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New Directions in Environmental Law

Environmental Law: Then And Now

A. Dan Tarlock*

This symposium originated when the editors of this journal approached Professor Mandelker about publishing an environmental symposium issue. He graciously consulted me and we decided on a yin and yang symposium. We selected five core environmental statutes: the Clean Air and Water Acts, the Endangered Species Act, the Toxic Substances Control Act, and the National Environmental Policy Act. We then paired established scholars with younger counterparts. The basic idea was that the senior scholar would look back at the assumptions behind the original Acts, examine how the assumptions have held up since the environmental decade (1969–1980) in light of evolving knowledge about the nature of the problems and the performance of governance institutions, and assess what worked and what did not work about each statute. Junior scholars would speculate on what in these statutes will continue to work and what reforms are needed to meet the future challenges of environmental protection.

Professor Mandelker and I are deeply grateful to the Washington University School of Law for sponsoring an authors seminar on March 20, 2009 in St. Louis. All the authors benefitted from the conference presentations and exchanges. We are equally grateful to

* Distinguished Professor of Law, Chicago-Kent College of Law, A.B. (1962), LL.B. (1965) Stanford University.

the editors of the *Journal* for their diligent editorial and organizational work in bringing this issue to fruition. For Professor Mandelker and me, the hardest part of this project was selecting the authors. We would have liked to publish a multi-volume symposium to reflect the extraordinary depth and breadth of current environmental law scholarship. We hope that this snapshot of the strengths and weakness of the first generation of environmental statutes raises provocative questions about the future of environmental law.

I. INTRODUCTION: THEN AND NOW

Environmental law is both a mature and constantly evolving field of law. While global climate change now dominates environmental discourse,¹ the core regulatory regimes that were enacted between 1969 and 1980 (the environmental decade) remain important because their original objectives have been only partially realized. The excellent articles in this volume probe the bases of these core statutory schemes and suggest reforms and new ways of incorporating global climate change mitigation and adaptation into their administration. This Introduction places the articles in the historical context of modern environmentalism and environmental law by situating the foundation of environmental law in both the rational and radical 1960s. To better understand the evolution of the law and the challenges we face in adapting environmental law in light of what we have learned since the late 1960s and early 1970s, we must first examine the era in which the environment statutes were drafted. This Introduction briefly articulates the basic assumptions of this era, including the inherent tensions between rational and radical environmentalism, illustrates how these tensions influenced the first generation of environment law, and, as the articles indicate, continue to influence the debates about reforms.

This is an optimal time to look backward for three primary reasons. First, there has been considerable learning in fields such as ecology and toxic substance exposure, much of which is barely

1. Eric Biber, *Climate Change and Backlash*, 17 N.Y.U. ENVTL. L.J. 1295, 1296 (2009) (“[C]limate change is *the* issue in environmental law in the United States . . .”).

reflected in existing law. Second, global climate change forces us to both examine the utility of existing regulatory programs and design new ones. For example, why protect endangered species' habitat if the species can no longer tolerate the area?² Third, after its spectacular development in the early 1970s, United States environmental law has been virtually static for almost three decades. This "stasis" is unsustainable because there is a widespread consensus that "political polarization and a lack of leadership have left environmental protection in the United States burdened with obsolete statutes and regulatory strategies."³ If environmental protection is to adapt to the challenges of the twenty-first century, the legacy of the environmental decade must be reevaluated and much of it rethought. If this legacy goes unexamined, environmental law may become the legal equivalent of the Austro-Hungarian Empire: a magnificent baroque structure which failed to adapt to changing conditions.

II. THE RATIONAL AND RADICAL OR MYTHIC 1960S

Modern environmentalism is widely understood as a product of the mythic, radical 1960s (1965–1973). However, environmental law is a byproduct of both the pre-radical, rational first half of the 1960s and the more familiar, radical part.⁴ Both halves of the 1960s recognized the radical implications of the scientific and moral "imperative" environmentalism, but they differed sharply in their faith in established governmental institutions to act on these imperatives. In the first half of the 1960s, the construct of environmental protection replaced the debate over natural resources conservation versus preservation,⁵ which had dominated "pre-environmental politics" in the twentieth century.⁶

2. See J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 B.U. L. REV. 1, 23–24 (2008).

3. Carol A. Casazza Herman, David Schoenbrod, Richard B. Stewart & Katrina M. Wyman, *Breaking the Logjam: Environmental Reform for the New Congress and Administration*, 17 N.Y.U. ENVTL. L.J. 1, 1 (2008).

4. See, e.g., JOHN C. MCWILLIAMS, *THE 1960S CULTURAL REVOLUTION* (2000) (discussing the varied aspects of the 1960s as a decade).

5. This idea is generally associated with the late L.K. Caldwell, whose theories of environmental protection as an organizing force for public administration were subsequently

The idea of respecting nature first appeared on the political agenda during the administrations of Theodore Roosevelt (1901–1908).⁷ President Roosevelt’s commitment to the conservation of natural resources included both preservation and ownership and efficient management exploitation.⁸ Conservation’s appeal faded during the rapacious and corrupt 1920s and had a rebirth in the 1930s during the New Deal,⁹ but by the 1950s, it again had lost its widespread appeal. However, bitter regional political fights over public lands issues such as grazing fees and the damming of scenic canyons occasionally attracted national attention. Respect for the beauty of nature and the need for scientific management laid the foundation for the modern environmental movement. The environmental movement primarily absorbed the preservation branch of the progressive conservation to “wall off” nature from humans,¹⁰ but it offered a much more holistic and scientific vision of the environment compared to the aesthetic and spiritual justifications for preservation used in the past. Writing about the rise of environmentalism in the 1950s and 1960s, Richard N. L. Andrews observed, “the most revolutionary element of this new public consciousness was a powerful new awareness of the environment as a living system—a “web of life” or *ecosystem*—rather than just a storehouse of commodities to be extracted or a physical or chemical machine to be manipulated.”¹¹

Political movements do not arise out of thin air. The environmental movement was a product of post-World War II fears of public health hazards and the loss of open space around urban areas. Among the immediate factors leading to the movement were

written into the National Environmental Policy Act of 1969. See RICHARD N. L. ANDREWS, *MANAGING THE ENVIRONMENT, MANAGING OURSELVES: A HISTORY OF AMERICAN ENVIRONMENTAL POLICY* 223–26 (1999).

6. Secretary of the Interior Stewart Udall’s book, *The Quiet Crisis*, was an important, popular synthesis of nascent environmental thinking and a call for a modern conservation ethic. See STEWART L. UDALL, *THE QUIET CRISIS* (1st ed. 1963).

7. See DOUGLAS BRINKLEY, *THE WILDERNESS WARRIOR: THEODORE ROOSEVELT AND THE CRUSADE FOR AMERICA* (2009).

8. See *id.*; see also ANDREWS, *supra* note 5, at 148–52.

9. For a discussion of conservation policies during the New Deal, see generally FDR AND THE ENVIRONMENT (Henry L. Henderson & David B. Woolner eds., 2005).

10. See ANDREWS, *supra* note 5, at 223–26.

11. *Id.* at 202.

fears about radiation exposure, which had been building since the 1950s; the linkage of visible pollution (smog) to the internal combustion engine; the suspected health and ecosystem damages caused by synthetic chemicals such as DDT; and the 1969 Santa Barbara oil spill, which suggested that other aesthetic and ecosystem disasters caused by inadequately regulated technology would increase.¹² These concerns were also fomented by the country's post-war affluence, which gave the American public a taste for beauty and recreation, and the release of social reform energy from the anti-Vietnam War movement.¹³

During the Kennedy administration, the need for environmental protection emerged as a dialogue among a few cabinet officials, legislators and their staffs, and representatives of the old-line conservation groups. During the Kennedy and Johnson administrations (before the latter was consumed by the Vietnam War), environmental policy was seen as government's response to diffuse demands for more open space, a more beautiful landscape, less visible pollution, and better control of science and technology.¹⁴ The creators of modern environmental policy saw environmental protection as an extension of the New Deal state.¹⁵ The main players were to be Congress and reformed "expert agencies."

Under the leadership of Secretary of the Interior Stewart Udall (1960–1968), the Kennedy and Johnson administrations sought to adapt the expert New Deal administrative state to address these new

12. JAMES E. KRIER & EDMUND URSIN, *POLLUTION AND POLICY: A CASE ESSAY ON CALIFORNIA AND FEDERAL EXPERIENCE WITH MOTOR VEHICLE AIR POLLUTION, 1945–1975*, at 263–77 (1977) (discussing the relationship between pollution crises and new pollution control legislation).

13. Many historians emphasize the post-World War II roots of modern environmentalism such as leisure and the dissemination of information about the negative effects of the fruits of World War II research, pesticides, and atomic power. *See, e.g.*, ANDREWS, *supra* note 5, at 201–02; SAMUEL P. HAYS, *BEAUTY, HEALTH AND PERMANENCE: ENVIRONMENTAL POLITICS IN THE UNITED STATES, 1955–1985* (1987). Additionally, the Council on Environmental Quality, *The Tenth Annual Report of the Council on Environmental Quality 10* (1979), noted that "the environmental outlook, with its opposition to careless impersonal use of technology in a way that destroys life rather than conserving it, had strong spiritual ties with the peace movement and the ethical climate of the 1960s."

14. *See* ANDREWS, *supra* note 5, at 222.

15. *Cf.* RICHARD J. LAZARUS, *THE MAKING OF ENVIRONMENTAL LAW* 35–38, 132–33 (2004).

mid-twentieth century values. Secretary Udall built on the conservationist legacy, although he also recognized that environmentalism posed a fundamental paradigm shift. For example, he wrote that Rachel Carson's book *Silent Spring* "spurred new lines of thought about resources and the limits of technology that began to alter the thinking of my generation."¹⁶ The architects of environmental protection assumed that this objective could still fit easily within the dominant liberal view that the problems of governance were technical rather than ideological. Initially, environmental protection was addressed through new preservation legislation such as the Wilderness Act,¹⁷ the Wild and Scenic Rivers Act,¹⁸ and the imposition of new planning mandates on the existing agencies. This thinking culminated in the National Environmental Policy Act of 1969.¹⁹ The detailed statutes and frequent judicial challenges to administrative decisions that came in the 1970s, however, were not part of the plan.

The rationalists were caught off guard when environmentalism became a mass movement driven by fear of imminent threats to public health, the "destruction" of nature, and a general rejection of the expert state whose legitimacy had been weakened by the Vietnam War. Frustrated with what they perceived as unresponsive, hostile government agencies, environmentalists followed the civil rights model and turned to the courts for relief from the political system. However, lawyers had to create environmental law out of whole cloth, as there was no constitutional basis on which to litigate. Environmental lawyers followed the great common law tradition left open to socially marginal groups and pursued a "rule of law litigation" strategy. New Deal expert agencies were reclassified as ossified, concrete-pouring mission agencies. To discipline them,

16. STEWART L. UDALL, *THE QUIET CRISIS AND THE NEXT GENERATION* 195 (1988). Udall defended *Silent Spring* in a 1964 *Saturday Review of Literature* review at a time when the chemical industry was spending large amounts of money to discredit the book. Secretary Udall, among others, imported Carson's basic lessons into the legislative history of NEPA.

17. Wilderness Act, Pub. L. No. 88-577 78 Stat. 890, 890 (1964) (codified at 16 U.S.C. §§ 1131–1136 (2006)).

18. Wild and Scenic Rivers Act, Pub. L. No. 90-542, 82 Stat. 906, 906 (1968) (codified at 16 U.S.C. §§ 1271–1287 (2006)).

19. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (codified at 42 U.S.C. § 4321 *et seq.* (2006)).

lawyers created the fiction that the recognition of new environmental protection duties *merely* required courts to perform their traditional and constitutionally legitimate function of applying and enforcing, rather than creating, pre-existing rules. They also convinced courts, and ultimately Congress, that environmental enforcement had to be shared between the agencies and citizens operating through non-governmental organizations.²⁰

The litigation “über alles” branch of environmental law can be explained as an unplanned byproduct of the unique guerilla politics of environmentalism in the late 1960s and early 1970s.²¹ Environmental law was born out of the fight to stop a pump storage project at Storm King Mountain on the Hudson River in New York State. The successful lawsuit to remand a Federal Power Commission license became the paradigmatic environmental lawsuit.²² First, an ad hoc citizen group gained unprecedented standing to represent non-economic, aesthetic interests. Second, the plaintiffs convinced the court of appeals to read a broad regulatory statute, which at best conferred discretion on the agency to consider aesthetic values (a then-much contested idea), to impose mandatory duties on an agency to consider environmental values, and to justify decisions not to protect environmental values more fully.²³ This remains the core “rule of law” litigation strategy.²⁴

This radical strategy was adopted out of necessity in an ad hoc fashion because environmental values had almost no support in the common law, constitutional law, or legislation. Access to the courts was limited because standing was thought to be confined to common law or statutory rights or legislatively created non-common law legal interests. The statutory regimes that promoted the degradation of the landscapes, rivers, and airsheds that NGOs and their lawyers were trying to mitigate all were enacted before environmental values were widely understood, and these statutes conferred almost unlimited

20. I have developed this idea at greater length in A. Dan Tarlock, *The Future of Environmental “Rule of Law” Litigation*, 19 PACE ENVTL. L. REV. 575 (2002).

21. *Id.* at 582.

22. *Scenic Hudson Preservation Conference v. FPC*, 354 F.2d 608 (2d Cir. 1965), *cert. denied*, 384 U.S. 941 (1966).

23. Tarlock, *supra* note 20, at 582–83.

24. *Id.* at 583.

discretion on administrative agencies to choose among resource use options ranging from complete preservation to full development.

Although in the late 1960s the prospect of comprehensive political action seemed remote, this quickly changed. In the early 1970s, environmental law gained statutory status.²⁵ However, the “rule of law” litigation strategy and the growing distrust of all forms of expertise were carried over into NEPA litigation and the implementation of all of the subsequently enacted pollution control and biodiversity conservation statutes. Thus, environmental law is an unstable mix of New Deal faith in the expert state and post-New Deal distrust of that state. Ultimately, the rule-of-law strategy transferred power from the mission agencies to the courts, dethroned engineers from their seats of power and created powerful environmental NGOs which now have a seat at the political table. However, both the rational and guerilla wings of environmental law shared certain common assumptions. The question is which of these assumptions and the law that they produced have been undermined in whole or in part, and which remain relevant.

III. THE ASSUMED SIMPLICITY OF ENVIRONMENTAL REGULATION

Modern environmental law rests on at least six key assumptions and several subsidiary ones. Five were products of the rational sixties and the sixth is a byproduct of the effort to ban DDT, the first major use of guerilla litigation. The overarching assumption in the early days of environmental law was that it would be *relatively* simple to develop the necessary policies to address the perceived problems of environmental degradation, which included visible pollution, cancer risk and aesthetic blight. The emphasis is on *relatively* because as Robert L. Glicksman and Matthew R. Batzel demonstrate in *Science, Politics, Law, and the Arc of the Clean Water Act: The Role of Assumptions in the Adoption of a Pollution Control Landmark*, the architects of the foundational programs were very knowledgeable about environmental problems and their complexity but still had a naive faith in the ability of rationality to solve them.²⁶ In the ensuing

25. See ANDREWS, *supra* note 5, at 227–29.

26. For example, Robert L. Glicksman & Matthew R. Batzel, *Science, Politics, Law, and*

four decades, this assumption has been severely eroded because our understanding of the complexity of “managing” the environment has deepened. For example, since the 1960s, there have been major advances in our understanding of the links between pollution, individual genetic makeup and illness, and the dynamic behavior of ecosystems. There are vexing economic and moral problems that challenge the idea that environmental protection is simply a technical problem. We are still debating whether environmentalism is naive romanticism, science-driven rationalism, or a secular religion. Finally, we have picked most of the low-hanging fruit of pollution and risk reduction and now must make harder judgments about the value of incremental further reductions in an “environment” where increases in knowledge yield more scientific, economic, and ethical questions than answers. The original vision of environmental protection remains embedded in this political and intellectual landscape, although the political moment that produced it has passed.

A. Ecosystem Preservation Is Transcendent, Value-Neutral, and Easy to Accomplish

The first crucial assumption underlying modern environmental law was that ecosystem protection was a transcendent, value-neutral, unifying public policy objective; the force of the idea was assumed to be self-evident to any rational person and capable of implementation throughout the government.²⁷ Once Congress mandated a consistent,

the Arc of the Clean Water Act: The Role of Assumptions in the Adoption of a Pollution Control Landmark, 32 WASH. U. J.L. & POL’Y 99, 104-08 (2010), show that the architects of the Clean Water Act were aware that the “no discharge by 1985” goal was not achievable but thought that a mandated mis-course study by the National Academies of Sciences and Engineering would provide the necessary scientific and technical information to chart the next step toward actually achieving the goal.

27. During the July 17, 1968, pioneering and almost unprecedented Joint House-Senate Colloquium to Discuss a National Policy for the Environment, Secretary Udall stated as his first principle for a national environmental policy: “We must begin to work with, not against, the laws of the planet on which we live, rejecting once and for all the false notion that man can impose his will on nature. This requires that we begin to obey the dictates of ecology, giving this master science a new and central place in the Federal scientific establishment.” Hearing Before the Committee on Interior and Insular Affairs United States Senate and Committee on Science and Astronautics United States House of Representative, 90th Cong. 2d Sess. 17 (1968).

comprehensive protection strategy through the entire federal bureaucracy, agencies would fall into line with the help of vigilant congressional oversight. This was the core belief of the late L.K. Caldwell, the “father of NEPA.”²⁸ Caldwell was a prominent public administration scholar; he was well aware of the barriers to the implementation of his idea, but he assumed that the overarching idea of ecosystem protection would become *the* governing principle for much of the federal bureaucracy. His meshed nicely with Aldo Leopold²⁹ and Rachel Carson’s³⁰ widely read pleas to respect nature by walling her off from the maximum amount of human intervention. For example, Secretary Udall credited Rachel Carson’s concepts with “inspir[ing] . . . the enactment of [the] National Environmental Policy Act,”³¹ although her ideas are not explicitly articulated either in the Act’s text or legislative history.

The modern environmental movement inherited the early twentieth century preservation movement’s idea that sacred and spectacular nature should not be disturbed by human intervention, but it quickly moved away from this soft idea in favor of a hard scientific justification for environmental protection. This idea was reflected, for example, in pre-environmental decade legislation such as the Wilderness Act of 1964³² and the Wild and Scenic Rivers Act.³³ Modern environmentalism soon moved from the spiritual and aesthetic to the scientific by making the relatively new idea of the inherently stable ecosystem rather than sacred space the focus of protection.³⁴

28. See ANDREWS, *supra* note 5, at 223–26.

29. ALDO LEOPOLD, *A SAND COUNTY ALMANAC AND SKETCHES HERE AND THERE* (1949). The book was written in 1947 and published after Leopold’s death from a heart attack in 1948. See MARYBETH LORBIECKI, *ALDO LEOPOLD: A FIERCE GREEN FIRE* 168–81 (1996); CURT MEINE, *ALDO LEOPOLD: HIS LIFE AND WORK* 504–25 (1948).

30. RACHEL CARSON, *SILENT SPRING* (1962).

31. UDALL, *supra* note 16, at 203.

32. The Wilderness Act of 1964, 16 U.S.C. §§ 1131–1136 (2006) defines a wilderness as an area “where the earth and its community of life are untrammelled by man.” 16 U.S.C. §§ 1131(c).

33. Wild and Scenic Rivers Act, Pub. L. No. 90-542, 82 Stat. 906 (1968) (codified at 16 U.S.C. §§ 1271–1287 (2006)).

34. See Michael J. McCloskey, *Changing Views of What the Wilderness System Is All About*, 76 DENV. U. L. REV. 369 (1999), for a discussion of the differences between the “natural” and ecological views of the purposes of the national wilderness system.

In the 1960s, the prevailing view of ecosystems was that they would eventually reach stasis or stability.³⁵ Glicksman and Batzel remind us that the dynamic nature of ecosystems was recognized, but ecologists and their followers still assumed that ecosystems passed through several stages before reaching the final, stable climax.³⁶ Environmental lawyers and administrators believed that equilibrium ecology, as stated in Eugene Odum's classic text,³⁷ provided the scientific basis to put Aldo Leopold's famous dictum "let nature be" into practice. Ecology allowed lawyers to argue that courts and agencies should adopt nature's rules as legal rules.³⁸ Ironically, environmental lawyers eagerly embraced equilibrium ecology just as this static view of nature was being replaced by more dynamic ones. Today, the equilibrium paradigm has been almost totally rejected in ecology—a trend which goes back to the 1930s—and replaced with a complex, stochastic non-equilibrium one.³⁹

In his pathbreaking book, *Discordant Harmonies*, Professor Daniel Botkin "deconstructed" the equilibrium paradigm as a misguided effort to match science to theological and enlightenment scientific visions of a perfect universe or perfectly functioning machine.⁴⁰ Botkin's basic argument is that the images of nature that have influenced ecology are static when in fact the kinds of resource use problems society faces require a dynamic view of nature, one which starts from the premises that human action is one of the principal forces operating on ecosystems and that system disturbances are both predictable and random.⁴¹ Ecosystems are patches or collections of conditions that exist for finite periods of time.⁴² The accelerating interaction between humans and the natural

35. Glicksman & Batzel, *supra* note 26, at 110 (arguing that Congress was aware that ecosystems were dynamic but assumed "that the time scale in which the CWA would operate would reflect 'a relatively high degree of stability'" in the absence of human intervention).

36. *Id.* at 109–10.

37. Odum explained and summarized his basic theory in EUGENE P. ODUM, *FUNDAMENTALS OF ECOLOGY* 44–46 (2d ed. 1959).

38. See WILLIAM HOLLAND DRURY, JR., *Chance and Change: Ecology for Conservationists* 184–85 (John G.T. Anderson ed., 1998).

39. Glicksman & Batzel, *supra* note 35, at 108–09.

40. DANIEL B. BOTKIN, *DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY* (1990).

41. *Id.* at 12–13.

42. *Id.* at 7–8.

environment makes it impossible to return to an ideal state of nature: “nature moves and changes and involves risks and uncertainties and . . . our judgments of our own actions must be made against this moving image.”⁴³

The new ecology is challenging and less comforting than the old one for at least three reasons. First, the idea of “pure” nature as a place apart from humans will not hold up in the future against the conservation tradition that began in the late nineteenth century. From a biodiversity conservation perspective, nature is more important for the services it provides than it is for just existing. The second challenge for future ecosystem management will be to restore degraded areas and to create the functional equivalent of “natural” systems.⁴⁴ Many environmentalists resist the ideas of restoration and creation because they believe there is a firm distinction between real and artificial nature and that is unethical for humans to attempt to create nature.⁴⁵ However, this unrealistic vision of the landscape in which we live has no future. The third challenge is that ecosystem management requires ad hoc, contingent solutions rather than uniform, fixed ones. In short, management is a series of experiments without a control group.

Professor Holly Doremus’s article, *The Endangered Species Act: Static Law Meets Dynamic World*, traces the history of the Endangered Species Act (“ESA”) to illustrate the need to correct the assumption that nature is simple to manage.⁴⁶ For all its flaws, the ESA remains the nation’s primary biodiversity conservation act,

43. *Id.* at 190.

44. *See, e.g.*, Fred Bosselman, *Swamp Swaps: The “Second Nature” of Wetlands*, 39 ENVTL. L. 577 (2009). In the course of an analysis of both the destruction of wetlands to reduce greenhouse gas emissions and their possible use as carbon sinks, the noted environmental and land use scholar asks, if a plant capable of reducing methane emissions were created and used to replace wetlands “and the replacement had only minimal adverse impact on other wetland functions, why wouldn’t it qualify as providing beneficial services?” *Id.* at 621.

45. The leading proponent of this idea is Eric Katz. *See* ERIC KATZ, NATURE AS SUBJECT: HUMAN OBLIGATION AND NATURAL COMMUNITY (1997); Eric Katz, *The Problem of Ecological Restoration*, 18 ENVTL. ETHICS 222 (1996). The argument that the distinction is supportable is effectively refuted in Yeuk-Sze Lo, *Natural and Artificial: Restored Nature As Subject*, 21 ENVTL. ETHICS 247 (1999); *see also* ROBERT ELLIOT, FAKING NATURE: THE ETHICS OF ENVIRONMENTAL RESTORATION (1997).

46. Holly Doremus, *The Endangered Species Act: Static Law Meets Dynamic World*, 32 WASH. U. J.L. & POL’Y 175 (2010).

although the construct had not been “invented” in 1973 when Congress enacted “one of the last pieces of environmental bandwagon legislation.”⁴⁷ Yet, it is difficult to adapt to the broader objective of biodiversity conservation, in part because the ESA rests on a static view of species and the landscapes and watercourses in which they live.⁴⁸ In the future, especially as we deal with global climate change’s impacts on biodiversity,⁴⁹ evolutionary theory and adaptive management must be incorporated into the Act, even as old certainties like the definition of species become muddied.⁵⁰

Professor Jamison E. Colburn carries this theme forward in his article, *Qualitative, Quantitative, and Integrative Conservation*, which illustrates the barriers to carrying biodiversity conservation into the twenty-first century.⁵¹ His probing article demonstrates the truth of the first book of Genesis, that new knowledge can be a mixed blessing. Using as examples the critical habitat designation for the Canadian Lynx and the listing of the Polar Bear as a threatened species, Professor Colburn argues that we lack the institutional capacity to apply scientific advances when making conservation decisions. The tragedy of modern biology is that the more risk information we have (and are required to try and assemble), “the less certain we are that we can ever know which biological entities merit our protection.”⁵²

Professor Colburn’s article identifies three tensions that impede current efforts to protect threatened and endangered species.⁵³ First, biodiversity conservation is becoming just another risk management problem which requires dynamic decision-making under varying conditions of uncertainty; put differently, it is an example of the theoretical convergence now taking place in environmental law. Biodiversity conservation is moving toward the toxics regulation

47. STEVEN L. YAFFEE, PROHIBITIVE POLICY: IMPLEMENTING THE FEDERAL ENDANGERED SPECIES ACT 48 (1982), *quoted in* Doremus, *supra* note 10, at 177.

48. *See* Doremus, *supra* note 46, at 202-03.

49. These impacts are discussed in COMMITTEE ON ECOLOGICAL IMPACTS OF CLIMATE CHANGE, NAT’L RESEARCH COUNCIL, ECOLOGICAL IMPACTS OF CLIMATE CHANGE (2008).

50. *See* Doremus, *supra* note 46, at 183-202.

51. Jamison E. Colburn, *Qualitative, Quantitative, and Integrative Conservation*, 32 WASH. U. J.L. & POL’Y 237 (2010).

52. *Id.* at 266.

53. *See infra* notes 54-55 and accompanying text.

model with, as Professor Adelman's article in this symposium so well enumerates, all the problems of this project.⁵⁴ Second, post-*Chevron* administrative law often subjects agency decisions to unpredictable judicial review; and third, we are seriously under-investing in biodiversity conservation, which results in internal regulatory gridlock. "The ESA saddles the Services with far too many *conjunctive* tasks today, inviting their opponents to disrupt, delay, and defeat them."⁵⁵ To correct this situation, Professor Colburn proposes what amounts to a "regulatory science" solution. Ultimately the ocean of available data must be shaped and adapted to the cognitive capacity of the users to provide managerial benchmarks to evaluate, *inter alia*, habitat designation; human, biological, and chemical interactions of the "whole 'earth system;'" and the "evolutionary processes of speciation."⁵⁶

B. Science Has the Answers

The rational 1960s were a time of great faith in the capacity for human progress through science and technology. The ecosystem stability hypothesis reflects the broader, progressive assumption that science could tell us both why and how we should act to preserve the environment as we progressed as a wealthy and powerful democracy. In retrospect, the 1960s were the twilight of the progressive vision that science and rationality applied by a strong regulatory state could produce a "good society." The complexity of environmental problems has forced the environmental movement to abandon the idea that science will produce only "the" right answer,⁵⁷ but of necessity we cling to the idea that rationality demands science-based decisions even as we recognize that science has been "deconstructed" and lost its legitimacy as an unfailing source of truth and enlightenment.⁵⁸ Therefore, modern environmental law exists in a

54. See David E. Adelman, *A Cautiously Pessimistic Appraisal of Trends in Toxics Regulation*, 32 WASH. U. J.L. & POL'Y 377 (2010).

55. Colburn, *supra* note 51, at 282 (emphasis added).

56. See *id.* at 289.

57. Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613 (1995) is a seminal exploration of the limits of science in environmental regulation.

58. See, e.g., SHEILA JASNOFF, *THE FIFTH BRANCH: SCIENCE ADVISORS AS POLICY*

twilight zone. We accept that science is a necessary but not sufficient condition for a legitimate decision.⁵⁹ At the same time, we reject the false dichotomy between good and bad or junk science, which has dominated environmental debates about toxic substances regulation since the EPA began to ban the use of certain pesticides, and has now spread its cancer to all science-based environmental issues.⁶⁰ For example, environmentalists reject the narrow definition of science that the Supreme Court articulated in *Daubert*,⁶¹ which is the legal basis of challenges to the science behind many regulations.

The current view of legitimate science is more nuanced than the original one. We have relaxed the indices long associated with “proven” science. We accept that credible science need not necessarily be peer reviewed and reflect a high level of consensus within the scientific community, because the choice is often regulation in the face of uncertainty or no regulation of potentially dangerous substances or activities. Thus, decision-makers can make decisions that represent prudent extensions of the existing state of knowledge for a variety of reasons. However, to control the use of science, lawyers have pulled the familiar procedural trick: the more that decision departs from the consensus within the scientific community and the greater the information gaps, the higher the burden of justification.⁶²

C. Technology Has the Rest of the Answers

In the 1960s, science and technology were conjoined; they were the twin engineers of social and material progress. Just as ecologists would tell us how to protect nature from destabilizing activities such as dams, roads, and power lines, engineers would tell us to control visible, nasty pollution. The Clean Air and Water Acts’ model of central command and control regulation rested on the assumption that

MAKERS (1990).

59. See Holly Doremus & A. Dan Tarlock, *Science, Judgment, and Controversy in Natural Resources Regulation*, 26 PUB. LAND & RESOURCES L. REV. 1 (2005), for a fuller discussion of the proper role of science in environmental regulation.

60. *Id.* at 17–18.

61. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590, 593–97 (1993).

62. See discussion *infra* Part III.F.

engineers could specify the technology necessary to meet health-based emission standards.⁶³ The high point of technological optimism led to the idea that technology could be forced on laggard industries and cities with minimal sewage treatment facilities.⁶⁴

Many of the articles in this symposium remind us that technology remains central to the project of environmental protection,⁶⁵ but that it is much harder to implement today for five primary reasons. First, NEPA litigation helped undermine society's faith in large-scale public works. Second, the discovery of orphaned and operating hazardous waste facilities dealt a serious blow to the credibility of engineers who claimed they could build "safe" disposal facilities. Facilities represented as state of the art and safe leaked. Third, many problems required both technology and management; but management, which often meant changes in land use practices and personal choice, proved too controversial and was opposed by powerful lobbies.⁶⁶ Automobile exhaust emissions have been cut by ninety percent, but we have been unable to deal with the problem of increased automobile use or runoff from agricultural waste, pesticide, and fertilizer applications. Fourth, at the beginning of the environmental movement, polluters were the "other." Industry and cities were the villains and strong government action was necessary to modify their behavior. There was little role for the individual as the few deep ecologists who preached reduced consumption were marginalized, but the problem of "directing" individual choice has emerged as a key problem in addressing global climate change.

63. See JASANOFF, *supra* note 58, at 102–06.

64. See Robert W. Adler, *Resilience, Restoration, and Sustainability: Revisiting the Fundamental Principles of the Clean Water Act*, 32 WASH. U. J.L. & POL'Y 139 (2010); Glicksman & Batzel, *supra* note 26, at 131–32.

65. See Adler, *supra* note 64; Glicksman & Batzel, *supra* note 26. The Clean Air Act relies on technology, but as Professor Buzbee notes, it relies on State Implementation Plans, which offer a wider range of technology and non-technology options than does the Clean Water Act. William W. Buzbee, *Clean Air Act Dynamism and Disappointments: Lessons for Climate Legislation to Prompt Innovation and Discourage Inertia*, 32 WASH. U. J.L. & POL'Y 33 (2010). For example, new sources of emission in nonattainment areas must locate offsets, which can come from ways other the installation of new controls on existing emitters. *Id.* at 50.

66. See, e.g., Glicksman & Batzel, *supra* note 26, at 133 (noting that Congress recognized that technological standards alone could not address non-point source water pollution but could not overcome opposition of agricultural lobbyists to a strong management program).

The story of the Clean Water Act illustrates the fifth reason—the need to supplement technology mandates with workable ecosystem resilience standards. Both Glicksman and Batzel and Adler agree that technological mandates account for the success of the Clean Water Act.⁶⁷ They also agree on the failings, the persistence of non-point pollution, the incomplete protection of wetlands,⁶⁸ and the uneven engagement of states in areas such as TMDL regulation or even routine enforcement.⁶⁹ Looking into the future, Professor Adler argues that we must keep the framework of the Act but adapt it more to the conservation and restoration of aquatic ecosystems.⁷⁰ For example, he proposes that the goal of restoring and maintaining the “chemical, physical, and biological integrity of the Nation’s waters” needs to be reframed as ecological resilience.⁷¹ This would be a substantial change over the original Act, because the goal would not be a numerical end state for specific water bodies but rather a moving target, a process and set of indices “to ensure that the system has sufficient capacity to respond to environmental perturbations or disturbances while still retaining its basic ecological structure and functions.”⁷² Existing water quality standards only partially address this objective, although various EPA and stakeholder efforts have tried to expand the reach of the Act by focusing on watershed restoration.⁷³

To provide a firmer legal framework, Professor Adler proposes amending the water quality standards provisions of the Act “to clarify that specific remedial measures must be undertaken to redress all violations of water quality standards, whether numeric and pollutant-specific or biologically and ecologically based.”⁷⁴ In addition, he argues that the jurisdictional reach of the Act should be expanded from navigable waters, which the Supreme Court has narrowed as

67. See Adler, *supra* note 64, at 172; Glicksman & Batzel, *supra* note 26, at 131.

68. Adler, *supra* note 64, at 169–72; Glicksman & Batzel, *supra* note 26, at 133–34.

69. See Adler, *supra* note 64, at 155–56; Glicksman & Batzel, *supra* note 26, at 134–37; see also Charles Duhigg, *Clean Water Laws Neglected, At a Cost*, N.Y. TIMES, Sept. 13, 2009, at A1.

70. Adler, *supra* note 64, at 166.

71. *Id.* at 149.

72. *Id.*

73. *Id.* at 154–55.

74. *Id.* at 155–56.

part of its ecologically insensitive Commerce Clause jurisprudence,⁷⁵ to “sustainable waters,” since “[w]ater is fundamental to national economic sustainability in ways that extend far beyond the concept of navigability.”⁷⁶

*D. Rational Planning Would Manage Heritage Resources Such as
Water and the Public Lands and Green the Public Works
Bureaucracies*

The two related fundamental characteristics of the New Deal state are expertise and faith in hyper-rational decision and planning processes.⁷⁷ The architects of the modern administrative state sought regulatory mechanisms that would allow the application of state power informed by state of the art expertise to changing economic, social, and scientific conditions.⁷⁸ This enlightened expertise would be combined with comprehensive resource planning. Rational resource planning had its roots in the Conservation Era vision of comprehensive river basin management.⁷⁹ New Deal planning efforts never achieved their promise due to intense political opposition,⁸⁰ but faith in expert planning to manage natural resources lived on and formed the basis of environmental-era legislation such as the National Environmental Policy Act of 1969,⁸¹ the Forest and Rangeland Renewable Resources Planning Act of 1974,⁸² and the Coastal Zone Management Act.⁸³

These acts triggered a great deal of analysis and planning, but expert rational planning never achieved legitimacy or a dominant role in resource allocation.⁸⁴ Old line resource agencies, such as the Corps

75. See, e.g., *Rapanos v. United States*, 547 U.S. 715 (2006).

76. Adler, *supra* note 64, at 164.

77. Cf. ALAN BRINKLEY, *THE END OF REFORM: NEW DEAL LIBERALISM IN RECESSION AND WAR* 37–39 (1995); MARION CLAWSON, *NEW DEAL PLANNING* 92–94 (1981).

78. See BRINKLEY, *supra* note 77, at 37–38, 46.

79. See CLAWSON, *supra* note 77, at 117–19.

80. See generally BRINKLEY, *supra* note 77; CLAWSON, *supra* note 77.

81. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970) (current version at 42 U.S.C. §§ 4321–4375 (2006))

82. 16 U.S.C. §§ 1600–1614 (2006).

83. 16 U.S.C. §§ 1451–1466 (2006).

84. The Supreme Court’s general hostility or indifference to environmental regulation has also contributed to the ineffectiveness of planning. For example, in *Norton v. S. Utah*

of Engineers, continued to place great faith in improved rational planning, but planning was often reduced to a formal exercise unconnected to the achievement of the underlying social objective, and seldom was conducted at the relevant geographic scale. In many ways, guerilla environmentalism worked against planning.

The environmental era helped erode the New Deal tradition of deference to administrative expertise, which in turn made planning a prelude to litigation. The various social revolutions of the 1960s and early 1970s coincided with the rise of the deeply pessimistic doctrines of law and economics and public choice theory,⁸⁵ which rejected the idea of an objective and higher public interest.⁸⁶ This pessimism about the ability of government to act to improve the human condition, seemingly borne out by the failures of President Johnson's War on Poverty, helped undermine the New Deal faith in administrative expertise to articulate the public interest. In *Clean Air Act Dynamism and Disappointments: Lessons for Climate Change Legislation to Prompt Innovation and Discourage Inertia*,⁸⁷ Professor Buzbee draws on his recent scholarship⁸⁸ to illustrate how public choice theory can produce a regulatory regime "encrusted with complexities and quirks" that is systematically biased in favor of older industries, and how this can "discourage new market entrants."⁸⁹

The legal basis for turning this pessimism or at least skepticism into law is the Administrative Procedure Act of 1946.⁹⁰ The Administrative Procedure Act turned out to be an excellent vehicle to

Wilderness Alliance, 542 U.S. 55 (2004), the Court held that the Administrative Procedure Act can only be used to compel an agency to undertake a discrete required action. *Id.* at 64. Thus, the decision makes it possible to challenge federal land management agency plans before they are concretely applied.

85. The foundational works in public choice theory are ANTHONY DOWNS, *AN ECONOMIC THEORY OF DEMOCRACY* (1957) and JAMES M. BUCHANAN & GORDON TULLOCK, *THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY* (1962).

86. See generally DOWNS, *supra* note 85.

87. Buzbee, *supra* note 65.

88. See, e.g., William W. Buzbee, *Asymmetrical Regulation and Interaction's Promise: Preemption Policy Shifts, Risk Regulation, and Experimentalism Lessons*, 57 EMORY L.J. 145 (2007).

89. Buzbee, *supra* note 65, at 38.

90. Administrative Procedure Act, Pub. L. No. 79-404, 60 Stat. 238 (1946) (codified as amended at 5 U.S.C. § 500 *et seq.* (2006)).

attack administrative decisions for environmental NGOs as well as for the regulated community, which was quick to learn from guerilla environmental litigation. After a decade-long debate about the proper role of judicial control of administrative action, the Administrative Procedure Act imposed a number of due process controls on administration actions.⁹¹ As a result, agencies are now simultaneously constrained by both the “public,” which has been given a voice to counter the narrow exercise of administrative expertise, and the courts.⁹² Public participation in agency decision-making, increased access to judicial review, and a hard look at agency decisions are the hallmarks of modern administrative law.⁹³

In an attempt to break the gridlock that resulted from environmental NGO and industry challenges to regulation, in the 1990s, a new theory of environmental protection emerged; in place of command and control regulation, this theory emphasized place-based problem solving through collaboration and consensus.⁹⁴ The merits of this approach are open to serious debate, but the theory, which was never fully integrated in first generation environmental law, is a logical extension of the disintegration of the New Deal state that began in the 1960s. In the “post-New Deal state,” the regulated community is still the central participant in administrative decision-making, but new interests or “stakeholders” beyond those with a direct economic benefit in the agency’s actions are increasingly included in the multiparty bargaining processes.⁹⁵ Federal agencies, such as the Corps and even the EPA, are portrayed as only one of many powerful participants in resource management and standard-setting disputes. Many hail this as a welcome adaptation of democratic and public values to the “de-centered” state, but the question of whether the “contracting” state is consistent with public

91. See George B. Shepherd, *Fierce Compromise: The Administrative Procedure Act Emerges from New Deal Politics*, 90 NW. U. L. REV. 1557, 1680–81 (1996).

92. Cf. Richard B. Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1667, 1760–62 (1975).

93. Cf. JASANOFF, *supra* note 58, at 52–60.

94. This theory is clearly articulated in Jody Freeman & Daniel A. Farber, *Modular Environmental Regulation*, 54 DUKE L.J. 795, 876–96 (2005).

95. See, e.g., Freeman & Farber, *supra* note 94.

or rule of law values and will deliver the benefits that “clunky” first generation environmental laws delivered has not been resolved.⁹⁶

The implementation of NEPA is an example of both the failure of 1960s rationality to achieve its objectives, and the hope that the process still holds. Professor Daniel R. Mandelker has been a student of NEPA since its passage and is a strong proponent of the ability of NEPA litigation to promote better environmental decision-making; but, as are all students of NEPA, he is accurately aware of its weaknesses. His paper applies his extraordinary knowledge of planning and NEPA law to tell the story of NEPA’s fate.⁹⁷ As envisioned by its principal architects, Senator Henry Jackson and Indiana University, Bloomington, Professor L. K. Caldwell, NEPA was designed to accomplish two objectives, neither of which required judicial intervention. As agencies reviewed the environmental impacts of their actions through the lens of ecology, the Enlightenment dream of progress through science would have us believe, agencies would internalize the lessons of science and do the right thing.⁹⁸ If they were legally constrained from so doing, they would disclose this problem to Congress and the necessary legal authority would follow.⁹⁹ Instead, agencies did not take NEPA seriously and judicial challenges to environmental impact statements became the legal weapon of choice by those challenging a wide range of federal actions.¹⁰⁰ Agencies did learn—how to blunt the impact of NEPA.¹⁰¹

After a series of federal circuit court opinions expanding the Act’s scope, the Supreme Court limited it to a disclosure statute and drastically limited its scope, especially for the very comprehensive

96. Collaborative governance used to be called agency capture. Under the influence of law and economics, the “captured” theory of agencies has now been discredited. However, students of earlier, failed collaborative western resource management experiments such as the Taylor Grazing Act are not excited about the new wave of stakeholder governance. *See, e.g.,* George C. Coggins, *Regulating Federal Natural Resources: A Summary Case against Devolved Collaboration*, 25 *ECOLOGY L.Q.* 602 (1999).

97. Daniel R. Mandelker, *The National Environmental Policy Act: A Review of Its Experience and Problems*, 32 *WASH. U. J.L. & POL’Y* 293 (2010).

98. *See* Mandelker, *supra* note 97, at 297.

99. *Cf.* William H. Rodgers, Jr., *NEPA’s Insatiable Optimism*, 39 *ENVTL. L. REP.* 10618, 10618 (2009).

100. *See* Bradley C. Karkkainen, *Whither NEPA?*, 12 *N.Y.U. ENVTL. L.J.* 333, 340 (2004).

101. *See* Mandelker, *supra* note 97, at 298.

agency plans and programs for which the statute was designed.¹⁰² Agencies learned to prepare adequate impact statements and to take minimal mitigation measures through FONSI's, a technique which, as Professor Mandelker points out, was authorized neither in the statute nor in the Council of Environmental Quality's NEPA regulations.¹⁰³ Congress first exempted specific EISs and in the past decade has created more general exemptions. Ted Boling's article, *Making the Connection: NEPA Processes for National Environmental Policy*, provides valuable empirical evidence of this trend by showing that agency decisions often result in Environmental Assessments, Mitigated Findings of No Significant Impact, and Categorical Exemptions.¹⁰⁴ This is especially true for projects under the American Recovery and Reinvestment Act.¹⁰⁵ NEPA primarily constrains agencies that remain vulnerable to litigation. Nonetheless, as Professor Mandelker concludes, "NEPA is a major environmental statute that has contributed its weight to the protection of the environment,"¹⁰⁶ but ways must be found to remove the encrusted limitations that have prevented it from fundamentally changing agency behavior.¹⁰⁷ To achieve this, Boling recommends that agencies stop preparing for litigation and instead take the risk of making decisions that may be litigated.¹⁰⁸ If the environmental consequences of a decision are known by decision makers and communicated to the public, "courts must ultimately defer to a well-designed agency environmental program."¹⁰⁹

102. See *Kleppe v. Sierra Club*, 427 U.S. 390; see also Mandelker, *supra* note 97, at 302.

103. Mandelker, *supra* note 97, at 295, 298.

104. Ted Boling, *Making the Connection: NEPA Processes for National Environmental Policy*, 32 WASH. U. J.L. & POL'Y 313, 321 (2010) (noting that there are 1000 EAs compared to forty-five full EISs for current projects that lack an existing NEPA analysis).

105. *Id.* at 321–22.

106. Mandelker, *supra* note 97, at 312.

107. Hope that NEPA can fulfill its original promise remains strong. See, e.g., Symposium, *NEPA at 40: How a Visionary Statute Confronts 21st Century Impacts*, 39 ENVTL. L. REP. NEWS & ANALYSIS 10615 (2009).

108. Boling, *supra* note 104, at 329.

109. *Id.* at 330.

E. Federalism: An Inconvenient Constitutional Barrier

From the 1930s to the 1960s, those concerned about air and water pollution sought to federalize regulation. This idea triumphed in the late 1960s, a time when the central New Deal state was very much alive. President Lyndon Johnson's Great Society (1964–1966) was seen as the perfection of the New Deal state that had been put on hold during the Truman and Eisenhower administrations.¹¹⁰ Even as environmentalists were busy attacking the captured mission agencies, they accepted the premise that important national policy had to be made at the federal level and imposed on the unwilling states. With a few exceptions, in the 1960s states had very limited environmental protection programs and laws. More importantly, the assumption was that states would, as had the southern states with anti-union laws, compete for industry by offering low pollution standards. As a sop to proponents of Brandeisian federalism, the idea of cooperative federalism, which developed during the New Deal, was adopted for environmental programs. Cooperative federalism rested on two ideas: first, the federal government would set floors, which the states could raise but not lower; second, the states would be responsible for administering the major regulatory programs, primarily the Clean Air and Water Acts, "incentivized" by federal grants and fiscal sanctions for non-enforcement.¹¹¹

Much has changed since the 1960s. Beginning in the 1970s, the federal government has progressively shrunk in power. The Reagan and Bush I and II administrations sought to divest the federal government of many of its regulatory functions. A more conservative Supreme Court began to flirt with long dormant dual federalism to curb federal powers both as a matter of the true meaning of the Commerce Clause and as a canon of statutory construction.¹¹² The Court also developed a rigid, formal federalism unconnected to the

110. DORIS KEARNS GOODWIN, *LYNDON JOHNSON AND THE AMERICAN DREAM* 210–50 (1986).

111. For a clear analysis of cooperative federalism in the context of the Clean Air Act, see Douglas R. Williams, *Cooperative Federalism and the Clean Air Act: A Defense of Minimum Federal Standards*, 20 ST. LOUIS U. PUB. L. REV. 67 (2001).

112. See Glicksman & Batzel, *supra* note 35, at 127–29, for an analysis of the Court's Commerce Clause jurisprudence and its effects on environmental legislation.

way that all levels of government often interact in environmental decisions. For this and other reasons, environmental cases that reach the Supreme Court tend to be decided in favor of opponents of environmental protection.

Nature abhors a vacuum, and the states, once seen as an unfortunate legacy of an out-of-date Constitution, have begun to fulfill Justice Brandeis's hope that they would be laboratories of progressive experimentation.¹¹³ The inability and unwillingness of both the Clinton and Bush II administrations to address global climate change has triggered a rich laboratory of experimentation. The rise of state initiatives, especially in the larger states, ultimately came to be seen as threat to economic growth and national security, and Congress and the Bush II administration began to press for ceiling preemption¹¹⁴—an idea that was unthinkable in the 1960s.

The two articles in this symposium that focus on the Clean Air Act illustrate the legacy of cooperative federalism and the promise of progressive state experimentation. Professor Buzbee's article, *Clean Air Act Dynamism and Disappointments: Lessons for Climate Change Legislation to Prompt Innovation and Discourage Inertia*, demonstrates that cooperative federalism is embedded in the Clean Air Act to a greater extent than in other environmental statutes.¹¹⁵ The result has been a mixed blessing. A few states have used it to go beyond federal floors, but in other states, it has enabled industry and state officials to cooperate "to take lax enforcement actions in an effort to subvert federal or citizen enforcement actions against a polluter violating the law."¹¹⁶

Professor Osofsky's article, *The Future of Environmental Law and Complexities of Scale: Federalism Experiments with Climate Change under the Clean Air Act*, examines how the cooperative federalism legacy will impact federal efforts to regulate automobile

113. See *New State Ice Co. v. Liebman*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) ("It is one of the happy incidents of the federal system that a single courageous state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country.").

114. William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, 82 N.Y.U. L. REV. 1547 (2007).

115. Buzbee, *supra* note 65, at 43–48.

116. *Id.* at 42.

greenhouse gas emissions.¹¹⁷ Professor Osofsky applies a four-factor vector analysis, which includes geographic scale, vertical and horizontal jurisdictions, top-versus bottom-down regulation and cooperation versus conflict, and in the regulation of greenhouse gas motor vehicle emissions; she finds that all present at different moments in time, as the original structure of cooperative federalism is inadequate to deal with the problem.¹¹⁸ To improve regulation, Professor Osofsky recommends that we accept small-scale scientific uncertainty as well as a full range of legal, economic, and cultural responses.¹¹⁹

Her analysis is an important modification of the original assumption that a strong central government was necessary for effective environmental protection as well as two subsidiary assumptions that have proven wrong. The first was that environmental protection would be a conversation between Congress and the agencies, in short a conversation among experts. Courts were not part of the original vision of NEPA, for example. The opposite occurred, and environmental law became a court-agency conversation mediated by third parties. The second was that environmental protection was a problem of curbing “the other”—large industries, cities, and the concrete-loving mission agencies. There was little room for any assumption of individual responsibility or action. Deep ecology was initially dismissed as a fringe utopian idea, but this is less and less the case. A wide range of public and private actors must be enlisted in the environmental protection project, but Professor Osofsky’s article argues that the best we can hope for is a partial diagonal federalism, which engages a subset of all relevant actors simultaneously in the regulatory regime “to construct a range of regulatory interactions that can complement one another.”¹²⁰

117. Hari M. Osofsky, *The Future of Environmental Law and Complexities of Scale: Federalism Experiments with Climate Change under the Clean Air Act*, 32 WASH. U. J.L. & POL’Y 79 (2010).

118. *Id.* at 90.

119. *Id.* at 91–93.

120. *Id.* at 96.

F. Public Health Protection Requires Extreme Risk Minimization

Environmental protection was initially focused on what we now call “visible pollution” and its immediate public health and aesthetic impacts.¹²¹ However, by the early 1970s, growing fears that exposure to a wide range of ordinary chemicals increased the risk of cancer helped to shift the focus of the public health branch of environmental protection to the regulation of toxic chemicals.¹²² Initially, cancer fear was driven by the mounting evidence about exposure to radiation. Then, Rachel Carson’s famous book, *The Silent Spring*, alerted people to the unseen dangers of chemical compounds such as pesticides and helped undermine the dominant idea that science and technology produced only progress.¹²³ As Stewart Udall wrote in *The Quiet Crisis and the Next Generation*, Rachel Carson “wanted an “ecology for man” to counterbalance the excesses of Atomic Age arrogance.”¹²⁴ In the 1970s, more and more substances, including pepper and hair dryers, were identified as *potential* carcinogens and toxic substance regulation became a discrete environmental problem.¹²⁵ As many of the articles in this symposium illustrate, toxic substance regulation helped to propel environmental law from remedying problems where the casual relation between the activity and the resulting damage was relatively clear, to the maddeningly complex world of risk assessment and management.¹²⁶

The rise of risk as a basis for regulation is the product of the successful efforts to ban the use of DDT. *Silent Spring* triggered lawsuits against the registration of the pesticide DDT and eventually a federal administration proceeding to ban the use of DDT.¹²⁷ After two years of hearings, the hearing examiner found no conclusive proof of either ecological or public health damage, because the hard evidence that DDT caused immediate damage to humans or even to

121. See ANDREWS, *supra* note 5, at 201–03.

122. See *id.* at 242.

123. UDALL, *supra* note 16, at 198–201; *cf.* ANDREWS, *supra* note 5, at 201–02.

124. UDALL, *supra* note 16, at 201.

125. *Cf.* David Markell, *An Overview of TSCA, its History and Key Underlying Assumptions, and its Place in Environmental Regulation*, 32 WASH. U. J.L. & POL’Y 333, 340–44 (2010).

126. See *id.* at 349; Adelman, *supra* note 54, at 379.

127. See UDALL, *supra* note 16, at 202–03.

the environment was too speculative.¹²⁸ However, the new administrator of the federal Environmental Protection Agency, William Ruckelshaus, decided that it was politically and morally wrong to demand such a high level of proof in light of cancer and environmental risks, however contested, that the hearings revealed.¹²⁹ He made the decision to cancel the right to use DDT based on the future public health and environmental risks that it presented,¹³⁰ this decision is the American root of the precautionary principle.

Ruckelshaus's decision helped to undermine the idea that it was possible to determine safe and unsafe dose and exposure levels, and it led to the aggressive use of risk assessment as basis for regulation.¹³¹ But, it also helped to produce the gridlock of much of toxic regulation because it set the stage for the good versus bad science debate and for risk management decisions that trade present benefits against remote risks.¹³² In his book, *Cancer Wars*, Robert Proctor distinguished between two types of conservatism in risk assessment debates.¹³³ Public health conservatism was the environmental movement's response to the problem of scientific uncertainty. Chemicals that are suspected of causing serious adverse health effects but whose casual links cannot be clearly established by the existing state of knowledge can be regulated using a precautionary approach.¹³⁴ Precaution that allowed the regulator to err "conservatively" on the side of safety was proposed and ultimately legitimated by the courts.¹³⁵

The substitution of risk for cause-in-fact is one of few seminal legal contributions of environmentalism, which has no roots in the common law or public law. However, we have never developed the institutions and legal standards to deal with the scientific uncertainty that pervades all toxic substances regulation.¹³⁶ The purported

128. Consolidated DDT Hearings, 37 Fed. Reg. 13,369, 13,370 (June 14, 1972).

129. Consolidated DDT Hearings, 37 Fed. Reg. at 13,372-73.

130. Consolidated DDT Hearings, 37 Fed. Reg. at 13,373.

131. Cf. Markell, *supra* note 125, at 336-38.

132. See ANDREWS, *supra* note 5, at 266-67; Markell, *supra* note 125, at 348-50.

133. ROBERT N. PROCTOR, *CANCER WARS* 261-65 (1995).

134. See Adelman, *supra* note 54, at 395-96.

135. The two leading cases are *Reserve Mining Co. v. EPA*, 514 F.2d 492 (8th Cir. en banc 1975) and *Ethyl Lead v. EPA*, 541 F.2d 1 (D.C. Cir. 1976) (en banc).

136. See Adelman, *supra* note 54, at 408-11.

objectivity of science has been deconstructed by advocates of both more and less regulation. However, appeals for either more precautionary and more transparent regulation or a rule of reason have fallen on deaf ears. Instead of risk regulation reform, precaution fueled a powerful counter-reaction. Advocates of the conservative use of “good science” labeled most risk assessment “junk science” because it over-protected society.¹³⁷ Regulators were unable to determine if a safe threshold existed, so they based reduction levels on what was technologically feasible rather than on a quantified risk assessment.¹³⁸ Since the risks that regulators identify are low probability but serious risks—cancer or genetic mutation—the suspicion remains that we are over-protecting, although there are vigorous debates about the costs and benefits of risk reduction.¹³⁹

The question for the future is how law will react to sweeping changes in science. Cancer theory is moving toward extremely complex genetic explanations for the disease.¹⁴⁰ This leads to increased reservations about the reliance on animal bioassays and the linear no-threshold models as well as the baselines that we choose to define risks.¹⁴¹ Two probing articles in this symposium help us grapple with these questions. Professor David Markell’s article, *An Overview of TSCA, its History and Key Underlying Assumptions, and its Place in Environmental Regulation*, examines the major fruit of the concern over the adverse public health impacts of toxic chemicals,¹⁴² and Professor David E. Adelman’s article, *A Cautiously Pessimistic Appraisal of Trends in Toxics Regulation*, carries the story forward and clearly explains why the existing regulatory structure does not work and why advances in science increase rather than decrease uncertainty.¹⁴³

137. See, e.g., *Special Report: Reform of Risk Regulation: Achieving More Protection at Less Cost, Report of the Harvard Group on Risk Management Reform*, 1 HUMAN & ECOLOGICAL RISK ASSESSMENT 183 (1995).

138. See Markell, *supra* note 125, at 345–46.

139. See *id.* at 333 n.2.

140. See Adelman, *supra* note 54, at 411–26.

141. See *id.* at 409.

142. Markell, *supra* note 125.

143. Adelman, *supra* note 54.

Professor Markell's article traces how the growing concern that increased cancer rates were a function of environmental factors led to TSCA.¹⁴⁴ In contrast to the after-the-fact approach of the earlier environmental statutes, Congress opted for a preventative, holistic approach to regulating these "unknown" substances.¹⁴⁵ Congress was acutely aware of the nation's lack of knowledge about health consequences of new chemicals coming on the market and of the need to develop the necessary data base.¹⁴⁶ TSCA gave the EPA a herculean task, and the problems of realizing its promise were known from the start. Professor Markell summarizes the various studies and government reports and concludes that EPA has made little progress reviewing the some 80,000 chemicals subject to its jurisdiction.¹⁴⁷ EPA has tried to increase its regulatory efficiency by using its authority to require pre-market notification ("PMN") rather than testing; this allows the agency, in theory, to do a relatively rapid review of a substance.¹⁴⁸

Professor Adelman's article continues the story and shows that the decision to drop pre-market testing from TSCA in favor of pre-manufacture notice, like Puccini's Tosca, does not have a happy ending.¹⁴⁹ Professor Adelman argues that advances in the science of toxic regulation, especially toxicogenomic models, will not lead to better toxic regulation.¹⁵⁰ These new models may "shift the focus of testing from animal models to *in vitro* testing of changes in specific biological processes using isolated cells."¹⁵¹ For example, the causal connections between any one gene and a complex disease are weak.¹⁵² Proposed reforms such as tiered regulatory review, enhanced post-market monitoring, and the promotion of green chemistry all have some potential to improve toxics regulation but none will deal

144. See Markell, *supra* note 125.

145. See *id.* at 338–39.

146. *Id.* at 340–43.

147. *Id.* at 355–56.

148. *Id.* at 360–63.

149. See Adelman, *supra* note 54, at 388–92.

150. *Id.* at 411–26.

151. *Id.* at 413.

152. *Id.* at 420.

with the scientific, economic, and moral problems that lie at the heart of toxic regulation.¹⁵³

IV. CONCLUSION

Environmentalism and environmental law are ultimately about the relationship between humans and the earth. Environmental history is, in the words of Simon Schama, a tale “of land taken, exploited, exhausted.”¹⁵⁴ Environmentalism and environmental law set out to substitute a new relationship for the historically abusive one. The late geographer Gilbert White traced the history of the relation of our changing perceptions of the earth from a storehouse of treasures or a subject of academic study to the present.¹⁵⁵ He argued that we were moving away from the narrow environmental idea that the earth should be protected from threatens to human and natural well-being. “[People now] recognize a commitment to care for it in perpetuity To come to terms with problems posed by growth in numbers and appetites. . . . The roots are in a growing solemn sense of the individual as part of one human family for whom earth is its one spiritual home.”¹⁵⁶

The articles in this symposium show that while large numbers of people have adopted White’s optimistic environmental imperative, United States environmental law remains locked in the transition phase of protecting the earth from discrete threats to human and natural well-being. We are still groping for, in Professor Buzbee’s words, “a more stable and knowable regulatory environment.”¹⁵⁷ We need to build on the legacy of the first generation of environmental law by adapting it to new conditions. The major themes running through this symposium are that we require a richer theory of the appropriate scale and mix of government participants (monitored by NGOs), management strategies that use information both to set protection targets and to allow flexible ways of reaching them, and

153. *Id.* at 430–42.

154. SIMON SCHAMA, *LANDSCAPE AND MEMORY* 13 (1995).

155. Gilbert F. White, *Reflections on Changing Perceptions of the Earth*, 19 ANN. REV. ENERGY & ENV’T 1 (1995).

156. *Id.* at 9.

157. See Buzbee, *supra* note 65, at 36.

ways of reducing the stream of chemicals that impair public health even as the question of what triggers adverse impacts on the human body becomes ever more complex. As if these challenges are not enough, as we address issues such as biodiversity conservation, energy consumption, and global climate change, the question of how to effectively modify individual resource consumption and use will become a critical component of any holistic response strategy.¹⁵⁸

158. See, e.g., Hope M. Babcock, *Assuming Personal Responsibility for Improving the Environment: Moving toward a New Environmental Norm*, 33 HARV. ENVTL. L. REV. 117 (2009); Richard J. Lazarus, *Super Wicked Problems of Climate Change: Restraining the Present to Liberate the Future*, 94 CORNELL L. REV. 1153, 1178–79 (2009); Michael P. Vandenberg & Anne C. Steinmann, *The Carbon Neutral Individual*, 82 N.Y.U. L. REV. 1673 (2007).