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# THE SEVEN STATUTORY WONDERS OF U.S. ENVIRONMENTAL LAW: ORIGINS AND MORPHOLOGY

*William H. Rodgers, Jr.\**

## I. INTRODUCTION

Students from around the world often ask my opinion on the most influential or effective of the United States environmental laws. I offer an opinion based on two criteria: What laws have contributed most to protection of the natural world and what laws have been most emulated? The second criterion is obviously an indicator of output, not of direct consequence. However, a linkage between the spread of strong laws and degree of environmental protection is assumed. In theory, of course, the questions of "how much protection" and "how many laws" can be answered empirically. But this story is available only in the sketchiest of terms, so opinions will have to suffice.

Here are the nominees for the seven great U.S. environmental laws:

(1) section 409 of the Food Additives Amendment of 1958,<sup>1</sup> known popularly as the Delaney Amendment, which states in part that no food additive "shall be deemed to be safe if it is found to induce cancer when ingested by man or animal";<sup>2</sup>

(2) section 2 of the Land and Water Conservation Fund Act of 1965,<sup>3</sup> which established a special fund from certain federal revenues—including receipts from oil and gas leasing on the Outer Continental Shelf—that can be used for the acquisition of parks and conservation lands;

(3) section 2 of the Wilderness Act of 1964<sup>4</sup> which established the National Wilderness Preservation System and defines wilderness "as an

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1. Pub. L. No. 85-929, 72 Stat. 1784, 1785 (codified as amended at 21 U.S.C. § 348 (1988 & Supp. IV 1992)).

2. 21 U.S.C. § 348(c)(3)(A) (1988).

3. Pub. L. No. 88-578, 78 Stat. 897, 897 (codified as amended at 16 U.S.C. § 4601-5 (1988)).

4. Pub. L. No. 88-577, 78 Stat. 890, 890 (codified as amended at 16 U.S.C. § 1131(a)-(c) (1988)).

area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain";<sup>5</sup>

(4) section 102 of the National Environmental Policy Act of 1969 (NEPA),<sup>6</sup> which requires that environmental impact statements accompany all actions by federal agencies that may have a significant effect on the human environment;

(5) section 301 of the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act or CWA),<sup>7</sup> which makes unlawful the discharge of any pollutant by any person;

(6) section 7 of the Endangered Species Act of 1973 (ESA),<sup>8</sup> which states that no federal agency shall take action "likely to jeopardize" the continued existence of a protected species or result in the "destruction or adverse modification" of its habitat;<sup>9</sup> and

(7) section 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA),<sup>10</sup> which imposes strict and joint and several liability on any person whose disposal of hazardous substances causes the owner of the affected property to incur response costs.

The measures of influence of these extraordinary enactments can be underscored in various ways. And now for my choices, in descending order of significance:

My first-place vote goes to the Land and Water Conservation Fund Act, which, since its inception, has resulted in expenditures of \$6.8 billion to maintain, purchase, and acquire parklands, changing the face of urban and rural America for the better.<sup>11</sup>

A close second is the Wilderness Act, which has given rise to a ten-fold expansion in protected acreage since 1964—now close to 100 million

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5. 16 U.S.C. § 1131(c) (1988).

6. Pub. L. No. 91-190, 83 Stat. 852, 853 (1970) (codified as amended at 42 U.S.C.A. § 4332 (West 1985)).

7. Pub. L. No. 92-500, 86 Stat. 816, 844 (codified as amended at 33 U.S.C.A. § 1311(a) (West 1986)).

8. Pub. L. No. 93-205, 87 Stat. 884, 892 (codified as amended at 16 U.S.C. § 1536 (1988 & Supp. IV 1992)).

9. 16 U.S.C. § 1536(a)(2) (1988).

10. Pub. L. No. 96-510, 94 Stat. 2767, 2781 (codified as amended at 42 U.S.C. § 9607 (1988 & Supp. III 1991)).

11. See COMMITTEE ON SCIENTIFIC AND TECHNICAL CRITERIA FOR FED. ACQUISITION OF LANDS FOR CONSERVATION, NATIONAL RESEARCH COUNCIL, SETTING PRIORITIES FOR LAND CONSERVATION 52 (1993) [hereinafter SETTING PRIORITIES].

acres—and coincidentally offers the opportunity to secure advances in the protection of North American biodiversity.<sup>12</sup>

In third place is the Delaney Amendment, which is much more than a low-level, pollutants-in-food law. This statute should be best remembered for bringing down DDT and putting in motion a worldwide social revolution against the serious problem of pesticide pollution.<sup>13</sup> In an irony that may yet be too conspicuous to escape the notice of Congress, the cancer studies that helped ban DDT twenty-five years ago have been supplemented dramatically by recent findings implicating the chemical as an indicator of human breast cancer.<sup>14</sup>

In fourth place is section 7 of the ESA, which is the most protective of all domestic environmental laws and admired throughout the world. Much of section 7's influence is measured in hope and not results. But the U.S. courts have embraced this protective law,<sup>15</sup> which has accounted for no small number of impressive victories for the creatures of the North American continent.

In fifth place is section 102 of NEPA, which has been replicated in rapid fashion throughout the United States and around the world. NEPA is the most frequently copied<sup>16</sup> and most frequently cited<sup>17</sup> of all U.S. domestic environmental laws. It also must be credited with significant gains in environmental quality on many fronts,<sup>18</sup> although there is some disagreement at the margins of this proposition.

My sixth-place finisher is section 301 of the Clean Water Act, which deserves a lion's share of the credit for the significant gains in the quality of U.S. surface waters in the last quarter century.<sup>19</sup>

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12. See WILDERNESS SOC'Y & U.S.D.A. FOREST SERV., *KEEPING IT WILD: A CITIZEN GUIDE TO WILDERNESS MANAGEMENT* 3 (1992) (reporting that National Wilderness Preservation System contains nearly 95 million acres, slightly more than four percent of total land area of United States).

13. See FRANK GRAHAM, JR., *SINCE SILENT SPRING* (1970).

14. E.g., Julie Corliss, *Pesticide Metabolite Linked to Breast Cancer*, 85 J. NAT'L CANCER INST. 602 (1993).

15. E.g., MICHAEL J. BEAN, *THE EVOLUTION OF NATIONAL WILDLIFE LAW* 380-83 (rev. & expanded ed. 1983); RICHARD LITTELL, *ENDANGERED AND OTHER PROTECTED SPECIES: FEDERAL LAW AND REGULATION* 47-63 (1992).

16. See Nicholas A. Robinson, *International Trends in Environmental Impact Assessment*, 19 B.C. ENVTL. AFF. L. REV. 591, 591 (1992).

17. The Author's Westlaw search of February 1994 revealed more than 2000 citations. Search of Westlaw, Jr. library (Feb. 19, 1994).

18. See, e.g., *ENVIRONMENTAL ANALYSIS: THE NEPA EXPERIENCE* (Stephen G. Hildebrand & Johnnie B. Cannon eds., 1993).

19. See COUNCIL ON ENVTL. QUALITY, EXECUTIVE OFFICE OF THE PRESIDENT, *ENVIRONMENTAL TRENDS* (1981).

In seventh place is section 107 of CERCLA. In thirteen short years, this statute has thoroughly revolutionized commercial property management and exchange in the United States. More than any other single enactment, section 107 has brought environmental law into the blue-ribbon law firms of every major city. In no small way, this statute has transformed the practice of environmental law from fringe novelty to mainstream reality.

Another perspective on the influence of this wondrous seven is to ask whether anybody has noticed. Turned around in this fashion, one is hard put to identify seven more controversial landmarks on the contemporary legal and political landscape. Land acquisitions and wilderness set-asides are under attack by the "wise-use" and other landowner movements.<sup>20</sup> The Delaney "paradox" has tied Congress in knots for the last decade.<sup>21</sup> Section 7 and other features of the ESA are under perpetual reconsideration, with the spotted owl adding new fuel to these flames.<sup>22</sup> Congress has nibbled away at NEPA with sufficient frequency so as to give rise to a separate literature on the subject.<sup>23</sup> Section 301 of the CWA has been exposed as the epitome of a "command and control" statute, a pejorative of no small moment among legal academics who claim to know something about environmental law.<sup>24</sup> As of this writing, the legislative reauthorization process of section 107 of CERCLA is underway and Congress is receiving a barrage of new information about transaction costs, gross unfairness, and the legal springs and traps that haunt this unpopular law.<sup>25</sup>

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20. Cf. Florence Williams, *The Compensation Game*, 57 WILDERNESS 29 (1993).

21. See COMMITTEE ON SCIENTIFIC AND REGULATORY ISSUES UNDERLYING PESTICIDE USE PATTERNS AND AGRIC. INNOVATION, NATIONAL RESEARCH COUNCIL, REGULATING PESTICIDES IN FOOD: THE DELANEY PARADOX (1987).

22. See Elizabeth A. Foley, *The Tarnishing of an Environmental Jewel: The Endangered Species Act and the Northern Spotted Owl*, 8 J. LAND USE & ENVTL. L. 253 (1992); Victor M. Sher, *Travels with Strix: The Spotted Owl's Journey Through the Federal Courts*, 14 PUB. LAND L. REV. 41 (1993).

23. See Victor M. Sher & Carol Sue Hunting, *Eroding the Landscape, Eroding the Laws: Congressional Exemptions from Judicial Review of Environmental Laws*, 15 HARV. ENVTL. L. REV. 435 (1991).

24. See William F. Pedersen, Jr., *Turning the Tide on Water Quality*, 15 ECOLOGY L.Q. 69 (1988); Symposium, *Free Market Environmentalism: The Role of the Market in Environmental Protection*, 15 HARV. J.L. & PUB. POL'Y 297 (1992). Interestingly, all seven of the "great" environmental laws fail under the prevailing weight of legal academic opinion for reasons of rent seeking, mismatch, and misdiagnosis. See CASS R. SUNSTEIN, *AFTER THE RIGHTS REVOLUTION: RECONCEIVING THE REGULATORY STATE* 74-110 (1990).

25. See, e.g., *Testimony Statement of Rep. Bill Sarpalius*, Federal Document Clearing House, Inc., Sept. 28, 1993, available in LEXIS, News Library (stating that cost of cleaning up Superfund sites will reach over one trillion dollars over the next 50 years).

Most remarkable about this process, though, is that many believe that these seven extraordinary laws have become virtually repeal-proof. According to this view, the details can change; screens, clouds, and shrouds can appear; decelerators and modifiers can emerge; but the central features of these seven statutes will remain unchanged as a kind of functional constitutional law. Whether or not this estimate is accurate, the suggestion encourages a closer look at the common features of these seven impressive laws. What are the ingredients of a great environmental law?

## II. COMMON FEATURES OF THE SEVEN STATUTORY WONDERS

Undoubtedly, a host of different theories of congressional behavior, political timing, constituency service, and what-not might be unfurled to explain the striking trajectory of a successful law. This Essay focuses on (1) strong leadership; (2) an inspirational and even radical message; (3) growth and sleeper potential; (4) research implantation; and (5) attentive monitoring.

### A. *Strong Leadership*

One conspicuous feature of the super seven is that these laws were advanced by strong leaders—respected and powerful members of Congress, savvy staffers, influential outsiders—sometimes all three. Entrepreneurial skills, sheer passion, and force of will figured in the outcome. The Delaney Amendment was the product of a crusty New York City congressman who was moved to help a friend who was worried about the long-range effects of the post-World War II pesticides.<sup>26</sup> The name most closely associated with the Land and Water Conservation Fund Act is Stewart Udall, the highly respected Secretary of Interior in the Kennedy Administration, and a card-carrying environmentalist.<sup>27</sup> Although the Wilderness Act was a long time in incubation and boasts a list of sponsors that grows as memories fade, it was written by nonlawyer and nonmember of Congress, Howard Zahniser of the Wilderness Soci-

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26. See JUDY BENTLEY, RALPH NADER CONGRESS PROJECT, JAMES J. DELANEY 5-7 (1972) (Delaney was "particularly worried" about DDT and nurtured his own backyard organic garden at the family homesite on Fire Island); CHRISTOPHER J. BOSSO, PESTICIDES AND POLITICS: THE LIFE CYCLE OF A PUBLIC ISSUE 72-78, 96-98 (1987).

27. See STEWART L. UDALL, THE QUIET CRISIS 181 (1963) ("The Land and Water Conservation Fund proposed by President Kennedy may mark a turning point in conservation history."). For general background on the Land and Water Conservation Fund, see George Cameron Coggins & Robert L. Glicksman, *Federal Recreational Land Policy: The Rise and Decline of the Land and Water Conservation Fund*, 9 COLUM. J. ENVTL. L. 125 (1984).

ety,<sup>28</sup> which might account for the superior quality of the prose. NEPA came into being with powerful political sponsorship (Henry Jackson), energetic academic support (Lynton Caldwell), and sophisticated staff work (William Van Ness and Grenville Garside).<sup>29</sup> Section 301 of the Clean Water Act was a central page in the distinguished career of Senator Edmund Muskie, with the staff heroics accomplished by Leon Billings and Tom Jorling.<sup>30</sup> Section 7 of the ESA was the creation of John Dingell, with key staff assistance by Frank Potter, and the tale of its enactment is marked by impressive entrepreneurial skills.<sup>31</sup> Superfund's critical features are credited to the skillful opportunism of senior Environmental Protection Agency (EPA) management, including Doug Costle,<sup>32</sup> although more of this story awaits the telling.

The first message, then, is that great laws are the product of great deeds. The process of enactment is chaotic and unpredictable, to be sure, but opportunity is not waiting on every corner. A close analogy, perhaps, is the process of extraordinary scientific discovery, which is filled with enough accidents to be called "serendipity," but comes only to those who created the opportunities and are in a position to seize them.<sup>33</sup>

### B. *The Inspirational and Radical Message*

A second conspicuous and surprising feature of these laws is that they lack the compromised and ambiguous form normally associated with an act of Congress. This bold portrait may be part mirage because trade-offs may be buried elsewhere in what is always a complex legislative picture. Or it may be partly attributed to the entrepreneurial verve that brings these laws into being. But something more seems to be involved. In the first place, these laws successfully make connection with what can best be described as a widely shared human sense of justice and

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28. See CHARLES F. WILKINSON, *THE EAGLE BIRD: MAPPING A NEW WEST* 12-13 (1992).

29. See Lynton K. Caldwell, *Achieving the NEPA Intent: New Directions in Politics, Science, and Law*, in ENVIRONMENTAL ANALYSIS: THE NEPA EXPERIENCE, *supra* note 18, at 12, 17.

30. My personal recollection will have to suffice as authority.

31. See STEVEN L. YAFFEE, PROHIBITIVE POLICY: IMPLEMENTING THE ENDANGERED SPECIES ACT 56, 61-66 (1982); Kathryn A. Kohm, *The Act's History and Framework*, in BALANCING ON THE BRINK OF EXTINCTION: THE ENDANGERED SPECIES ACT AND LESSONS FOR THE FUTURE 10 (Kathryn A. Kohm ed., 1991).

32. See MARC K. LANDY ET AL., THE ENVIRONMENTAL PROTECTION AGENCY: ASKING THE WRONG QUESTIONS 140-42 (1990). Costle was the EPA Administrator during the Carter years and was an important participant in the original design of the EPA. *Id.* at 39.

33. ROYSTON M. ROBERTS, SERENDIPITY: ACCIDENTAL DISCOVERIES IN SCIENCE 244-47 (1989). According to Roberts, Horace Walpole coined the word "serendipity" in 1754 after reading the fictional adventures of "The Three Princes of Serendip." *Id.* at ix-x.

fair dealing.<sup>34</sup> The genius of Delaney is that it hit upon a theme—who would put cancer in our food?—with a universal appeal that continues to stymie the most clever of legislative second guessers. The Land and Water Conservation Fund Act was moved by images of children of many colors coming together in public playgrounds. Recreational opportunities for the poor and underprivileged were a prominent theme of this Act, which became the first and most successful step in what has recently become known as the “environmental justice movement.”<sup>35</sup>

The Wilderness Act succeeded in tapping the psychological and emotional roots—some would say religious feelings—that tie humans to the pristine physical environments that are part of our distant evolutionary history.<sup>36</sup> NEPA exploited the popular cautionary principle by identifying government as the culprit at a time when technological blunder and agency boosterism had become empirically unmistakable. Section 7 of the ESA appeals to similar sentiments, not to mention the emotional attachment to other living creatures that is shared by many members of the species of *Homo sapiens*.<sup>37</sup> Again, who could stand up and argue for the entitlement of public officials to kill, maim, or cripple the few members of a species close to the brink of extinction? The Clean Water Act, too, has an inspirational core that challenges the very morality of dumping pollutants into the community water supply. CERCLA expresses the same sort of contempt for polluters and their legally derived refinements of fault that stand in the way of retaliation. The ruling proposition is that the “polluters pay,” and behind this proposition is the sentiment that they should pay. After all, they made the earth uninhabitable, we did not. Polluters are perfectly appropriate lightning rods for the moralistic aggression sent their way.

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34. Compare Elizabeth Pennisi, *What Is Biodiversity, Anyway?*, 143 *SCI. NEWS* 410 (1993) (reporting that poll on biodiversity ranked ethical concerns much higher than potential economic value) with Mark Dowie, *American Environmentalism: A Movement Courting Irrelevance*, *WORLD POL'Y J.*, Winter 1991-92, at 67 (pointing out loss of passion in U.S. environmental movement).

35. But see SAMUEL TRASK DANA & SALLY K. FAIRFAX, *FOREST AND RANGE POLICY: ITS DEVELOPMENT IN THE UNITED STATES* 213-16 (2d ed. 1980) (pointing out, though, that financing scheme of Act reflects congressional policy “that recreational users should pay their way”); Richard J. Lazarus, *Pursuing “Environmental Justice”: The Distributional Effects of Environmental Protection*, 87 *NW. U. L. REV.* 787 (1993) (suggesting that environmental protection policy unfairly burdens certain groups, particularly racial minorities).

36. See, e.g., RODERICK NASH, *WILDERNESS AND THE AMERICAN MIND* (3d ed. 1982); MAX OELSCHLAEGER, *THE IDEA OF WILDERNESS: FROM PREHISTORY TO THE AGE OF ECOLOGY* (1991).

37. See Edward O. Wilson, *Biophilia and the Conservation Ethic*, in *THE BIOPHILIA HYPOTHESIS* 31, 31 (Stephen R. Kellert & Edward O. Wilson eds., 1993).



The more interesting part of the story, though, is that the moralism of these laws is unbounded. Protections are relentless, paybacks unforgiving, qualifiers swept away. On this level, these seven great laws are radical, extremist, and absolutist. *No* cancer-causing substances in the food? Even to the tune of parts per trillion? Natural carcinogens in infinitesimal amounts? And is the march to parkland so irresistible that the park becomes the paradigm and the people the spectators?<sup>38</sup> Does the wilderness really care if a few hammers and nails put in a functional appearance?<sup>39</sup> NEPA extends to *all* federal actions with significant effects. The ESA can stop the project *without* regard to cost. The Clean Water Act says *no* discharge of any pollutants, and it backs this up with the no-discharge goal of subsection 101(a)(1), which simply says that the discharge of pollutants into navigable waters shall be eliminated by 1985.<sup>40</sup> The hypothetical reach of CERCLA liability is often illustrated by the fable of the high school chemistry teacher who makes the mistake of sending a small amount of laboratory waste to the Hanford nuclear reservation for treatment: This individual is jointly and severally liable for the entire fifty billion dollars or so that will be needed to clean up the Hanford facilities.

Some writers have dwelt on the difference between *goals* statutes built upon aspirations and *rules* statutes that are meant to happen.<sup>41</sup> My aim, however, is not to discuss whether the rules on the ground will catch up to the goals on the books. Rather, it is to show that statement and overstatement, rules and goals, duty and aspiration are all part of the same successful package. These are daredevil laws and are much admired for it; audacity is an integral part of the successful package. People can subscribe to the visionary missions of wholesome food, pristine wilderness, and clean water. Nobody takes to the streets in support of marginal cost.

### C. Growth and " Sleeper " Potential

A strong leader sometimes can sell generalities with the details to follow. For this reason, many of these great laws did not confront opposition at the moment of enactment. Several of them, moreover, were en-

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38. See *The Wildlands Project Mission Statement*, WILD EARTH, Special Issue 1992, at 3, 4.

39. On the "degree of purity" issue in wilderness management, see 2 GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 14.04[4] (1993).

40. 33 U.S.C.A. § 1251(a)(1) (West 1986 & Supp. 1993).

41. E.g., John P. Dwyer, *The Pathology of Symbolic Legislation*, 17 *ECOLOGY L.Q.* 233 (1990); David Schoenbrod, *Goals Statutes or Rules Statutes: The Case of the Clean Air Act*, 30 *UCLA L. REV.* 740 (1983).

acted as "sleepers" in the sense that the full reach and application of the legislative hand were not imagined at the moment of enactment.<sup>42</sup> Like weeds in a field, these great laws suddenly appeared without the usual residue of legislative reflection, give and take, trading and compromise.

That great law is in large measure inadvertent law is a proposition that many might doubt, so let me reinforce the conclusion with a few examples. The conventional account of the expansion in the influence of Delaney is that extraordinary technological developments in our ability to detect chemicals in food since 1958 have rendered obsolete the "zero tolerance" standard that the amendment represents.<sup>43</sup> Thus, according to this view, a law that in 1958 meant to exclude a few offending chemicals from the food supply now threatens our agricultural way of life because of wholly unanticipated technological change. Similar tales of evolutionary change, legislative surprise, and unexpected application attend the other great laws. NEPA, enacted without expectation of lawsuit, has produced thousands of lawsuits. The ESA slipped through for the benefit of a few warm and cuddly mammals, and now section 7 is being unfurled in the interests of plants, mice, and insects. CERCLA emerged at the eleventh hour with limited ambitions, and has become a legal monster. Section 301 of the Clean Water Act was itself not a sleeper; however, the principle it embraced was a reincarnation of the

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42. On "sleepers" in environmental law, see William H. Rodgers, Jr., *The Lesson of the Owl and the Crows: The Role of Deception in the Evolution of the Environmental Statutes*, 4 J. LAND USE & ENVTL. L. 377 (1989); and William H. Rodgers, Jr., *The Lesson of the Red Squirrel: Consensus and Betrayal in the Environmental Statutes*, 5 J. CONTEMP. HEALTH L. & POL'Y 161 (1989).

43. See SUNSTEIN, *supra* note 24, at 95 ("The drafters of the Clause assumed that a few chemical additives caused cancer and presented a significant health risk. By the 1980s it was clear that numerous food additives included carcinogenic substances, but many of the relevant risks were trivial."). For other critical commentary on Delaney, see Margaret Gilhooley, *Plain Meaning, Absurd Results and the Legislative Purpose: The Interpretation of the Delaney Clause*, 40 ADMIN. L. REV. 267 (1988); Richard A. Merrill, *FDA's Implementation of the Delaney Clause: Repudiation of Congressional Choice or Reasoned Adaptation to Scientific Progress?*, 5 YALE J. ON REG. 1 (1988); Roger D. Middlekauff, *The 1950s: The Delaney Clause is Enacted*, 45 FOOD DRUG COSMETIC L.J. 31 (1990); and Paulette L. Stenzel, *Right-to-Know Provisions of California's Proposition 65: The Naivete of the Delaney Clause Revisited*, 15 HARV. ENVTL. L. REV. 493 (1991). The fictions that rule this field are compared nicely with empirical reality in William S. Pease, *The Role of Cancer Risk in the Regulation of Industrial Pollution*, 12 RISK ANALYSIS 253, 261 (1992) ("[T]he total number of bans . . . has been quite small: less than 200 out of a universe of at least 10,000 consumer products; . . . about as many carcinogens have been approved for use in food as have been banned as a result of the Delaney Clause.").

1899 Refuse Act, which has a "no discharge" ultimatum that is one of the great sleepers of our time.<sup>44</sup>

Obviously, these great laws do not remain "sleepers" for long. Their influence quickly becomes conspicuous and impressive. But the key to success in law, as in other evolutionary systems, is in getting started. The contributions of the leader and the sleeper features help these great laws get started. Their inspirational character assures maintenance and nourishment by enthusiastic constituencies. Other support for these laws is found in their scientific anchorage, discussed in the following section.

#### *D. Research Implantation*

While causes and effects are obscure, another feature of the seven great laws is their ability to attract and hold scientific constituencies and to generate scientific questions. This result may be an accidental artifact of the breadth and reach of these laws, a fallout consequence of their spectacular influence, or a necessary ingredient built into the legal structure that contributes to the credibility of the endeavor. All of these laws have a scientific component, and some of them have contributed in no small way to advancing the particular sciences with which they are associated. For example, the entire Clean Water Act has generated a host of questions on subjects such as chemistry, biology, hydrology, and land morphology. The ESA is closely associated with a variety of new work in population and conservation biology, CERCLA with a number of sciences related to groundwater, and the Delaney Amendment with the toxicology, epidemiology, and other sciences brought to bear in the real world of risk assessment. Interestingly, the Wilderness Act came into being with a specific research component,<sup>45</sup> and who would be surprised? The whole idea of setting lands apart in protective status suggests the notion of a "natural" baseline, which has obvious implications for scientific comparisons with properties that might be treated differently.

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44. Ch. 425, § 13, 30 Stat. 1121, 1152 (1899) (codified as amended at 33 U.S.C. § 407 (1988)); see 2 WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW: AIR AND WATER § 4.13 (1986 & Supp. 1992).

45. Compare 16 U.S.C. § 1133(b) (1988) (stating that "wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use") with DANIEL B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY 194-97 (1990) (discussing need to maintain "baseline" wilderness untouched by direct human actions) and NATIONAL WILDERNESS RESEARCH COMM., REPORT OF THE Soc'Y OF AM. FORESTERS, U.S. NATIONAL WILDERNESS RESEARCH NEEDS, PRIORITIES AND STRATEGIES (1993) (stating that research is insufficient to support needs as regards stewardship, impacts, allocation and management, benchmark studies, or education).

NEPA, of course, is definite in its embrace of the science of ecology,<sup>46</sup> and the central idea of predictive impact statements cries out for follow-up research to validate or contradict the predictions.<sup>47</sup>

It is hard to tell what to make of the scientific connections found in the great environmental laws. Here is one possibility: All of these laws assert bold propositions about humans, nature, and the physical environment—for example, carcinogenic toxics should be excluded from the food supply, pollutants should be banned from the water, and the habitat of endangered species should be absolutely protected. If one puts aside the normative content, what remains are striking scientific hypotheses: Introducing animal carcinogens to human food will produce human cancers; discharging pollutants into water will result in dead fish; endangered species can survive only if their habitats are protected. In an indirect way, the Dingells, Muskies, and Delaneys of the world advance propositions about how nature works that are as challenging as those advanced by Einstein, Hubble, or Turing. Needless to say, scientists will respond to the challenge.

#### *E. Attentive Monitoring*

With the exception of the Land and Water Conservation Fund Act, and perhaps the Wilderness Act, all of the great laws are prohibitive, and sweepingly so. This means that there will be compliance problems. How well do these great laws exploit various mechanisms of social control—such as self-monitoring, neighbor monitoring, formal legal sanctions, and market influences—that are identified in the literature?<sup>48</sup> Reasonably well, which leads us to another secret to the success of a great law.

At first glance there appears to be nothing unusual or especially effective about how these laws exploit traditional legal sanctions or market influences. Indeed, these two staples of environmental law enforcement are largely missing from the pages of the great laws. Occasionally, one can find a prosecution for discharging without a permit,<sup>49</sup> the dumping of

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46. See 42 U.S.C. § 4332(2)(H) (1988).

47. See COMMITTEE ON THE APPLICATIONS OF ECOLOGICAL THEORY TO ENVTL. PROBLEMS, NATIONAL RESEARCH COUNCIL, *ECOLOGICAL KNOWLEDGE AND ENVIRONMENTAL PROBLEM-SOLVING: CONCEPTS AND CASE STUDIES* (1986).

48. See, e.g., Donald T. Campbell, *Legal and Primary-Group Social Controls*, in *LAW, BIOLOGY & CULTURE: THE EVOLUTION OF LAW* 165 (Margaret Gruter & Paul Bohannan eds., 2d ed. 1992).

49. See *United States v. Plaza Health Labs., Inc.*, 3 F.3d 643, 649 (2d Cir. 1993) (holding that rule of lenity is applied in criminal prosecutions to conclude that individual polluter is not "point source").

hazardous waste,<sup>50</sup> or the taking of endangered species.<sup>51</sup> But the numbers are hardly impressive, and it is difficult to believe that one-step-ahead-of-the-prosecutor fears figure, in any meaningful way, in the record of compliance with the great seven laws. Similarly, economic incentives are not prominent on this scene in a practical sense,<sup>52</sup> not to mention the problem that many of these absolutist prohibitions forbid behavior that is expected and encouraged by the underlying economic theory. The "reasonable person" of economic theory does not withhold all discharges into the water, avoid negligible insults in food, or throw away a dam to save a tiny fish. It is also difficult to embrace any scenarios of maniacal enforcement, business reputation, and so on, that encourage reliable compliance as a matter of sound economic choice.

Some progress might be made on the compliance front by recognizing that the inspirational messages of the seven great laws advance the cause of self-monitoring as manifested by the pangs of conscience, accumulated remorse, or even the fears of supernatural retribution. The inspirational tones of Delaney, the Endangered Species Act, and the Clean Water Act obviously can reach observers and sympathizers, but they can also be heard by would-be offenders. The business world is not filled exclusively with people who resist the killing of endangered species or the polluting of food with carcinogens only if benefits are likely to exceed costs.

With this said, the triumph of these laws is that they successfully exploit what I describe as "attentive monitoring." This includes personal activities such as face-to-face observation, emotions such as shame and pride, and group sanctions such as ostracism and citizen lawsuits.<sup>53</sup> Structural legal changes often facilitate this attentive monitoring. The business of federal land acquisition is furthered obviously by an identifiable source of funds, but it is also assisted by a personalized, hands-on lawmaking in the Congress that makes each transaction very much a small-numbers game.<sup>54</sup> Wilderness set-asides create constituency managers and users that are highly motivated and keenly attentive to abusive practices. Both NEPA and the ESA have elaborate consultative arrange-

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50. See, e.g., G. Nelson Smith, III, *No Longer Just a Cost of Doing Business: Criminal Liability of Corporate Officials for Violations of the Clean Water Act and the Resource Conservation and Recovery Act*, 53 LA. L. REV. 119 (1992).

51. ENVIRONMENTAL DEFENSE FUND, *WHATEVER HAPPENED TO THE CLASS OF '67?* (1993).

52. See, e.g., DEFENDERS OF WILDLIFE, *BUILDING ECONOMIC INCENTIVES INTO THE ENDANGERED SPECIES ACT* (Wendy E. Hudson ed., 1993).

53. See Campbell, *supra* note 48, at 170.

54. For a description, see *SETTING PRIORITIES*, *supra* note 11, at ch. 3.

ments where the proposals of the agencies are displayed to friend and foe alike, criticized and refashioned, and bound up in commitments of various sorts—with varying degrees of credibility—among the principals. Compliance in the early stages is high because everyone is watching. Eventually, compliance breaks down as time, space, and personnel changes displace attentive monitoring with formal monitoring.<sup>55</sup> Section 301 of the Clean Water Act long was backed by a highly effective citizen-suit mechanism that only in recent years has been dismantled by Supreme Court decisions.<sup>56</sup> The genius of section 107 of CERCLA is that it exploits the model of nuisance law by strengthening the legal hand of the owner whose property is polluted; this is the epitome of face-to-face, neighbor-to-neighbor enforcement. Delaney lacks an effective day-to-day system of attentive monitoring, which might help explain its general reputation for being widely violated.<sup>57</sup>

The important point is that great laws cannot stand indefinitely on the reputation of the leader, the inspiration of the message, or the interest of the scientific community. Somehow, the zeal that brought these laws into being must be sustained at the level of monitoring and enforcement.

### III. CONCLUSION

The secrets of the seven great environmental laws are simple enough: All that is needed is a messianic leader with a stirring message containing seeds of growth in a sustainable environment. In practice, legal oases of this sort are few and far between.

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55. See ENVIRONMENTAL ANALYSIS: THE NEPA EXPERIENCE, *supra* note 18, at ch. 7 (collecting several useful articles discussing compliance rates of EIS mitigation commitments).

56. See MICHAEL D. AXLINE, ENVIRONMENTAL CITIZEN SUITS §§ 1.01-.04 (1993); 2 RODGERS, *supra* note 44, § 4.5.

57. See Pease, *supra* note 43, at 253-54.

