" scenario. Ruhl, *supra* note 34, at 1068.

247. See discussion *supra* notes 164–65 and accompanying text (discussing the limits on the nonbinding consultative model in promoting agency expertise and accountability).

248. See discussion *supra* notes 166–70 and accompanying text.

249. See discussion *supra* notes 168–70 and accompanying text. Although the binding nature of this model limits somewhat the immediate educational benefits of reviewer-administrator interaction, the systemic benefits of that educational process persist.

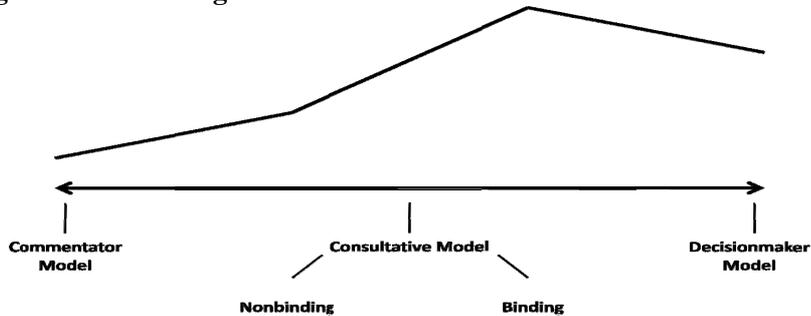
250. See discussion *supra* notes 166–70 and accompanying text.

251. To the extent it has an educational impact on an agency, the decisionmaker model is more closely akin to the commentator model due to its single-comment format. See discussion accompanying note 160.

inputs.²⁵² Although the decisionmaker model's single-comment form limits its educational potential, it creates a record of scientific competence within the agency and contributes to public perception of administrative competence and scientific rigor in a way that benefits the entire administrative process.²⁵³

These potential benefits of administrative peer review can also be represented as a function of the various models.

Fig. 3. Benefits Diagram²⁵⁴



Benefits are smallest in the commentator model, as any enhancement to the credibility of scientific information as a result of peer review is largely dependent on administrators' willingness to abide by reviewer recommendations. The nonbinding consultative model includes additional educational and public perception benefits due to its collaborative form, but represents at best a marginal increase in the level of scientific credibility over the commentator model. The binding consultative model includes the educational benefits of the collaborative process as well as significant benefits to substantive agency knowledge and public accountability due to its binding effect. The decisionmaker model shares all of the benefits of the binding consultative model except the educational one due to its single-comment review process.

After considering the costs and benefits of administrative peer review as a function of the various peer review models, all that remains is to compare the two. Taking the two curves developed above, the largest positive disparity between costs and benefits occurs at the decisionmaker model.

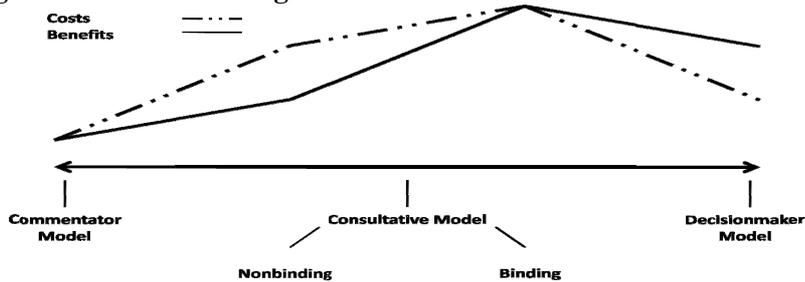
252. See discussion *supra* notes 174–75 and accompanying text.

253. See discussion *supra* notes 176–77 and accompanying text.

254. As with Figure 2, *supra*, the change in benefits from the commentator to binding consultative model is nonlinear because different variables change over the two segments included in that portion of the curve. The commentator and nonbinding consultative models are distinguished by their form, while the nonbinding and binding consultative models include different effects. Because a change in form results in a significantly smaller increase in benefits than a change in effect, benefits cannot be represented as growing linearly through those three points on the curve.

This conclusion can be represented graphically as follows.²⁵⁵

Fig. 4. Cost–Benefit Diagram



In short, the balancing analysis indicates that the decisionmaker model is most likely to result in the largest net benefit to the administrative process when considered in the context of administrative legitimacy.

CONCLUSION

The purpose of this Article is not to promote a particular model of administrative peer review as superior to its alternatives. It is instead to provide a new template for the ongoing discussion of whether scientific peer review benefits agency action by first addressing the existence of various peer review models and then initiating a discussion as to which of those models is best suited to further an administrative process that is legitimate within our constitutional democracy. As the above discussion demonstrates, there are a number of assumptions and different normative vantage points from which the relative value of administrative peer review can be evaluated. These choices may themselves be subject to debate and will likely impact any conclusion regarding how administrative peer review should be performed.

That said, the above discussion does provide some interesting insights. First is the realization that each of the normative analyses leads to a different preferred model of administrative peer review; the public welfare analysis favors the binding consultative model, the public service analysis prefers the commentator model, and the cost–benefit analysis identifies the decisionmaker model as the strongest proponent of administrative legitimacy. This is instructive because it highlights the significance of the present discussion. Not only does the normative framework in which we think about administrative peer review impact our conclusions about its usefulness to administrative government, but the specific model of peer

255. The fact that the curves may not start at the same absolute value does not interfere with the ultimate analysis because the relative value of the various models depends more on the shape of the curves than the absolute values of the starting points.

review is also highly relevant to that analysis; without some consideration of how peer reviewers can and should relate to administrators, it is difficult to reach any robust understanding of the theoretical basis for peer review generally, let alone for the particular way in which administrative peer review should be employed.

Second is that, at least with respect to the viewpoints referenced here, one model of administrative peer review—the nonbinding consultative model—is generally less likely to advance our democratic principles within the administrative process. This is particularly interesting because it is precisely that model that is most prominently featured in federal administrative law.²⁵⁶ Whether this indicates a weakness of the model itself or of our expectations of administrative government, it nevertheless raises an interesting question for further consideration.

Third is the strong implication that some form of what is herein called “binding” peer review—and is represented in the binding consultative and decisionmaker models—is more in line with administrative legitimacy than its nonbinding counterpart. Beyond the fact that this suggestion is likely counterintuitive and unrepresented as a matter of peer review practice, it raises even more difficult questions regarding the political accountability of independent peer reviewers and the constitutionality and wisdom of independent, private-sector peer reviewers being empowered to (at least partially) override a government agency’s choice of which scientific information it may rely on in performing its policymaking function.

In addition to raising questions about the wisdom of peer review practices, the above discussion reveals some other questions meriting additional inquiry. For example, in cases where the commentator model is employed, a question arises as to whether peer review is appreciably different from the Administrative Procedure Act’s notice-and-comment process²⁵⁷ to merit the additional investments of time and resources. While certainly more narrowly defined than notice-and-comment procedures in terms of the sources and scope of participation anticipated by administrative peer review, the advent of challenges to the quality of scientific information disseminated by administrative agencies under the Information Quality Act,²⁵⁸ particularly when considered in conjunction with the growing sophistication of the public and of organized interest

256. See *supra* note 116 for a list of supporting sources.

257. See 5 U.S.C. § 553(b)–(c) (2006) (setting out the APA’s notice and comment requirements).

258. Information Quality Act, Pub. L. No. 106-554, § 515, 114 Stat. 2763, 2763A-153–54 (2000) (enacted as a rider to the Treasury and General Government Appropriations Act of 2001).

groups,²⁵⁹ may lead to a level of public comment that is technically sophisticated enough to make peer review under the commentator model effectively redundant. The converse of this, of course, is that in cases where the commentator model is not used, the issue of peer reviewers' relationship to the notice-and-comment process becomes essentially moot. Although not an issue of first impression in the academic literature,²⁶⁰ consideration of this issue in the context of a specific model of administrative peer review allows for a different and more in-depth treatment of the topic.

Also germane to this discussion are considerations of the application of these analyses in different scientific contexts and of the relevant *scientific* standards of review or proof to be employed by peer reviewers.²⁶¹ Although defined generally as a deferential examination limited to scientific methodology and rationality and likened here to an abuse of discretion review, there is little said in the literature (including here) of the precise scientific standard that should be employed in peer review of regulatory science.²⁶² This question gains further importance when considered not just in the context of a monolithic account of administrative peer review, but in reference to the various models developed here as well.

While each is important in its own right, these questions can only be addressed in sufficient detail by first considering the theoretical underpinnings and justifications for various models of administrative peer review. This discussion is meant to represent an initial step in that larger inquiry. By proposing four models of peer review and three normative standards by which to judge them, it is the goal of this project to define the analytical boundaries within which the issues raised here, as well as those yet to be identified, may be more comprehensively and consistently examined through the lens of administrative legitimacy. As administrative law seeks to function in an increasingly technical and scientifically ordered world, it is crucial that our scientific quality controls comport with higher order principles of representative democracy.

259. Weiss, *supra* note 7 (noting that in the first twenty months of the Information Quality Act's existence, "39 petitions with potentially broad economic, policy or regulatory impact" were filed challenging the scientific support for regulatory initiatives, thirty-two of which were from organized interest groups).

260. See, e.g., May, *supra* note 66 (suggesting that in the Internet age, the opportunity for public comment is sufficiently broad to displace scientific peer review).

261. See Ruhl & Salzman, *supra* note 23, at 53 (comparing the differences between the "default scientific burden of proof" and the "standards of proof prescribed in the relevant statutory program").

262. See *id.*