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Robert V. Percival

Robert.Percival@chicagounbound.edu

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# Regulatory Evolution and the Future of Environmental Policy

Robert V. Percival†

During the 1970s, U.S. environmental law made a dramatic transformation from a highly decentralized system built on private law principles to one dominated by federal legislation requiring agencies to implement comprehensive, national regulatory programs. During the 1980s, Congress expanded and refined these programs, moving U.S. environmental law far beyond its common law roots and extending federal regulation to smaller entities and activities less obviously associated with environmental harm. But as paleontologist Stephen Jay Gould cautions in his recent book, *Full House: The Spread of Excellence from Plato to Darwin*,<sup>1</sup> one should not assume that an apparent trend toward greater complexity implies inexorable evolutionary progress.<sup>2</sup> Indeed, during the 1990s, the growth of federal environ-

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† Professor of Law, Robert Stanton Scholar & Director, Environmental Law Program, University of Maryland School of Law. I would like to thank Rachel Schowalter and Jennifer Lewis for research assistance and Alan S. Miller, Miranda A. Schreurs and the participants in the Harrison Program on the Future of the Global Agenda, University of Maryland Department of Government and Politics, for their comments at a workshop in which the thoughts presented in this paper were presented on October 7, 1996. Portions of this paper are drawn from testimony previously delivered by the author at a congressional hearing. Some of the examples used in the paper are discussed in more detail in Robert V. Percival, et al, *Environmental Regulation: Law, Science & Policy* (Little, Brown 2d ed 1996).

<sup>1</sup> Stephen Jay Gould, *Full House: The Spread of Excellence from Plato to Darwin* (Harmony 1996).

<sup>2</sup> Id at 18-21. Gould argues that human life may not be "a predictable result of an inherently progressive progress," but rather "a momentary cosmic accident that would never arise again if the tree of life could be replanted from seed and regrown under similar conditions." He premises his argument on the notion that if evolution starts from a condition of total simplicity with no life forms simpler than bacteria, even random changes initially can only be in the direction of greater complexity. Therefore, even if "progress stands out as the major pattern of life's history," evolutionary processes do not inevitably move in this direction. Gould maintains that "no pervasive or predictable thrust toward progress permeates the history of life," and that the proper focus should be on changes in the overall range of variation of biological systems, what he calls the "full house." Gould argues that his thesis helps explain the disappearance of the .400 hitter in baseball. He maintains that as the overall quality of play has improved (as humans approach the "right wall" of athletic excellence), variation in batting averages shrinks, making the occurrence of extremes far less likely. Id.

mental law has slowed; basic elements of its regulatory infrastructure are now undergoing fundamental reexamination on several fronts. This Article considers what can be learned from the history of environmental regulation and how these lessons should be used to shape the future evolution of regulatory policy.

This Article begins by reviewing the history of U.S. environmental regulation. It notes that the transformation of American environmental law during the 1970s was a product of a remarkable burst of federal legislation adopted in response to perceived inadequacies of the common law and frustration with the failure of decentralized approaches to environmental protection. Adopted with overwhelming, bipartisan support, these laws directed federal agencies to establish national regulatory programs of breathtaking complexity and opened the courts to citizen suits to ensure that they were implemented and enforced. These federal regulatory programs made dramatic progress in reducing certain kinds of pollution, particularly emissions from large industrial point sources. They created new incentives for careful handling of hazardous substances, and they helped spawn the development of "greener" technology. But opponents have criticized current federal policy as a reflection of misplaced regulatory priorities and as an inefficient mechanism for improving environmental quality.

This Article argues that, when viewed from an evolutionary perspective, the current regulatory infrastructure is neither as irrational nor as inefficient as its critics have claimed. Despite acknowledged inefficiencies, the first generation of national regulations properly focused on achieving broad-based emissions reductions without requiring detailed inquiry into site-specific costs and benefits. Regulatory policy has now matured to the point where greater efforts can be made to address the concerns for fairness and efficiency that animated the common law standards it displaced. Recent policy initiatives are taking important steps in this direction.

While recognizing the benefits of improving the regulatory system, this Article cautions against sweeping proposals for "regulatory reform" that are not sufficiently sensitive to the lessons of history. History suggests that future opportunities to improve regulatory policy are best pursued in evolutionary, rather than revolutionary fashion. Public confidence in the regulatory process is essential for environmental policy to succeed; efforts to promote regulatory reform are doomed to failure if they are perceived as efforts to relax environmental protections. Proposals

to impose additional analytical requirements on agencies and to subject them to more intrusive judicial review would exacerbate persistent problems with the current regulatory system. These problems include the ossification of the rulemaking process and the judiciary's failure to grasp the full implications of the shift away from common law standards to a system of precautionary regulation.

## I. ENVIRONMENTAL REGULATION: AN EVOLUTIONARY HISTORY

### A. Regulation Before the Rise of the Modern Environmental Movement

Until the 1970s, the common law was the legal system's primary vehicle for responding to environmental disputes. For centuries, courts wrestled with cases raising the quintessential question of environmental law: how to harmonize conflicts that occur when human activity adversely affects the quality of life enjoyed by others.<sup>3</sup> The common law relied largely on doctrines of nuisance law to resolve these conflicts, although physical invasions of property could also be addressed as trespasses.<sup>4</sup> The U.S. Supreme Court occasionally umpired interstate pollution disputes in cases brought by states under the federal common law of nuisance,<sup>5</sup> though eventually it relegated such actions to the lower federal courts.<sup>6</sup>

Federal regulatory legislation to protect public health or the environment was virtually unknown until the twentieth century. Congress acted only in response to a few highly visible and widely publicized problems. In 1838, Congress mandated that safety regulations be adopted to prevent steamship boilers from exploding.<sup>7</sup> Congress acted again in 1912 to respond to a horribly disfiguring disease, phosphorus necrosis (also called "phossyjaw" be-

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<sup>3</sup> See, for example, *Aldred's Case*, 77 Eng Rep 816 (1611); *Bamford v Turnley*, 122 Eng Rep 27 (1862); *St. Helen's Smelting Co. v Tipping*, 11 HLC 642 (1865); *Susquehanna Fertilizer Co. v Malone*, 73 Md 268, 20 A 900 (1890); *Smith v Stasso Milling Co.*, 18 F2d 736 (2d Cir 1927).

<sup>4</sup> See, for example, *Keppel v Lehigh Coal & Navigation Co.*, 200 Pa 649, 50 A 302 (1901).

<sup>5</sup> *Missouri v Illinois*, 200 US 496 (1906); *Georgia v Tennessee Copper Co.*, 206 US 230 (1907); *New York v New Jersey*, 256 US 296 (1921); *New Jersey v City of New York*, 284 US 585 (1931).

<sup>6</sup> *Illinois v Milwaukee*, 406 US 91 (1972).

<sup>7</sup> Robert L. Rabin, *Federal Regulation in Historical Perspective*, 38 Stan L Rev 1189, 1196 (1986). Congress initially adopted legislation regulating steamship boilers in 1838 and then strengthened the law in 1852.

cause it literally ate away the jaws of workers exposed to white phosphorus in match manufacturing). The Esch-Hughes Act sought to prevent this disease by eliminating the use of white phosphorus in match manufacturing.<sup>8</sup> Because Congress did not believe it had the constitutional authority to impose a national ban, it enacted a federal tax to make it prohibitively expensive to use white phosphorus.<sup>9</sup>

Other early federal regulatory legislation, including the Rivers and Harbors Act of 1899,<sup>10</sup> the Pure Food and Drug Act of 1906,<sup>11</sup> and the Insecticide Act of 1910,<sup>12</sup> was spawned largely by a desire to promote commerce rather than by concern over public health or environmental protection. The Rivers and Harbors Act banned discharges of refuse into navigable waters to prevent obstructions to the free flow of commerce, which was conducted primarily on waterways at that time. Early food, drug, and pesticide laws sought to prevent consumers from being defrauded by products that were not what they were advertised to be.<sup>13</sup>

In the absence of comprehensive environmental legislation, the federal response to the rare health or safety problem that attracted national attention was to convene a conference of experts. In 1925, the U.S. Surgeon General convened a conference to consider the risks of gasoline lead additives after more than a dozen workers died of lead poisoning in plants manufacturing tetraethyl lead.<sup>14</sup> Another conference was convened to address radium poisoning in workers painting luminous figures on watches.<sup>15</sup> Alice Hamilton, a leading public health crusader, lauded "this entirely informal and extra-legal method that we Americans have devised" to respond to any "new and striking danger which

<sup>8</sup> Pub L No 62-112, 37 Stat 81 (1912), repealed by Pub L No 76-1, 53 Stat 1 (1939).

<sup>9</sup> Taxing White Phosphorous Matches, House Committee on Ways and Means, HR Doc No 406, 62d Cong, 2d Sess 5 (1912).

<sup>10</sup> Act of March 3, 1899, Ch 425, 30 Stat 1121.

<sup>11</sup> Act of June 30, 1906, Ch 3915, 34 Stat 768. repealed by Pub L No 75-717, 52 Stat 1059 (1938).

<sup>12</sup> Act of April 26, 1910, 36 Stat 331, repealed by Pub L No 80-125, 61 Stat 172 (1940).

<sup>13</sup> Robert V. Percival, *Environmental Federalism: Historical Roots and Contemporary Models*, 54 Md L Rev 1141, 1149-50 (1995).

<sup>14</sup> After conducting a quick study that compared the health of workers at gas stations that sold leaded and unleaded gasoline, the conference approved continued use of lead additives, while recommending measures to improve worker safety. Alice Hamilton, *Nineteen Years in the Poisonous Trades*, 159 Harper's Magazine 580, 586 (1929).

<sup>15</sup> Id at 587.

lends itself to newspaper publicity.”<sup>16</sup> However, she complained that “it cannot be used to combat old and familiar dangers,” or “newer poisons which do not produce spectacular effects; and these are much more numerous.”<sup>17</sup> These limitations are illustrated by the Surgeon General’s decision to permit the continued marketing of lead additives in gasoline. Although the Surgeon General recognized the possibility that lead emissions from gasoline combustion could cause lead poisoning in humans, in the absence of proof concerning the prospective effects of chronic, low-level exposure, nearly fifty years passed before federal authorities began regulating lead additives to protect children’s health.<sup>18</sup>

After World War II, federal law imposed few regulations on private industry that were animated by environmental concerns, but the federal government became involved in encouraging the states to adopt pollution control measures of their own. The Federal Water Pollution Control Act of 1948 provided grants to states for water pollution control.<sup>19</sup> In 1956, over President Eisenhower’s veto, Congress provided federal funds to municipalities for the construction of sewage treatment plants.<sup>20</sup> Federal funding was founded on the premise that cities would be reluctant to build sewage treatment plants on their own because these investments would primarily benefit downstream cities.<sup>21</sup> While this program grew to become a substantial source of federal financial assistance to municipalities, it did not impose any federal pollution control regulations. The federal government sought instead to encourage states to adopt their own regulations to protect water quality.

The federal programs of the 1950s and 1960s reinforced the notion that environmental problems were the responsibility of state and local governments. The primary federal role was to assist with research and funding while letting the states decide how to control pollution. With expanding economic activity in the post-World War II era, the interstate character of pollution became increasingly apparent. Awareness that pollutants do not

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<sup>16</sup> *Id.*

<sup>17</sup> *Id.*

<sup>18</sup> Hamilton, 159 *Harper’s Magazine* at 587 (cited in note 14).

<sup>19</sup> Act of June 30, 1948, Ch 758, 62 Stat 1155, codified as amended at 33 USC §§ 1251 et seq (1994).

<sup>20</sup> Water Pollution Control Act Amendments of 1956, Pub L No 84-660, 70 Stat 498. See Percival, 54 *Md L Rev* at 1155 (cited in note 13).

<sup>21</sup> *Id.*

respect state, or even national boundaries, grew rapidly as scientists warned that the entire planet was being dangerously poisoned by radiation from atmospheric nuclear testing.<sup>22</sup> These and other developments seriously undermined the customary assumption that the federal role in environmental protection policy should be a non-regulatory one.

## B. The Modern Environmental Revolution

During the 1970s, an explosion of federal legislation erected the modern federal regulatory infrastructure. These statutes established the ground rules for national environmental protection efforts. They mandated that all federal agencies explicitly consider the environmental impacts of their actions<sup>23</sup> and prohibited actions that jeopardize endangered species.<sup>24</sup> They required the establishment of the first comprehensive limits on air<sup>25</sup> and water<sup>26</sup> pollution, and they imposed controls on how toxic substances<sup>27</sup> and hazardous wastes<sup>28</sup> were to be managed. This burst of legislative activity occurred just as the judiciary was opening up the courts to citizens seeking to challenge decisions affecting the environment.<sup>29</sup> Congress and the courts gave concerned citizens new tools for challenging these decisions and for prodding agencies to implement the ambitious new legislative directives.

The national regulatory legislation that transformed American environmental law during the 1970s was a product of a remarkable groundswell of public concern for the environment.<sup>30</sup>

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<sup>22</sup> Id at 1157.

<sup>23</sup> National Environmental Policy Act of 1969, Pub L No 91-190, 83 Stat 852, codified at 42 USC § 4321 et seq (1994).

<sup>24</sup> Endangered Species Act of 1973, Pub L No 93-205, 87 Stat 884, codified at 16 USC § 1531 et seq (1994).

<sup>25</sup> Clean Air Act Amendments of 1970, Pub L No 91-604, 84 Stat 1676, codified at 42 USC § 7401 et seq (1994).

<sup>26</sup> Federal Water Pollution Control Act Amendments of 1972, Pub L No 92-500, 86 Stat 816, codified at 33 USC § 1251 et seq (1994).

<sup>27</sup> Toxic Substances Control Act, Pub L No 94-469, 90 Stat 2003 (1976), codified at 15 USC § 2601 et seq (1994).

<sup>28</sup> Resource Conservation and Recovery Act of 1976, Pub L No 94-580, 90 Stat 2795, 42 USC § 6901 et seq (1994).

<sup>29</sup> See, for example, *Citizens to Preserve Overton Park v Volpe*, 401 US 402 (1971).

<sup>30</sup> Robert Rabin finds it difficult to account for this remarkable legislative activity, which he describes as the "Public Interest Era." Rabin, 38 Stan L Rev at 1189 (cited in note 7). Cass Sunstein refers to the enactment of these statutes as part of a "rights revolution" that was an outgrowth of the New Deal. Cass R. Sunstein, *After the Rights Revolution: Reconceiving the Regulatory State* (Harvard 1990). While environmental

With overwhelming, bipartisan support, this legislation revolutionized U.S. administrative law by requiring administrative agencies to be more responsive to environmental concerns and by giving citizens access to the courts to ensure that the laws were implemented and enforced.<sup>31</sup> In response to these laws, the judiciary liberalized rules of prudential standing.<sup>32</sup> Federal agencies were directed to establish and implement national regulatory programs of breathtaking complexity to prevent harm to human health and the environment and to guarantee a uniform, minimum level of environmental quality in all areas of the country. While state governments were given the opportunity to operate the new federal regulatory programs and to enact even more stringent regulations if they chose, the federalization of environmental law was widely understood as a response to the abysmal failure of decentralized approaches to environmental protection.

The new federal regulatory programs mandated that large industrial polluters reduce their emissions across the board without requiring detailed inquiry into the environmental consequences in any particular locale. Congress adopted this regulatory strategy after years of frustration over the failure of efforts to base regulations on assessments of the impacts of ambient pollution concentrations. In some cases, the regulatory programs sought to force the development of new pollution control technology, as occurred when automobile manufacturers were required to reduce emissions from their products by 90 percent.<sup>33</sup>

In addition to mandating that comprehensive precautions be taken to prevent environmental harm, the laws considerably expanded the class of parties held liable when harm occurred. With the enactment of the Comprehensive Environmental Response, Compensation and Liability Act in 1980 ("CERCLA"), commonly known as the Superfund legislation, broad classes of parties associated with releases of hazardous substances were subjected to strict, joint and several liability for the costs of remediating environmental contamination.<sup>34</sup> This represented a distinct move away from common law standards of liability.

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legislation did not refer specifically to "rights," there can be no doubt about the revolutionary nature of the legislation.

<sup>31</sup> See, for example, Clean Air Act, 42 USC § 7604 (1994).

<sup>32</sup> See *United States v Students Challenging Regulatory Agency Procedures*, 412 US 669 (1973).

<sup>33</sup> Clean Air Act Amendments of 1970 § 6, Pub L No 91-604, 84 Stat 1676, 1690, codified at 42 USC §1857f-1(b)(1)(A) (1970).

<sup>34</sup> Pub L No 96-510, 94 Stat 2787, codified at 42 USC § 9601 et seq (1994).



The judiciary played a prominent role in the implementation of the new federal regulatory programs as virtually every major environmental regulation became the subject of a court challenge. By the narrowest of margins, the U.S. Court of Appeals affirmed the Environmental Protection Agency's ("EPA") efforts to limit the lead content of gasoline, endorsing preventative regulation, even in the absence of clear proof of harm.<sup>35</sup> Four years later, the U.S. Supreme Court qualified this endorsement by indicating that agencies implementing precautionary legislation should first determine that risks are significant before imposing costly regulations to reduce them.<sup>36</sup> The Court quickly clarified that this did not require the use of cost-benefit analysis in circumstances where Congress had not expressly mandated it.<sup>37</sup>

As the initial generation of federal environmental laws was reauthorized by Congress, they were broadened, strengthened, and made more specific. Comprehensive amendments to the Resource Conservation and Recovery Act ("RCRA") were adopted in 1984,<sup>38</sup> to CERCLA<sup>39</sup> and the Safe Drinking Water Act<sup>40</sup> in 1986, to the Clean Water Act in 1987,<sup>41</sup> and to the Clean Air Act in 1990.<sup>42</sup> Many of the amendments enacted during this period tried to force the federal environmental agencies to implement the environmental laws in a more expeditious fashion. Faced with an executive branch less sympathetic to environmental concerns, Congress imposed new deadlines for agency action and established specific sanctions for agencies who failed to carry out the law. "Hammer" provisions written into some laws specified regulations that would take effect automatically when an agency

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<sup>35</sup> *Ethyl Corp. v EPA*, 541 F2d 1 (DC Cir 1976) (en banc). The 5-4 decision reversed a 2-1 panel decision that had struck down EPA's regulation on the ground that the agency failed to prove actual harm from auto emissions of lead. The court explained that in the face of scientific uncertainty, it would "not demand rigorous step-by-step proof of cause and effect," because it "may be impossible to obtain if the precautionary purpose of the statute is to be served." Id at 113.

<sup>36</sup> *Industrial Union Department, AFL-CIO v American Petroleum Institute*, 448 US 607, 639 (1980) ("Benzene").

<sup>37</sup> *American Textile Manufacturers Institute v Donovan*, 452 US 490, 512 (1981).

<sup>38</sup> Hazardous and Solid Waste Amendments of 1984, Pub L No 98-616, 98 Stat 3224, codified at 42 USC § 6901 et seq (1994).

<sup>39</sup> Superfund Amendments and Reauthorization Act of 1986, Pub L No 99-499, 100 Stat 1615, codified at 42 USC § 9601 et seq (1994).

<sup>40</sup> Safe Drinking Water Amendments of 1986, Pub L No 99-339, 100 Stat 642, codified at 42 USC § 300f et seq (1994).

<sup>41</sup> Water Quality Act of 1987, Pub L No 100-4, 101 Stat 7, codified at 33 USC § 1251 et seq (1994).

<sup>42</sup> Clean Air Act Amendments of 1990, Pub L No 101-549, 104 Stat 2399, codified at 42 USC § 7401 et seq (1994).

failed to adopt its own regulations by a particular date. For example, the Hazardous and Solid Waste Amendments of 1984 provided that all land disposal of certain hazardous wastes would be banned by specified dates unless an express determination was made that particular levels of treatment were sufficient to avoid future environmental problems.<sup>43</sup> Sanctions for violating the environmental laws also increased dramatically, with substantial criminal penalties imposed for intentional violations.<sup>44</sup>

These programs made dramatic progress in reducing certain kinds of air and water pollution, particularly emissions from large industrial point sources, and they created powerful incentives for more careful handling of hazardous substances. But they came under considerable fire, particularly from regulated industries who argued that they were inefficient and inequitable mechanisms for improving environmental quality. These criticisms have intensified as environmental law's regulatory tentacles have been extended to embrace smaller entities and to affect development decisions by individual property owners.

### C. Rethinking Environmental Regulation

As environmental regulation has matured, federal agencies have begun to pursue more innovative forms of regulation. These include increased use of informational approaches to regulation (to help harness market forces to prevent pollution) and the creation of marketable emissions allowances (to reduce compliance costs). In response to pressures to relax the environmental laws, the Clinton administration has launched a series of initiatives to "reinvent regulation," urging more flexibility and a reduction in unnecessary regulatory burdens.<sup>45</sup> As a result, agencies have begun to experiment with new regulatory approaches such as environmental contracting and challenge regulations that promise reduced compliance burdens in return for improved environmental performance.

The pendulum that swung so powerfully toward environmental regulation during the 1970s and 1980s began to move back in the 1990s with the rise to power of a Congress and a judiciary decidedly more skeptical about government regulation. Even before the Republican sweep of the 1994 congressional elections,

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<sup>43</sup> § 201(a), 98 Stat at 3226-33, codified at 42 USC § 6924(d)(1).

<sup>44</sup> See, for example, RCRA, 42 USC § 6928, amended by Hazardous and Solid Waste Amendments of 1984, 98 Stat at 3256-57.

<sup>45</sup> Bill Clinton and Al Gore, *Reinventing Environmental Regulation* (1995).

efforts to reauthorize some of the major federal environmental statutes had failed in both the 102d and 103d Congresses.<sup>46</sup> Although their Contract With America did not mention the word "environment," the new Republican majority in the 104th Congress pursued an agenda that included sweeping cutbacks in environmental laws. Most of these initiatives failed, though Congress did enact the Unfunded Mandates Reform Act in March 1995.<sup>47</sup> The Act makes it procedurally more difficult to apply new environmental regulations to entities of state and local governments unless federal funding for compliance is provided.

A bill that would have dramatically weakened the Clean Water Act passed the House in 1995,<sup>48</sup> but the prospects of a presidential veto and an election-year "greening" of Congress made it impossible to enact any legislation that would rollback major provisions of the federal environmental laws.<sup>49</sup> Congress instead used appropriations riders to prevent implementation and enforcement of various provisions of the environmental laws during the period covered by the appropriations. For instance, in appropriations legislation that became law in 1995, Congress imposed a temporary freeze on the listing of new endangered species and required the U.S. Forest Service to increase timber harvests on federal lands.<sup>50</sup>

In March 1995, the House of Representatives approved legislation that would have required all major regulatory decisions to be justified on the basis of cost-benefit analyses.<sup>51</sup> However, the 104th Congress ultimately failed to enact such sweeping regulatory reform legislation, including proposals for a regulatory moratorium, requirements that future regulations meet risk assessment and cost-benefit criteria, and requirements that landowners be compensated when the value of their property is adversely affected by regulation.<sup>52</sup> When it extended the federal debt limit

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<sup>46</sup> Percival, 54 Md L Rev at 1167 (cited in note 13).

<sup>47</sup> Unfunded Mandates Reform Act of 1995, Pub L No 104-4, 109 Stat 48.

<sup>48</sup> Clean Water Act Amendments of 1995, HR 961, 104th Cong, 1st Sess (Feb 15, 1995), in 141 Cong Rec D 612 (May 16, 1995).

<sup>49</sup> Peter M. Lehner, *The Debate Over Clear Water: Amendments Point to Costs of Pollution*, NY L J S1 (June 12, 1995).

<sup>50</sup> Pub L No 104-6, 109 Stat 73, 86 (1995).

<sup>51</sup> HR 9, 104th Cong, 1st Sess (Jan 4, 1995), in 141 Cong Rec S 3743 (Mar 9, 1995). These and other proposals to mandate risk assessment and cost-benefit analyses are discussed in Cass R. Sunstein, *Congress, Constitutional Moments, and the Cost-Benefit State*, 48 Stan L Rev 247 (1996); David A. Wirth and Ellen K. Silbergeld, *Risky Reform*, 95 Colum L Rev 1857 (1995); and Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 Colum L Rev 1613, 1696 n 318, 1713 n 381 (1995).

<sup>52</sup> These proposals, whose basic components were embodied in Comprehensive Regu-

in March 1996, Congress did incorporate some aspects of the regulatory reform bills in legislation that targeted regulations affecting small businesses.<sup>53</sup> Called the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA"), this legislation has been dubbed "stealth regulatory reform" by Professor William Funk.<sup>54</sup>

Overall, however, environmental law's basic regulatory infrastructure survived the assaults of the 104th Congress. Indeed, it was arguably strengthened by the surprising enactment of consensus food safety and safe drinking water legislation adopted with uncommon speed late in the session.<sup>55</sup> Thus, in hindsight, early predictions that the 104th Congress might represent a "constitutional moment" for dramatically altering the legacy of the New Deal<sup>56</sup> appear to have missed the mark, at least with respect to environmental regulation. Indeed, it is arguable that the election year "greening" of a Congress that had been so hos-

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latory Reform Act of 1995, S 343, 104th Cong, 1st Sess (Feb 2, 1995), in 141 Cong Rec S 9261 (June 28, 1995), in the Senate; and HR 9 (cited in note 51), and the Risk Assessment and Cost Benefit Act of 1995, HR 1022, 104th Cong, 1st Sess (Feb 23, 1995), in 141 Cong Rec H 2261 (Feb 27, 1996), in the House, are discussed in more detail in Sunstein, 48 Stan L Rev at 274-82 (cited in note 51).

<sup>53</sup> Small Business Regulatory Enforcement Fairness Act of 1996, Pub L No 104-121, 110 Stat 857, codified at 5 USC § 551 et seq (1994 & Supp 1996) ("SBREFA"). The SBREFA has three particularly significant provisions. First, it requires agencies to give greater consideration to the impact of regulation on small businesses when rules are being developed that may adversely affect such businesses. This includes a requirement that EPA and the Occupational Safety and Health Administration ("OSHA") give representatives of small businesses an opportunity to review and comment on rules that may affect them *before* the rules are proposed publicly. Most significantly, SBREFA makes agency compliance with the Regulatory Flexibility Act, 5 USC §§ 601-612 (1994), subject to judicial review. Second, SBREFA requires that *all* rules issued by federal agencies be sent first to Congress for review 60 days before taking effect. The legislation creates special fast-track procedures for the enactment of resolutions disapproving the rules. Third, SBREFA seeks to ease the burden of environmental enforcement on small entities. It requires agencies to provide for waivers or reductions in civil penalties imposed on small businesses. Furthermore, it amends the Equal Access to Justice Act, 28 USC § 2412 (1994 & Supp 1996), to authorize court awards of attorneys fees to small businesses who violate the law if the penalty initially sought by the government is found to be unreasonable and substantially in excess of the final penalty levied.

<sup>54</sup> William Funk, *More Stealth Regulatory Reform*, 21 Admin & Reg L News 1 (Summer 1996).

<sup>55</sup> The Safe Drinking Water Act Amendments of 1996, Pub L No 104-182, 110 Stat 1613 (1996), codified at 42 USC § 300f et seq (1994 & Supp 1996), broadly supported by state and local officials, environmentalists, and industry groups, were approved unanimously in the Senate and by a 392-30 margin in the House. 1996 USCCAN 1366. The Food Quality Protection Act of 1996, Pub L No 104-170, 110 Stat 1489, codified at 7 USC § 136, 21 USC § 301 et seq (1994 & Supp 1996), passed unanimously in the House on July 23, 1996 and in the Senate the following day. 1996 USCCAN 1208.

<sup>56</sup> Sunstein, 48 Stan L Rev at 251 (cited in note 51).

tile to environmental concerns has confirmed the strength of public support for environmental regulation and the vitality of the existing regulatory infrastructure.<sup>57</sup> Yet, for reasons described below, initiatives to increase the flexibility of environmental regulation most likely will continue to be pursued.<sup>58</sup>

These efforts are being undertaken at a time when the federal judiciary has become less sympathetic toward environmental concerns. Despite doctrines of deference to administrative agencies, a judiciary more skeptical of regulation has struck down major environmental regulations by insisting that agencies provide greater and more specific evidentiary support for them. Important regulatory initiatives, such as the EPA's effort to phase out all remaining uses of asbestos, have been struck down on grounds that harken back to the common law's demand for detailed proof of particularized injury.<sup>59</sup> Despite broad citizen suit provisions in the environmental laws, the courts are showing signs of reviving common-law doctrines of legal injury as a predicate for recognition of standing to sue.<sup>60</sup> Judicial resuscitation of constitutional principles of state sovereignty now threatens to undermine national regulatory programs. For the first time in more than 60 years, the Supreme Court has struck down a federal regulatory program on the grounds that it exceeded the constitutional authority of Congress to regulate interstate commerce.<sup>61</sup> While this decision did not occur in an environmental case, lower courts may now insist on more particularized showings of interstate impact to uphold federal environmental regulations<sup>62</sup> and

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<sup>57</sup> See John H. Cushman, Jr., *G.O.P. Backing Off From Tough Stand Over Environment*, NY Times A1 (Jan 26, 1996); *The Environmental Counterattack*, NY Times A14 (Feb 5, 1996).

<sup>58</sup> Timothy Noah, *Both Parties Paint Themselves Green, but Trend of Looser Environmental Rules Is Seen Continuing*, Wall St J A18 (Sept 9, 1996).

<sup>59</sup> *Corrosion Proof Fittings v EPA*, 947 F2d 1201, 1215 (5th Cir 1991).

<sup>60</sup> See, for example, *Public Interest Research Group of New Jersey, Inc. v Magnesium Elektron, Inc.*, 123 F3d 111 (3rd Cir 1997); *Friends of the Earth, Inc. v Crown Central Petroleum*, 95 F3d 358, 360 (5th Cir 1996).

<sup>61</sup> *United States v Lopez*, 514 US 549, 567-68 (1995).

<sup>62</sup> In *United States v Olin Corp.*, 927 F Supp 1502 (S D Ala 1996), a federal district judge refused to approve a consent decree covering a \$10.4 million cleanup of soil and groundwater contamination at the site of a chemical plant that had been closed in 1982. Id at 1503-04. The judge found that *Lopez* required him to dismiss the case. While he conceded that application of CERCLA to an operating chemical plant could involve the regulation of economic activity that "substantially affects" interstate commerce under *Lopez*, he concluded that because the plant that caused the contamination had been closed in 1982, the application of CERCLA to the site cleanup did not involve regulation of "economic activity" or "commerce," permissible under the Commerce Clause. Id at 1532. Rather the case involved only "clean-up of real property," which "has been traditionally a

some courts have struck down such regulations for infringing on state sovereignty.<sup>63</sup> By requiring more detailed demonstrations of causal injury or effects on interstate commerce, these decisions make it more difficult to achieve the law's promise of preventative regulation, resurrecting the very deficiencies of the common-law that public law sought to overcome.

## II. LESSONS FROM THE HISTORY OF ENVIRONMENTAL REGULATION

At present, there is a remarkable burst of interest in "re-thinking" or "reinventing" the next generation of environmental regulations. More than a dozen major initiatives involving government officials, academics, industry groups, and think tanks are underway to help design new approaches to environmental policy.<sup>64</sup> Several major reports addressing these issues already

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local matter falling under the police power of the states." *Id.* The judge went on to suggest that CERCLA exceeds congressional authority because it does not have any "jurisdictional element" that ensures "through case-by-case inquiry" that it affects interstate commerce. *Id.* at 1533. Even if it had such a provision, he declared, "the particular inquiry in this case clearly demonstrates that the activity in question has virtually no effect on interstate commerce" because the contamination mostly affects a "locally-contained alluvial aquifer" and "there is no evidence that contaminants at [the site] travel across state lines." *Id.* This decision subsequently was reversed on appeal. *United States v Olin Corp.*, 107 F3d 1506 (11th Cir 1997).

<sup>63</sup> See, for example, *ACORN v Edwards*, 81 F3d 1387 (5th Cir 1996) (voiding requirement that states establish remedial programs for removal of lead contamination from school and day-care drinking water systems on grounds that it violated the Tenth Amendment).

<sup>64</sup> Former EPA administrator William Ruckelshaus is currently chairing a policy forum called Enterprise for the Environment, which includes representatives from industry, government, and environmental groups. Coordinated by the Center for Strategic & International Studies and the National Academy of Public Administration, the project is seeking "to build a broad, durable, bipartisan consensus for comprehensive reform and improvement of the environmental management system and the economic policies that drive public and private decisions affecting the environment." Enterprise for the Environment, *The Enterprise for the Environment Summary 2* (draft paper, June 3, 1996). The EPA has convened a workgroup on Reinventing EPA & Environmental Policy and the agency has responded to a National Academy of Public Administration report by setting up a Statutory Integration Project that is gathering more information "on the need for and possible mechanisms for better integrating environmental statutes." EPA, *EPA Reinvention Activity Fact Sheets: Statutory Integration Project* (June 1, 1997) <[www.epa.gov/ooaujeag/old.reinvent.pages/stip.htm](http://www.epa.gov/ooaujeag/old.reinvent.pages/stip.htm)>. Yale Law School convened more than a dozen expert panels to consider similar issues in what it calls The Next Generation Project. Marian R. Chertow and Daniel C. Esty, *Thinking Ecologically: The Next Generation of Environmental Policy* (Yale 1997). The Aspen Institute ("Environment in the 21st Century"), Resources for the Future ("The Alternative Path"), and the National Environmental Policy Institute also are involved in similar projects. *The Alternative Path: States, Issues, and Concerns*, (Resources for the Future 1996).

have been completed, including studies by the National Academy of Public Administration,<sup>65</sup> the Office of Technology Assessment,<sup>66</sup> and the President's Council on Sustainable Development.<sup>67</sup> The intense interest in this subject may make this an auspicious time to consider what can be learned from past experience with environmental regulation and how these lessons can be applied to improve future regulatory policy.

After more than a quarter century of experience with comprehensive, national regulatory programs to protect the environment, the United States now has a rich history that offers valuable lessons for shaping future regulatory policy. Outlined below are some observations from this history that may be relevant to guide the development of future policy.

#### A. Regulatory Priorities

One important lesson from the history of environmental regulation is that it has been far easier for regulatory policy to respond to acute incidents of highly visible harm than to problems caused by low-level, chronic exposures. This is well illustrated by early federal efforts to prevent steamship boilers from exploding and to phase out the use of white phosphorus in match manufacturing. The availability of scientific knowledge is an important influence on regulatory priorities, but public awareness of risk is an even more potent factor in the priority-setting process. Despite general knowledge concerning the toxicity of lead, the federal government responded much more rapidly to problems of exploding steamship boilers and workers whose jaws were disintegrating than it did to massive childhood lead poisoning from lead-based paint, lead in gasoline, and other chronic exposures. History demonstrates that regulatory attention is far less likely to be devoted to chronic, low-level environmental hazards than it is to acute, highly visible incidents that grab the headlines.

To be sure, the deaths of workers producing tetraethyl lead in the 1920s briefly focused the attention of public health authorities on the potential long-term health effects of lead in gasoline.

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<sup>65</sup> National Academy of Public Administration, *Setting Priorities, Getting Results: A New Direction for EPA* (1995).

<sup>66</sup> U.S. Congress, Office of Technology Assessment, *Environmental Policy Tools: A User's Guide* (GPO 1995).

<sup>67</sup> The President's Council on Sustainable Development, *Sustainable America: A New Consensus* (GPO 1996).

Public alarm provided an opportunity for the Surgeon General's Conference to consider whether to stop the release of a toxic metal that ultimately produced widespread poisoning in a largely invisible manner. Unfortunately, public health authorities were unable to prove that lead additives would produce such harm and they failed to monitor adequately the long-term effects of the lead emissions. For nearly fifty years, virtually no research was performed, independent of that conducted by the lead industry. Ironically, the Surgeon General's Conference created an unwarranted perception that the safety of lead additives had been settled, at least for purposes of regulatory decisionmaking.

The myopic tendency of regulatory policy to overlook the effects of long-term, chronic exposures in favor of responding to the headline-grabbing crisis of the moment is well documented. Indeed, it was almost by coincidence that regulatory attention eventually focused on the health effects of lead additives. The initial EPA restrictions on the use of leaded gasoline were a response to the need to protect catalytic converters, rather than humans, from the effects of lead.<sup>68</sup> Similarly, the eventual decision to reduce drastically lead levels in gasoline was set in motion by frustration with the misfueling problem, as much as by concern over the health effects of lead emissions.<sup>69</sup>

Reviewing the history of occupational health, Henry Selleck notes that "the biggest steps toward protection of life and limb have stemmed from the greatest tragedies—a war, a holocaust, a disaster that rouses human indignation and starts a public clamor for drastic action."<sup>70</sup> Dan Farber accounts for the ability of legislators to enact environmental laws that appear to overcome collective action problems by using the concept of "republican moments."<sup>71</sup> The history of environmental law seems to suggest that Congress and the EPA respond to perceived crises that demand public attention: for example, CERCLA<sup>72</sup> was enacted in response to Love Canal and other incidents generating widespread public concern over uncontrolled hazardous waste sites;

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<sup>68</sup> Warren T. Piver, *Potential Dilemma: The Methods of Meeting Automotive Exhaust Emission Standards of the Clean Air Act of 1970*, 8 *Envir Health Persp* 165, 166 (1974).

<sup>69</sup> Alvin Alm, *The Multimedia Approach to Pollution Control: An Impossible Dream?*, in National Research Council, *Multimedia Approaches to Pollution Control: Symposium Proceedings* 114 (NRC 1987).

<sup>70</sup> Henry B. Selleck, *Occupational Health in America* 36 (Wayne State 1962).

<sup>71</sup> Daniel A. Farber, *Politics and Procedure in Environmental Law*, 8 *J L Econ & Org* 59 (1992).

<sup>72</sup> Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Pub L No 96-510, 94 Stat 2767, codified at 42 USC § 9601 et seq (1994).



the origins of the Emergency Planning and Community Right-to-Know Act<sup>73</sup> can be traced to the Bhopal tragedy; and the Exxon Valdez oil spill broke more than a decade of legislative gridlock and produced the Oil Pollution Act of 1990.<sup>74</sup>

In light of the reactive nature of much environmental legislation, the EPA's discovery that its priorities are more in line with the public's perception of risk than with experts' comparative risk assessments is hardly surprising.<sup>75</sup> But it does not necessarily follow that placing more emphasis on comparisons of quantitative risks will dramatically improve regulatory priority-setting. Many scientists believe that too much emphasis already has been placed on controlling more easily quantifiable cancer risks than on regulating other environmental health risks. This may be a product of regulatory policy's increasing emphasis on risk assessment, since techniques for quantitative assessments of risk are better developed for cancer than for neurological, reproductive, or developmental risks. While regulators often assume that regulations to protect against cancer will also protect against other health risks, scientists are now beginning to question the accuracy of such assumptions.<sup>76</sup>

Data limitations also make the use of comparative risk assessments problematic. The EPA's *Unfinished Business* study found that it was virtually impossible to perform any rigorous, quantitative assessments of risks other than cancer.<sup>77</sup> While the agency attempted to provide rough qualitative rankings of cancer and non-cancer health effects, ecological risks and risks of economic damage, it found that data were simply inadequate to perform rigorous risk assessments of most existing problems and that even rough rank-orderings were virtually impossible for new activities such as biotechnology and new toxic chemicals.<sup>78</sup> The study found serious conceptual difficulties in comparing risks

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<sup>73</sup> Emergency Planning and Community Right-to-Know Act of 1986, Pub L No 99-499, 100 Stat 1729, 42 USC § 11001 et seq (1994).

<sup>74</sup> Pub L No 101-380, 104 Stat 486, codified at 33 USC § 2701 et seq (1994). See Daniel C. Esty, *What's the Risk in Risk?* 13 Yale J Reg 603, 608 (1996) (reviewing the explanations of John D. Graham and Jonathan B. Wiener, *Risk versus Risk: Tradeoffs in Protecting Health and the Environment* (Harvard 1995), for why misguided risk comparisons are so frequent).

<sup>75</sup> EPA, *Unfinished Business: A Comparative Assessment of Environmental Problems* (EPA 1987); EPA Science Advisory Board, *Reducing Risk: Appendix A* (EPA 1990).

<sup>76</sup> See, for example, Ann Gibbons, *Reproductive Toxicity: Regs Slow to Change*, 254 Science 25 (1991).

<sup>77</sup> EPA, *Unfinished Business* at xvi, 98 (cited in note 75).

<sup>78</sup> *Id* at 99.

that are fundamentally different in character (for example, comparing ecological risks to cancer risks and comparing risks of damage to developmental, immunological, reproductive, or respiratory systems). It also concluded that environmental exposure data were surprisingly poor.<sup>79</sup>

The fact that environmental regulation has not yet succeeded in adopting a "worst first" approach to priority setting does not imply that the environmental and health risks it has addressed are massively overregulated. Regulatory agencies have had enormous difficulties in discharging even their most basic responsibilities, reducing the danger that any agency would overreact to truly trivial risks. However, resistance from politically influential industries has kept some significant risks from being controlled, producing legitimate complaints about regulatory priorities.

Most criticisms of regulatory priorities fall into one of three categories: (1) complaints about the high cost of remediating environmental contamination after it has occurred, (2) criticisms of regulations that control substances or activities that have trivial or non-unique benefits, or (3) criticisms of regulations that respond to risks whose involuntary character renders them particularly offensive to the public. Most of the regulations that are the targets of these criticisms can be understood as rational responses to risk rather than as products of forces inexorably producing massive overregulation. First, the extraordinarily high cost of cleaning up environmental contamination largely reflects the relatively primitive state of remediation technology and counsels in favor of making greater efforts to prevent environmental releases before they occur. Second, even very tiny risks are not worth accepting if they produce trivial benefits (such as color additives covered by the color additives Delaney Clause).<sup>80</sup> Third, the fact that people voluntarily incur some risks that are substantially larger than those targeted by environmental regulation, does not make those regulations irrational. Individuals are willing to accept greater degrees of risk from activities that they can choose to avoid (voluntary risks) than from those that they have little or no choice about (involuntary risks). Risk has been defined as "the sum of hazard and outrage" because voluntariness, control, and fairness are important components of how the public assesses the acceptability of risk.<sup>81</sup> Thus, it is

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<sup>79</sup> Id at 18-19.

<sup>80</sup> Food, Drug, and Cosmetic Act, 21 USC § 376(b)(5)(B) (1994). See *Public Citizen v Young*, 831 F2d 1108 (DC Cir 1987).

<sup>81</sup> Peter M. Sandman, *Risk Communication: Facing Public Outrage*, EPA J 21-22

appropriate to question whose behavior is more irrational: the public or the risk manager who "continues to ignore these factors—and continues to be surprised by the public's response of outrage."<sup>82</sup>

## B. The Costs and Benefits of Environmental Regulation

Critics argue that environmental regulation has been grossly inefficient.<sup>83</sup> They are particularly critical of the use of command-and-control and technology-based regulation in the major pollution control statutes.<sup>84</sup> These criticisms tend to overlook several factors that should be considered when dispassionately assessing the merits of the current regulatory infrastructure. First, from an evolutionary perspective, the initial choice of a regulatory strategy that required broadly-based emissions reductions may not have been such a bad investment. Former EPA administrator Russell Train maintains that the pollution problems facing the country in the early 1970s were sufficiently grave that virtually any approach that produced emissions reductions was a worthwhile first step.<sup>85</sup> As Carol Rose has argued, regulatory strategies that employ command-and-control approaches initially are likely to have lower administrative costs than are emissions trading schemes, at least until the pressures of resource use reach a certain level.<sup>86</sup> Thus, it may have made good sense to emphasize a command-and-control regulatory approach to achieve the initial reductions in emissions.<sup>87</sup>

Second, claims that environmental regulation has paid inadequate attention to cost considerations frequently are exaggerated,

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(Nov 1987).

<sup>82</sup> Id at 22.

<sup>83</sup> See, for example, Bruce A. Ackerman and Richard B. Stewart, *Reforming Environmental Law*, 37 Stan L Rev 1333 (1985); Cass R. Sunstein, *Administrative Substance*, 1991 Duke L J 607; Richard H. Pildes and Cass R. Sunstein, *Reinventing the Regulatory State*, 62 U Chi L Rev 1, 96 (1995).

<sup>84</sup> Ackerman and Stewart, 37 Stan L Rev at 1334-40 (cited in note 83); Sunstein, *Administrative Substance*, 1991 Duke L J at 627-31 (cited in note 83); Pildes and Sunstein, 62 U Chi L Rev at 96-99 (cited in note 83).

<sup>85</sup> Status of the Programs and Policies of the Environmental Protection Agency, Hearing before the Subcommittee on Environmental Pollution of the Senate Committee on Public Works, 95th Cong, 1st Sess 9 (1977) (Statement of Russell E. Train, Administrator, EPA).

<sup>86</sup> Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 Duke L J 1, 14-24.

<sup>87</sup> See, for example, Thomas W. Zosel, *Is Integrated Legislation A Good Idea? Necessary? Desirable? Possible?*, in Resources for the Future, *Materials for a Conference on Integrated Environmental Legislation* (June 3, 1996).

sometimes woefully. Environmental law is rarely cost-blind; cost considerations inevitably are factored into regulatory decisions at some level. Some environmental statutes explicitly require regulators to balance costs and benefits.<sup>88</sup> Others require that economic feasibility be considered when standards are developed.<sup>89</sup> Even the laws that demand that health-based goals be set without consideration of costs<sup>90</sup> generally permit costs to be considered in determining how to pursue these goals. For example, while the Clean Air Act requires that national ambient air quality standards ("NAAQSs") be established without consideration of costs, states may and do consider costs in crafting their implementation plans for achieving them.<sup>91</sup>

Since 1981, it has been the official policy of the executive branch of the federal government to require agencies to consider the costs and benefits of major regulatory decisions except where prohibited by law.<sup>92</sup> Statutes that explicitly forbid consideration of costs are extremely rare. The classic examples of cost-blind statutes are the Delaney Clauses of the Federal Food, Drug and Cosmetic Act, which ban the use of carcinogenic food or color additives in processed foods,<sup>93</sup> and Section 112 of the Clean Air Act, governing emissions standards for hazardous air pollutants.<sup>94</sup> The color additives Delaney Clause can be understood as representing a kind of global cost-benefit judgment by Congress that the unique benefits of any particular color additive are likely to be so trivial as to not make it worth weighing costs and benefits. In the rare case when application of the food additives Delaney Clause threatened to have substantial economic im-

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<sup>88</sup> See, for example, Toxic Substances Control Act, 15 USC § 2605 (1994); Federal Insecticide, Fungicide, and Environmental Rodenticide Control Act, 7 USC § 136a(d) (1994).

<sup>89</sup> See Clean Water Act, 33 USC § 1311(b)(2)(A) (1994); Occupational Safety and Health Act, 29 USC § 655(b)(5) (1994) ("OSH Act"). See also *United Steelworkers of America v Marshall*, 647 F2d 1189, 1264-65 (DC Cir 1980) (stating that feasibility limitation in OSH Act requires consideration of economic as well as technological feasibility).

<sup>90</sup> See Clean Air Act, 42 USC § 7409 (1994); Safe Drinking Water Act, 42 USC § 300g-1(b)(3)(5) (1994).

<sup>91</sup> *Natural Resources Defense Council v EPA*, 902 F2d 962, 972-73 (DC Cir 1990) (stating that once a requisite exposure level is determined, cost can be considered in reaching that level).

<sup>92</sup> Executive Order 12,291, 3 CFR 127 (1981); Executive Order 12,866, 3 CFR 638 (1993).

<sup>93</sup> 21 USC § 376(b)(5), (8).

<sup>94</sup> 42 USC § 7412.

pact,<sup>95</sup> Congress promptly changed the law to bar its application to pesticide residues on processed foods.<sup>96</sup>

Indeed, regulations that threaten to impose truly draconian costs almost inevitably are blocked or modified before taking effect. For example, one of the primary targets of Richard Epstein's criticisms of environmental regulation—the mandatory employer trip reduction requirements of the 1990 Clean Air Act Amendments—is a program that was repealed by Congress before taking effect.<sup>97</sup> The RCRA hazardous waste listing for wood-preserving chemicals that the Office of Management and Budget ("OMB") made famous by estimating that it would cost several trillion dollars per life saved never became effective; it was modified by the EPA in a manner that satisfied most of the industry's objections.<sup>98</sup>

Studies of the regulatory process have found that cost considerations do in fact influence decisions concerning health-based standards.<sup>99</sup> While some argue that it would be better to consider costs explicitly when setting standards,<sup>100</sup> ostensibly cost-blind standards can help stimulate the development of improved pollution control technology. Thus, they can be rationalized as important elements of efforts to ascertain where technology-forcing can be pursued with greatest promise. Regulations that con-

<sup>95</sup> Following the decision in *Les v Reilly*, 968 F2d 985 (9th Cir 1992) (EPA's refusal to revoke regulation permitting use of four pesticides as food additives on grounds that chemicals caused only de minimis risk found contrary to Delaney Clause), the EPA was faced with the prospect of having to revoke the tolerances for many widely-used pesticides that contained carcinogens. This helped produce the compromise legislation barring application of the Delaney Clause to pesticide residues on foods in the Food Quality Protection Act.

<sup>96</sup> Food Quality Protection Act of 1996 § 221, Pub L No 104-170, 110 Stat 1489, 1502.

<sup>97</sup> § 102, Pub L No 101-549, 104 Stat 2399, 2437, codified at 42 USC § 7511a(d)(1)(B), repealed by Pub L No 104-70, 109 Stat 773 (1995). See Richard A. Epstein, *Simple Rules for a Complex World* 283-85 (Harvard 1995).

<sup>98</sup> 57 Fed Reg 61492 (1992). See also *Standards for Wood Preserving Wastes to Become Less Stringent Under Final Rule*, 23 Envir Rptr (BNA) 1867 (1992).

<sup>99</sup> Marc K. Landy, Marc J. Roberts, and Stephen R. Thomas, *The Environmental Protection Agency: Asking the Wrong Questions* 49-88 (Oxford expanded ed 1994) (finding that cost considerations had a significant influence on the EPA's decision to relax the National Ambient Air Quality Standards ("NAAQSs") for ozone from 0.08 to 0.12 ppm); John P. Dwyer, *The Pathology of Symbolic Legislation*, 17 Ecol L Q 233, 251 (1990) (Despite clear indications that Congress intended to prohibit cost considerations in setting standards for hazardous air pollutants under Section 112 of Clean Air Act, EPA continues to weigh costs in setting standards.).

<sup>100</sup> George Eads, *The Confusion of Goals and Instruments: The Explicit Consideration of Costs in Setting National Ambient Air Quality Standards*, in Mary Gibson, ed, *To Breathe Freely: Risk, Consent, and Air* 222-32 (Institute for Philosophy & Public Policy 1985).

front industry with the prospect of substantial compliance costs create greater incentives for the development of cheaper control technology. Time and time again, after regulations have gone into effect, regulatory targets have proven able to do what they previously claimed was impossible when they were seeking to forestall the regulations. A study of industrial responses to regulation found that the stringency of regulation was "the most important factor influencing technological innovation."<sup>101</sup> For example, in the 1990 Amendments to the Clean Air Act, Congress mandated that gasoline be reformulated to burn more cleanly.<sup>102</sup> William Rosenberg, who was then EPA Assistant Administrator for Air, explained: "Three days before the conference committee finished its work, representatives from the oil industry said they couldn't make reformulated gas to meet the standard. Three days after they finished, Amoco started selling it on Pennsylvania Avenue."<sup>103</sup>

When health-based regulation has not succeeded in forcing the development of necessary technology within the time frame required for compliance, public policy inevitably permits deadline extensions or the relaxation of standards, as illustrated by the extensive non-compliance with the NAAQSs for ozone in many areas of the country. The Clean Air Act now explicitly allows differential compliance timeliness depending upon the severity of nonattainment in particular air quality control regions.<sup>104</sup> Thus, even laws that appear to require nationally uniform, health-based standards have been implemented in a manner that tolerates considerable regional variation in the severity of compliance timetables.<sup>105</sup>

As environmental regulation has matured, regulators and legislators have become more attuned to cost considerations. For example, the costs and benefits of the 1990 Amendments to the Clean Air Act were debated in great detail.<sup>106</sup> The fact that

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<sup>101</sup> See Nicholas A. Ashford, *Understanding Technological Responses of Industrial Firms to Environmental Problems: Implications for Government Policy*, in Kurt Fischer and Johan Schot, eds, *Environmental Strategies for Industry* 282 (Island 1993).

<sup>102</sup> Clean Air Act Amendments of 1990, Pub L No 101-549, 104 Stat 2399, 2488, codified at 42 USC § 7545(k) (1994).

<sup>103</sup> *Bush Signs Clean Air Act Amendments, Predicts Benefits for All U.S. Citizens*, 21 Envir Rptr (BNA) 1387 (1990).

<sup>104</sup> 42 USC § 7545(k)(2)(B).

<sup>105</sup> See James E. Krier, *On the Topology of Uniform Environmental Standards in a Federal System—And Why It Matters*, 54 Md L Rev 1226, 1231 (1995).

<sup>106</sup> See, for example, Paul R. Portney, *Economics and the Clean Air Act*, reprinted in 136 Cong Rec H 12916 (Oct 26, 1990).

Congress overwhelmingly approved the law despite warnings that it would produce double-digit billions in net costs suggests either that Congress disagreed with these estimates or that it decided that the legislation was worthwhile on other grounds.<sup>107</sup> In retrospect, Congress appears to have chosen wisely. The amendments' costs have been far less, and their benefits far greater, than initially forecast, as even some opponents of the legislation have now conceded.<sup>108</sup>

The prospective costs and benefits of environmental regulation are virtually always subject to considerable uncertainty. Many regulations produce environmental benefits that are difficult, if not impossible, to quantify. Thus, it is not surprising to find that benefits estimates are incomplete or not quantified for most environmental rules,<sup>109</sup> often making their costs seem greater than their benefits. Experience also has demonstrated that cost estimates are frequently overstated while benefits are understated for several reasons. First, it is in the strategic interest of regulatory targets to exaggerate prospective costs in an effort to avoid regulation. Some of the most striking evidence of exaggerated cost projections is provided by the precipitous decline in the cost of reducing sulfur dioxide emissions under Title IV of the Clean Air Act.<sup>110</sup> When the 1990 Amendments were debated, industry representatives projected that allowances to emit a ton of SO<sub>2</sub> could sell for \$1,000 to \$1,500 per ton based on their estimates of the cost of installing pollution control equipment to achieve the emissions reductions required by Title IV.<sup>111</sup> The EPA estimated that the reductions would cost around \$750 per ton; actual costs have proven to be substantially lower.<sup>112</sup> Early allowance sales were reported to have been made at prices ranging from \$250 to \$400 per allowance. When auctioned by the

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<sup>107</sup> See Robert M. Friedman, *Air Pollution Benefit-Cost Assessment*, 253 Science 607 (1991). See also Sidney A. Shapiro and Thomas O. McGarity, *Not So Paradoxical: The Rationale for Technology-Based Regulation*, 1991 Duke L J 729, 741-42 (arguing that it is rational for society to do its best to prevent harm to public health and the environment even if the resources devoted to pursuit of this goal exceed benefits predicted by the "willingness to pay" measure of value).

<sup>108</sup> Mobil Corporation, for example, states that it "opposed some of that legislation, because we thought it might be too costly for the consumer. In retrospect, we were wrong. Air quality is improving, at a cost acceptable to the motoring public." Mobil Corporation, Informational advertisement, NY Times A29 (Oct 27, 1994).

<sup>109</sup> Robert W. Hahn, *Achieving Real Regulatory Reform*, 1997 U Chi Legal F 143, 149.

<sup>110</sup> 42 USC § 7651 (1994).

<sup>111</sup> Michael E. Porter and Claas van der Linde, *Toward a New Conception of the Environment-Competitiveness Relationship*, 9 J Econ Persp 97, 108 (Fall 1995).

<sup>112</sup> *Id.*

Chicago Board of Trade, spot allowances sold for average prices of \$159 in 1994, \$132 in 1995, and \$68 in 1996.<sup>113</sup> The low prices for which emissions allowances are selling demonstrates that industry estimates of the costs of complying with Title IV were greatly exaggerated.<sup>114</sup>

Another reason why ex ante cost estimates are often too high is that regulation can stimulate technological innovations that dramatically reduce control costs. For example, prior to the decision to phaseout ozone-depleting chlorofluorocarbons ("CFCs"), there was little incentive for industry to search for alternative substances that did not harm the ozone layer. After regulatory policy required dramatic reductions in CFC use, alternatives were found much more quickly and at far lower cost than previously expected. In 1988, when the U.S. had agreed to reduce CFC production by 50% by 1998, EPA estimated that this would cost \$3.55 per kilogram.<sup>115</sup> Four years later, when the phasedown had been broadened to encompass a complete ban by the year 2000, compliance costs had plunged to \$2.20 per kilogram.<sup>116</sup> In similar fashion, the petroleum industry estimated in 1971 that phasing lead additives out of gasoline would cost \$7 billion per year.<sup>117</sup> In 1990, when 99 percent of the phaseout had been completed, costs had proven to be 95 percent less than estimated.<sup>118</sup>

In many cases the benefits of environmental regulation have been substantially understated by ex ante estimates because regulated substances have subsequently been discovered to have additional harmful effects or to cause harm at lower thresholds than previously thought. In the early 1970s, when the EPA promulgated its initial limits on levels of lead in gasoline, the

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<sup>113</sup> Id.

<sup>114</sup> Allowances have been selling for prices far below initial expectations because the cost of reducing SO<sub>2</sub> emissions has been much lower than expected. The price of low-sulfur coal has fallen due to improved mine productivity and reductions in the cost of transporting coal by rail. The cost of installing scrubbers also has fallen substantially. *Cyprus Amax Sees Many Reasons for SO<sub>2</sub> Price*, *Air Daily* 1 (Oct 25, 1995).

<sup>115</sup> EPA, Protection of Stratospheric Ozone, 53 Fed Reg 30604, 30607 (1988).

<sup>116</sup> EPA, Protection of Stratospheric Ozone, 57 Fed Reg 31242, 31259 (1992).

<sup>117</sup> William G. Rosenberg, *Clean Air Act Amendments*, 251 *Science* 1546, 1547 (1991).

<sup>118</sup> Id. Many other examples are available. Innovations that removed all emissions of VOC-releasing solvents during paint application significantly reduced compliance costs for regulations concerning emission of volatile compounds during paint application. A discovery by Aristech Chemical, which removed benzene from tar in the initial processing step, eliminated the need for costly gas blankets and produced net savings instead of a substantial cost increase in complying with regulations requiring reduction in emissions of benzene. Porter and van der Linde, 9 *J Econ Persp* at 107-108 (cited in note 111).



agency's goal was to keep lead levels in children's blood below 40 micrograms per deciliter.<sup>119</sup> Subsequently, research demonstrated that even substantially lower levels of exposure to lead cause significant harm to health.<sup>120</sup> As a result, the Centers for Disease Control has lowered what they considered to be the level of medical concern for lead exposure in 1975, 1985 and 1991, until it now stands at 10 micrograms per deciliter.<sup>121</sup> The EPA's 1984 cost-benefit analysis of lead phasedown did not consider the effects of lead exposure in boosting blood pressure in adult males.<sup>122</sup> When this factor was added to the agency's 1985 analysis, the net benefits of the regulation increased by more than five-fold.<sup>123</sup> In his book *Breaking the Vicious Circle*, Supreme Court Justice Stephen Breyer decries the cost of regulating mineral oil laden with polychlorinated biphenyls (PCBs) because it avoids "health risks considerably lower than those accompanying eating a raw mushroom."<sup>124</sup> However, while PCBs have long been regulated as a carcinogen, a recent study suggests that they also are powerful neurotoxins, reducing the IQs of children exposed neonatally.<sup>125</sup>

Benefits also may be underestimated because regulation can generate positive externalities that usually are not captured by traditional analyses. For example, a study by economists at the World Resources Institute finds that conventional measures of productivity fail to take into account productivity gains produced by environmental amenities.<sup>126</sup> The study concludes that these are substantial, particularly in certain industries.<sup>127</sup> If regulatory policy is to pay attention to adverse second-order effects, such as the health effects of reduced income due to the costs of regulation,<sup>128</sup> then it should also seek to trace the *positive* second-order effects of regulation that are not captured by conventional

<sup>119</sup> See *Ethyl Corp. v EPA*, 541 F2d 1, 38 (DC Cir 1976) (en banc).

<sup>120</sup> Herbert L. Needleman, ed, *Human Lead Exposure* 39, 239-40 (CRC 1992).

<sup>121</sup> Robert V. Percival, et al, *Environmental Regulation: Law, Science, and Policy* 631 (Little, Brown 2d ed 1996).

<sup>122</sup> *Id* at 563.

<sup>123</sup> *Id* at 565.

<sup>124</sup> Stephen Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* 17 (Harvard 1993).

<sup>125</sup> Robert Langreth, *Exposure Before Birth to PCBs Is Linked To Lower IQs in Children, Study Says*, Wall St J B10 (Sept 12, 1996).

<sup>126</sup> Robert Repetto, et al, *Has Environmental Protection Really Reduced Productivity Growth? We Need Unbiased Measures* (WRI 1996).

<sup>127</sup> *Id* at 15-19.

<sup>128</sup> See Frank B. Cross, *When Environmental Regulations Kill: The Role of Health/Health Analysis*, 22 Ecol L Q 729 (1995).

analysis. Regulations that prevent deaths undoubtedly reduce mental and emotional damage to families and friends of victims, though such effects typically are not factored into conventional benefits analyses.<sup>129</sup>

As more detailed studies of environmental regulation are completed, it is not surprising to find that environmental regulations are less costly and more beneficial than previously thought. An EPA study released in November 1995 estimates that the reductions in SO<sub>2</sub> emissions required by Title IV will produce annual health benefits in the eastern United States with a value ranging from \$12 billion to \$78 billion by the year 2010.<sup>130</sup> These reductions also are estimated to produce between \$290 million and \$1.87 billion in annual health benefits for Ontario and Quebec, Canada.<sup>131</sup> Most of these benefits are calculated to result from reductions in premature deaths (estimated at more than 9,600 per year) and reduced cases of chronic bronchitis (estimated at more than 14,500 per year).<sup>132</sup> These estimates do not even take into account the environmental benefits of reduced damage to forests, lakes, streams, and buildings and improved visibility. Because the costs of complying with Title IV are expected to be only \$2 billion to \$3 billion per year, the program now looks like a terrific bargain.<sup>133</sup>

In June 1996 the EPA released a draft analysis of its estimates of the overall costs and benefits of the Clean Air Act from 1970 to 1990.<sup>134</sup> The report found that the \$20 billion annual cost of the Act was producing total benefits of at least \$400 billion per year.<sup>135</sup> Thus, the agency concluded that in 1990 "Americans received roughly 20 dollars of value in reduced risks of death, illness, and other adverse effects for every one dollar

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<sup>129</sup> See *Metropolitan Edison Co. v People Against Nuclear Energy*, 460 US 766, 779 (1983) (holding that an environmental impact assessment by the Nuclear Regulatory Commission need not consider the psychological impact on local residents of restarting the nuclear power plant that is the companion to the plant where the Three Mile Island accident occurred).

<sup>130</sup> EPA, *Human Health Benefits from Sulfate Reduction Under Title IV of the 1990 Clean Air Act Amendments* S-8 (1995).

<sup>131</sup> *Id.* at S-6.

<sup>132</sup> *Id.* at S-5.

<sup>133</sup> Jessica Mathews, *Clean Sweeps: Two Success Stories for the Environment*, Wash Post A23 (Dec 18, 1995).

<sup>134</sup> EPA, *The Benefits and Costs of the Clean Air Act, 1970 to 1990* 10, 64 (draft, 1996). See also Gary Lee, *Clean Air Regulations Are Paying Off, EPA Says*, Wash Post A17 (June 10, 1996).

<sup>135</sup> EPA, *The Benefits and Costs of the Clean Air Act, 1970 to 1990* at 10, 64 (cited in note 134).

spent to control air pollution."<sup>136</sup> Overall, the EPA estimated that the nation had spent \$436 billion on air pollution control between 1970 and 1990, which had yielded \$6.8 trillion in benefits.<sup>137</sup> The agency found that air pollution controls extended the lives of 140,000 people each year, reducing heart attacks by 18,000 per year, strokes by 13,000, and cases of hypertension and respiratory illness by 15,000 and 16,000 per year.<sup>138</sup>

Even if some environmental regulations have had substantial net costs,<sup>139</sup> this does not mean that society's overall portfolio of investments in environmental regulation has yielded negative returns. Just like investors who face risk and uncertainty because market valuations of assets can change dramatically over time, regulators cannot determine in advance what the ultimate costs and benefits of regulatory action will be because they too can change dramatically over time. Portfolio theory suggests that a decision rule that only allows investments in "sure things" is not the best way to maximize returns for private investors; it also is not a good way to maximize social returns by insisting that regulatory policy should eschew preventative regulation unless it can be demonstrated prospectively to be a "sure thing."<sup>140</sup>

### C. The Uneasy Transition from Common Law to Preventative Regulation

Environmental law's swift transition from a decentralized system relying on common law principles to a federalized system dominated by national regulatory programs has generated tensions that contribute to some of the current resistance to environmental regulation. These include the tension between the common law's insistence on individualized proof of causal injury and

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<sup>136</sup> Lee, Wash Post at A17 (cited in note 134).

<sup>137</sup> Id.

<sup>138</sup> Id.

<sup>139</sup> For example, economist Robert W. Hahn challenges EPA's cost-benefit analysis of the Clean Air Act by arguing that since "three-fourths of the quantifiable benefits of air pollution controls result from reducing hazards from lead and particulate matter," then "the tens of billions of dollars aimed at reducing smog and carbon monoxide may have been a drain on the economy, thus hurting the average citizen." Robert W. Hahn, *The EPA's True Cost*, Wall St J A18 (June 27, 1996).

<sup>140</sup> See, for example, the discussion of portfolio theory in Stuart D. Root, *Suitability—The Sophisticated Investor—and Modern Portfolio Management*, 1991 Colum Bus L Rev 287, 347-51; Michael T. Johnson, *Speculating on the Efficacy of "Speculation": An Analysis of the Prudent Person's Slipperiest Term of Art in Light of Modern Portfolio Theory*, 48 Stan L Rev 419, 425-27 (1996) (investments with higher risks command higher expected returns).

the inherently probabilistic and uncertain nature of environmental consequences. Regulatory legislation sought to overcome this problem by dispensing with common law causation requirements and endorsing preventative regulation by expert administrative agencies. But this left open the question of how much, and what kind, of evidence agencies needed before they could regulate to prevent suspected harm. The judiciary's initial endorsement of preventative regulation<sup>141</sup> and its effort to encourage agencies to perform risk assessments<sup>142</sup> have helped improve the quality of agency decisionmaking. More recently, however, agencies have been subjected to excessively demanding analytic requirements. As a result, their efforts to achieve the environmental laws' ambitious promises of preventative regulation have become mired in persistent battles over burdens of proof and analytical thresholds.

The EPA and other agencies have had a disappointing track record in implementing environmental, health, and safety legislation. The complex judgments required by these regulatory statutes and the sheer volume of the responsibilities delegated to the agencies has strained limited agency resources. Thus, it is not surprising that only a handful of toxic substances have been regulated by the EPA under the Toxic Substances Control Act,<sup>143</sup> while the Occupational Safety and Health Administration ("OSHA") has fallen hopelessly far behind in the task of updating occupational exposure standards.<sup>144</sup> Budget constraints, turnover of technical staff, and the difficulty of obtaining information readily available to the regulated community make it extremely difficult for agencies to complete more than a handful of major rulemakings in any given year. Thus, nearly two decades after the enactment of comprehensive regulatory legislation it was reported that "[n]o health and safety agency has been able to promulgate regulations for more than three controversial chemicals in any given year."<sup>145</sup>

As Congress has continued to expand the regulatory responsibilities of agencies, the need for agencies to develop more efficient rulemaking procedures has grown more urgent. Yet agency efforts to use existing authorities to regulate in a more compre-

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<sup>141</sup> *Ethyl Corp.*, 541 F.2d at 13.

<sup>142</sup> *Industrial Union Department, AFL-CIO v. American Petroleum Institute*, 448 U.S. 607, 639-40 (1980) ("Benzene").

<sup>143</sup> Breyer, *Breaking the Vicious Circle* at 19 (cited in note 124).

<sup>144</sup> Sidney A. Shapiro and Thomas O. McGarity, *Reorienting OSHA: Regulatory Alternatives and Legislative Reform*, 6 Yale J. Reg. 1, 2-3 (1989).

<sup>145</sup> *Id.* at 3.

hensive fashion have met resistance in the courts. One approach for streamlining regulation would be to permit agencies to adopt interim standards based on substantially reduced information thresholds while the agency gathers the necessary data to determine at what levels final standards should be set. When OSHA was created, Congress realized that the Agency faced a mammoth task in promulgating regulations to protect workers from exposure to a plethora of workplace hazards. To ensure that workers were provided with at least a modicum of protection, Congress directed OSHA to adopt interim standards, without conducting rulemaking under the Administrative Procedure Act.<sup>146</sup> These national consensus standards were to be set at levels already established by a national standard-setting organization or already adopted by other federal agencies.<sup>147</sup> In 1971, OSHA adopted exposure limits for approximately 400 chemicals based largely on the Threshold Limit Values ("TLVs") adopted by the American Conference of Governmental Industrial Hygienists ("ACGIH") in 1968.<sup>148</sup>

Although Congress contemplated that OSHA would revise the interim standards to provide more protection to workers through normal rulemaking proceedings,<sup>149</sup> OSHA did not attempt to revise the standards to keep them up to date with changes in the ACGIH TLVs until 1989, long after the TLVs had been lowered for hundreds of the chemicals.<sup>150</sup> Yet OSHA's efforts to use generic rulemaking simply to update the standards to reflect changes made by the ACGIH were struck down in court, even though the agency estimated that the revisions would prevent 55,000 occupational illnesses and 683 deaths annually.<sup>151</sup>

OSHA's difficulties are largely a product of the seemingly modest analytical requirements imposed on the agency by the Supreme Court's decision in the *Benzene* case.<sup>152</sup> In the years that followed this decision, OSHA conducted five risk assess-

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<sup>146</sup> 29 USC § 655(a) (1994).

<sup>147</sup> *Id.*

<sup>148</sup> See Thomas O. McGarity and Sidney A. Shapiro, *Workers At Risk: The Failed Promise of the Occupational Safety and Health Administration* 123 (Praeger 1993).

<sup>149</sup> 29 USC § 655(b)(5) (1994).

<sup>150</sup> Department of Labor, Occupational Health and Safety Administration, Air Contaminants, 54 Fed Reg 2332 (Jan 19, 1989).

<sup>151</sup> *AFL-CIO v OSHA*, 965 F2d 962, 971-72, 975 (11th Cir 1992).

<sup>152</sup> *Benzene*, 448 US at 639. A bare plurality of the Court rejected OSHA's effort to lower the permissible exposure limit to benzene because OSHA had not performed a risk assessment demonstrating that the significant risks to workers would be appreciably reduced.

ments that confirmed its original conclusion that benzene posed extremely serious risks to workers.<sup>153</sup> The risk assessments indicated that workers exposed to benzene at levels permitted by the existing standard faced excess leukemia risks ranging from 44 to 152 per 1,000.<sup>154</sup> In 1987, OSHA finally adopted the very exposure limit struck down by the Supreme Court.<sup>155</sup> OSHA concluded that exposure to 10 ppm of benzene posed a risk of 95 additional leukemia deaths per 1,000 workers. This level of risk was much greater than other toxic substance risks OSHA had deemed significant (including arsenic, ethylene oxide, and ethylene dibromide) and was greater than the risk of accidental death in high- and average-risk industries (where death risks ranged from 30 to 3 in 1,000).<sup>156</sup> Due to judicial imposition of additional analytic requirements, it took OSHA more than ten years to lower the benzene standard to the very level the agency had sought to adopt on an emergency basis in 1977, delaying regulation that could have prevented the exposure of thousands of workers to very significant risks.

For more than a decade, the EPA spent enormous staff resources crafting a regulatory response to the risks posed by continuing uses of asbestos, a substance that has caused hundreds of thousands of deaths, particularly among workers exposed in occupational settings.<sup>157</sup> The agency ultimately decided that because exposure to asbestos was so difficult to control and because any exposure poses some risk of fatal disease, the most efficient regulatory approach was to phaseout virtually all remaining uses of asbestos, using its authority under the Toxic Substances Control Act ("TSCA").<sup>158</sup> The risks posed by asbestos were so high

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<sup>153</sup> Robert V. Percival, et al, *Environmental Regulation: Law Science and Policy* 512 (Little, Brown 2d ed 1996).

<sup>154</sup> Id.

<sup>155</sup> Department of Labor, Occupational Health and Safety Administration, Occupational Exposure to Benzene, 52 Fed Reg 34460 (Sept 11, 1987).

<sup>156</sup> OSHA estimated that the new PEL would prevent at least 326 deaths from leukemia and other blood diseases and that the actual number of deaths prevented would be considerably greater. See id.

<sup>157</sup> It is estimated that more than 21 million Americans have experienced occupational exposures to asbestos and that at least 200,000 of them will die by the end of the century from cancers caused by asbestos. Irving Selikoff, *Disability Compensation for Asbestos-Associated Disease in the United States* (Report to the Department of Labor, June 1981). When all diseases caused by asbestos are considered, it is estimated that 265,000 people in the United States will have died as a result of asbestos-related diseases by the year 2015. Paul W. MacAvoy, *The Economic Consequences of Asbestos-Related Disease* 37 (Working Paper No 27, 1982).

<sup>158</sup> EPA, Asbestos; Manufacture, Importation, Processing, and Distribution in Commerce Prohibitions, 54 Fed Reg 29460 (1989).

that the agency deliberately chose to focus only on the most easily quantifiable risks.<sup>159</sup> Even though the EPA believed that its quantitative risk assessment substantially underestimated the true risks of continued asbestos use, perhaps by an order of magnitude, it thought that it could demonstrate that the risk warranted regulation. However, this regulation was struck down by the U.S. Court of Appeals for the Fifth Circuit in *Corrosion Proof Fittings v EPA*.<sup>160</sup> The court focused only on the risks the EPA chose to quantify, disaggregated them on a product-by-product basis, and faulted the agency for failing to provide detailed assessments of the costs and benefits of less stringent alternatives.<sup>161</sup> The *Corrosion Proof Fittings* decision illustrates how extraordinary the barriers to regulation are today when a substance that is the paradigmatic candidate for a TSCA product ban cannot be phased out.<sup>162</sup>

These and other decisions indicate that the implications of the shift in regulatory policy away from a common law system requiring individualized proof of causal injury to one dominated by precautionary regulation have not been fully appreciated. Courts are undermining the laws' promise of preventative regulation not only by demanding increasingly detailed analytical support for regulation, but also by requiring more particularized showings of harm before citizens are granted standing to enforce the environmental laws.<sup>163</sup> Despite doctrines of judicial deference, courts are rejecting, or requiring more detailed support for, legislative and executive judgments concerning potential to cause environmental harm.<sup>164</sup> And the Supreme Court's reshaping of

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<sup>159</sup> *Id.*

<sup>160</sup> 947 F2d 1201 (5th Cir 1991).

<sup>161</sup> *Id.* at 1215.

<sup>162</sup> See the discussion of the costs and benefits of the asbestos ban in Lisa Heinzerling, *Political Science*, 62 U Chi L Rev 449, 463-64 (1995).

<sup>163</sup> This is occurring both with respect to the injury-in-fact and redressability prongs of the standing doctrine. See, for example, *Friends of the Earth, Inc. v Crown Central Petroleum Corp.*, 95 F3d 358, 361-62 (5th Cir 1996) (denying standing to environmental group to bring citizen suit against petroleum refinery 18 miles upstream from where members recreate; court suggests that plaintiffs should present water samples or expert testimony demonstrating that the actual pollutants discharged are in the waters they use); *Louisiana Environmental Action Network v Browner*, 87 F3d 1379, 1382-84 (DC Cir 1996) (one national and two local environmental organizations denied standing to challenge regulations governing EPA approval of state air pollution control programs on the ground that the groups had not shown "an injury sufficiently imminent and concrete" because there was no showing that EPA approval of inadequate state standards was imminent; court also raised the possibility that even a showing that group members would breathe more polluted air would not be sufficient for standing because "it is difficult to imagine a grievance more generalized than one shared by all persons who breathe . . .").

<sup>164</sup> *Lucas v South Carolina Coastal Council*, 505 US 1003, 1031 (1992) (demanding

constitutional doctrines underpinning federalism may make individual demonstrations of effects on interstate commerce necessary before certain kinds of environmental regulations can be enforced.<sup>165</sup>

### III. THE FUTURE OF ENVIRONMENTAL REGULATION

As noted above, more than a dozen different initiatives are underway to rethink the future of environmental regulation. Preliminary results from these initiatives point to the emergence of some common themes. First, there seems to be a fair amount of consensus that the first generation of environmental laws and regulations has been generally successful, and that we are now in a position to make substantial improvements in regulatory policy. Second, there is a growing willingness to experiment with new approaches to regulation that promise improved environmental performance in return for greater flexibility. Lessons derived from past regulatory history suggest the following five principles that should be used to shape future policy.

#### A. Greater Effort Should Be Devoted to Defining Environmental Policy Goals

One of the frustrations with environmental policy has been society's inability to agree on clear goals. This is partly a product of the reactive manner in which the regulatory infrastructure was constructed. The environmental laws incorporate necessarily ambiguous directives to "protect human health and the environment,"<sup>166</sup> prevent "unreasonable risk,"<sup>167</sup> avoid "unreasonable adverse effects,"<sup>168</sup> and "create and maintain conditions under which man and nature can exist in productive harmony."<sup>169</sup> In the rare instance in which a law specifies a clear goal—the Clean Water Act's goals of "fishable, swimmable" waters by 1983 and

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that harms sought to be prevented by regulations preventing development of real estate be shown to constitute a common law nuisance before a takings claims can be avoided); *Dolan v City of Tigard*, 512 US 374, 391 (1994) (striking down an exaction of property rights sought as a condition to approving a development permit for failure to "make some sort of individualized determination that the required dedication is related both in nature and extent to the impact of the proposed development.").

<sup>165</sup> See, for example, *Leslie Salt Co. v United States*, 55 F3d 1388, 1392 (9th Cir 1995), cert denied as *Cargill, Inc. v United States*, 116 S Ct 407, 409 (1995) (Thomas dissenting).

<sup>166</sup> Solid Waste Disposal Act, 42 USC § 6902(a)(4) (1994).

<sup>167</sup> Clean Air Act, 42 USC § 7411(j)(1)(A)(iii) (1994).

<sup>168</sup> Federal Insecticide, Fungicide and Rodenticide Act, 7 USC § 136a(a) (1994).

<sup>169</sup> National Environmental Policy Act, 42 USC § 4331(a) (1994).



the prohibition of the "discharge of toxic pollutants in toxic amounts"—they have been widely derided as hopelessly unrealistic.<sup>170</sup> While legislative reluctance to specify more specific goals and benchmarks in the regulatory statutes is understandable, agencies undoubtedly can do a better job of defining what they are seeking to achieve through the implementation of the environmental statutes. The EPA already is moving in this direction,<sup>171</sup> and such efforts should become an important part of future policy as a means for evaluating agency performance.

#### B. The Best Approach to Regulation is a Mix of Regulatory Tools—No Single Approach is Superior in All Contexts

An important consequence of the fragmented structure of the environmental laws is that different regulatory approaches are applied to different problems. As a result, we have acquired substantial experience with a variety of regulatory tools and we now know a considerable amount about their advantages and drawbacks. This experience suggests that the best approach to regulation is to employ a mix of regulatory strategies that varies depending upon the problem being addressed and the relative importance of the various values served by each approach.

Shortly before it was abolished by the 104th Congress, the Office of Technology Assessment ("OTA") prepared a comprehensive review of the advantages and disadvantages of alternative approaches to environmental regulation.<sup>172</sup> OTA identified seven criteria for comparing regulatory tools<sup>173</sup> and factors for assessing how well various regulatory tools satisfy these criteria. OTA found that no single set of regulatory tools scored highly on each of the criteria.<sup>174</sup>

For example, if the primary concern of regulatory policy is assurance that specific environmental goals will be met, harm-based standards, design standards, technology specifications and

<sup>170</sup> 33 USC § 1251(a)(2), (3) (1994).

<sup>171</sup> EPA, *Proposed Environmental Goals for America with Benchmarks for the Year 2005* (1995).

<sup>172</sup> U.S. Congress, Office of Technology Assessment, *Environmental Policy Tools: A User's Guide* (GPO 1995).

<sup>173</sup> These criteria included: (1) their cost-effectiveness and fairness, (2) the implementation demands they place on government, (3) the degree of assurance of meeting goals that they provide, (4) the extent to which they promote pollution prevention and (5) environmental justice and equity, (6) their adaptability to new information or new technology, and (7) their effect on technological innovation and diffusion. *Id.* at 23.

<sup>174</sup> *Id.* at 198-200.

product bans are effective tools.<sup>175</sup> However, they may not be very cost-effective or adaptable to change, particularly when compared to tradeable emissions schemes, challenge regulation, and informational approaches.<sup>176</sup> Harm-based standards also place considerable implementation burdens on government regulators.<sup>177</sup> While informational approaches place the least burden on regulators, they do not provide as much assurance of meeting environmental performance targets.<sup>178</sup> Thus, the report concluded that the best mix of regulatory tools will vary depending upon the problem being addressed and the relative importance attached to each criterion.<sup>179</sup>

This is sound advice. Policymakers should try to select policy tools for responding to a particular problem by considering how important it is to set a fixed environmental performance target, whether the problem is sufficiently localized to require a source specific response, and what is the availability and cost of monitoring technology. They should also consider the magnitude and variability of the costs that will be imposed on regulatory targets, the difficulty of implementing various approaches, and whether our understanding of the problem and the technology available for controlling it is likely to improve significantly in the future. In many cases, the best strategy is a mix of approaches that combines clear regulatory targets with incentives to achieve improved performance at lower cost. This is consistent with the conclusion of the President's Council on Sustainable Development, which found that "[b]asic standards of performance that are clear, fair, and consistently enforced remain necessary," but recommended that "the system should provide enhanced flexibility in return for superior environmental performance."<sup>180</sup>

### C. Regulatory Policy Should be More Sensitive to the Costs and Benefits of Analytic Requirements in Order to Avoid "Paralysis by Analysis"

Analytical requirements always have substantial theoretical appeal. After all, who can oppose the notion that regulatory deci-

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<sup>175</sup> Id at 199.

<sup>176</sup> U.S. Congress, Office of Technology Assessment, *Environmental Policy Tools* (cited in note 172).

<sup>177</sup> Id.

<sup>178</sup> Id.

<sup>179</sup> Id at 200.

<sup>180</sup> President's Council on Sustainable Development, *Sustainable America: A New Consensus* v (GPO 1996).

sions should be based on consideration of the highest quality information available? Yet the principle of diminishing returns applies to information-gathering and analytical requirements as well. At some point, the expense and delay occasioned by gathering and considering additional information is more costly than the value of the additional analysis.<sup>181</sup> Despite the enormous informational and analytic demands now placed on agencies by statute, internal agency procedures, executive oversight, and the courts, some proponents of "regulatory reform" seek to bury agencies with additional requirements as an explicit strategy for braking federal regulation. If adopted, these proposals would exacerbate the already serious problem of ossification of the rulemaking process.<sup>182</sup>

This is not to suggest that risk assessment should be abandoned, but rather that it should be employed in a genuine effort to improve the quality of regulation, rather than as a disguised tool for creating regulatory gridlock. President Clinton's executive order on Regulatory Planning and Review<sup>183</sup> employs a more sensible approach than previous administrations by recognizing that regulatory analysis will be most useful if applied in a selective fashion. The executive order directs agencies to "consider, to the extent reasonable, the degree and nature of the risks posed by various substances or activities within its jurisdiction," as a means for setting regulatory priorities.<sup>184</sup> But it does not require that risk assessments be conducted for all regulations; nor does it require that all regulations be submitted to OMB for review. Instead, the thrust of the executive order is to require such analysis and review only for the most significant regulatory initiatives.<sup>185</sup>

The need to be more sensitive to the costs of analytic requirements was recognized by the National Commission on Risk Assessment and Risk Management in its June 1996 report.<sup>186</sup> The Commission recommended that agencies adopt a more com-

<sup>181</sup> See Daniel A. Farber, *Revitalizing Regulation*, 91 Mich L Rev 1278, 1294-95 (1993).

<sup>182</sup> See Thomas O. McGarity, *Some Thoughts on "Deossifying" the Rulemaking Process*, 1992 Duke L J 1385. For an empirical study demonstrating the extent of ossification in Clean Air Act rulemakings, see Steven J. Groseclose, *Reinventing the Regulatory Agenda: Conclusions from an Empirical Study of EPA's Clean Air Act Rulemaking Progress Projections*, 53 Md L Rev 521 (1994).

<sup>183</sup> Executive Order 12,866, 3 CFR 638 (1993).

<sup>184</sup> § 1(b)(4), *Id.* at 639.

<sup>185</sup> § 6(a)(3), *Id.* at 645.

<sup>186</sup> Curt Suplee, *Panel Criticizes Government's Regulation of Health Risks*, Wash Post A23 (June 14, 1996).

prehensive and coordinated approach to risk management than the current "chemical-by-chemical, medium-by-medium, risk-by-risk strategy."<sup>187</sup> The Commission decried the "paralysis by analysis" that has frequently delayed regulatory action because of uncertainties in assessment of risks and it recommended that agencies be given greater freedom to concentrate on the most serious problems.<sup>188</sup> The Commission's report opposed most of the regulatory reform agenda promoted in the 104th Congress, including proposals to subject regulatory decisions to greater judicial scrutiny and to mandate compliance with cost-benefit criteria.<sup>189</sup> It argued that because courts "are not best equipped to assess in detail and delve deeply into the technical science that supports much agency decisionmaking," increased judicial review could "prematurely disrupt" regulatory actions.<sup>190</sup> While supporting the consideration of economic factors in regulatory decisions, the Commission concluded that cost-benefit analysis should not be "an overriding determinant of risk management decisions."<sup>191</sup>

#### D. Opportunities to Improve Both the Fairness and Efficiency of Existing Regulatory Programs Should Be Embraced Whenever Consistent With Program Goals

Environmental policy should seize opportunities to improve the fairness and efficiency of existing regulatory programs whenever this can be accomplished without undermining program goals. Advocates of more efficient regulatory policies often have foundered because of their refusal to address the distributional consequences of their proposals. Measures that create a larger pie are not likely to be adopted, if the pie benefits a few at the expense of many. Thus, the pursuit of measures to make regulatory policy more efficient should be linked directly to measures to make its benefits more broadly available.

There are several encouraging signs of movement in this direction. Regulatory policy increasingly is turning to informational approaches that help harness the power of informed consumers to promote environmental protection.<sup>192</sup> Consensus envi-

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<sup>187</sup> Id.

<sup>188</sup> Id.

<sup>189</sup> Id.

<sup>190</sup> Suplee, Wash Post at A23 (cited in note 186).

<sup>191</sup> Id.

<sup>192</sup> Richard H. Pildes and Cass R. Sunstein, *Reinventing the Regulatory State*, 62 U

ronmental legislation adopted by Congress in 1996<sup>193</sup> incorporated provisions that made regulatory standards more flexible and efficient in return for measures to broaden the scope of overall protection and to provide more information to consumers. While the Food Quality Protection Act does not repeal the Delaney clauses for food and color additives *per se*, it bars application of the food additives Delaney clause to pesticide residues on food, replacing it with a "reasonable certainty of no harm" standard.<sup>194</sup> It also endorses the EPA's use of ten-fold margins of safety in regulating pesticides where inadequate information is available to assess children's vulnerability to risk.<sup>195</sup>

The Clinton administration's "reinventing regulation" initiatives also move in this direction. In March 1995, the Clinton administration proposed to extend schedules for compliance with effluent standards for companies that agree to adopt innovative treatment approaches to prevent pollution.<sup>196</sup> It also endorsed effluent trading, which would allow sources that reduce pollution below the required minimum to acquire pollution allowances that could be sold to other firms.<sup>197</sup> The EPA has developed a policy promoting effluent trading within watersheds.<sup>198</sup> The policy endorses effluent trading as an innovative means for developing solutions to water quality problems that will yield economic, environmental, and social benefits.

Efforts to provide greater regulatory flexibility have also been endorsed by the President's Council on Sustainable Develop-

Chi L Rev 1, 106-07 (1995) (discussing OSHA hazard communication standard, the Emergency Planning and Community Right-to-Know Act, and nutrition labeling initiatives).

<sup>193</sup> Safe Drinking Water Act Amendments of 1996, Pub L No 104-182, 110 Stat 1615, codified at 42 USC § 300f et seq (1994 & Supp 1996); Food Quality Protection Act of 1996, Pub L No 104-170, 110 Stat 1489; codified at 7 USC §136, 21 USC § 301 et seq (1994 & Supp 1996).

<sup>194</sup> Food Quality Protection Act § 408(b)(2)(A), 110 Stat at 1516, codified at 21 USC § 346a(b)(2)(A) (1994 & Supp 1996).

<sup>195</sup> § 408(b)(2)(C), 110 Stat at 1517, codified at 21 USC § 346a(b)(2)(C) (1994 & Supp 1996).

<sup>196</sup> Bill Clinton and Al Gore, *Reinventing Environmental Regulations* 43 (1995).

<sup>197</sup> The administration estimates that trades between industrial point sources could save between \$8.4 million and \$1.9 billion in compliance costs for industry. *Id.* at 19.

<sup>198</sup> EPA, Effluent Trading in Watersheds Policy Statement, 61 Fed Reg 4994 (1996). A few states have experimented with effluent trading programs. Wisconsin's program for trading between point sources has not resulted in any trades. A program authorizing trading between point and nonpoint sources at the Dillon Reservoir has been little used. U.S. Congress, Office of Technology Assessment, *Environmental Policy Tools* at 113 (cited in note 172).

ment. The Council concluded that basic regulatory standards contained in existing environmental laws have been successful and should not be relaxed.<sup>199</sup> However, it found that the efficiency and effectiveness of the current environmental management system could be improved by developing new approaches to regulation that emphasize performance targets rather than prescribing the means for achieving them.<sup>200</sup> The report recommended that the EPA build upon its experience with Project XL and the agency's Common Sense Initiative to develop new approaches to regulation that reduce compliance costs.<sup>201</sup> It also concluded that government should encourage the development of new products that help prevent pollution and preserve natural resources.<sup>202</sup>

The EPA has begun experimenting with "environmental contracting" through its Project XL program.<sup>203</sup> Project XL, whose acronym stands for Excellence in Leadership, is designed to provide businesses and state and local governments with greater flexibility in deciding how to meet environmental standards.<sup>204</sup> Participants in the project enter into contracts with the EPA that promise greater, multi-media reductions in pollutant discharges than would be achieved through existing standards.<sup>205</sup>

The EPA's Common Sense Initiative is examining how six industry sectors can develop "cleaner, cheaper, smarter" approaches to reduce pollution.<sup>206</sup> EPA Administrator Carol Browner predicts that the EPA eventually will make most regulatory decisions on an industry-sector-by-industry-sector basis, rather than relying on medium-specific regulation.<sup>207</sup> One proposal would rank industries on the basis of their environmental

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<sup>199</sup> President's Council on Sustainable Development, *Sustainable America* at 26 (cited in note 180).

<sup>200</sup> *Id.* at 28.

<sup>201</sup> *Id.* at 34-36. See also Gary Lee, *Regulators Urged to Alter Approach to Pollution*, Wash Post A3 (Feb 14, 1996).

<sup>202</sup> President's Council on Sustainable Development, *Sustainable America* at 38-39 (cited in note 180).

<sup>203</sup> EPA, Regulatory Reinvention (XL) Pilot Projects, 60 Fed Reg 27282 (May 23, 1995). See also *Project XL Launched With Announcement by President of First Eight Participants*, 26 Envir Rptr (BNA) 1179 (1995).

<sup>204</sup> 26 Envir Rptr (BNA) 1179 (cited in note 203).

<sup>205</sup> *Id.*

<sup>206</sup> See EPA, Regulatory Reinvention (XL) Pilot Projects, 60 Fed Reg 27282 (May 23, 1995). See also *Metal-Finishing Group Urges Browner to Translate "Common Sense" to Action*, 26 Envir Rptr (BNA) 1553 (1995).

<sup>207</sup> 26 Envir Rptr (BNA) 1553.

performance and vary the intensity of regulatory scrutiny on the basis of these rankings.<sup>208</sup>

Some critics of environmental regulation have even gone so far as to oppose efforts to increase regulatory flexibility on the ground that such flexibility helps diffuse political opposition to environmental policy.<sup>209</sup> A more legitimate concern is the potential for abusing such flexibility by giving certain interests an unfair advantage over their competitors. While environmental law has not been nearly as prone to special interest deals as economic regulation,<sup>210</sup> it is important that objective standards be developed for environmental contracting to prevent such abuses.<sup>211</sup> Professor Rena Steinzor has questioned whether Project XL will accomplish its goals.<sup>212</sup> While praising the general concept behind Project XL, she suggests that the EPA, in its haste to get the project off the ground, is sacrificing too many regulatory safeguards by approving projects with uncertain benefits and the potential to undermine public participation and enforcement.<sup>213</sup> She notes that an internal EPA newsletter quotes the agency's staff as having coined the motto "If it isn't illegal, it isn't XL."<sup>214</sup>

#### E. More Effort Should be Devoted to Overcoming the Political Barriers to Improved Regulatory Policy

Those who make a serious effort to "rethink regulation" ultimately will recognize that far more fundamental environmental progress could be accomplished by changing the nation's energy, agricultural, and transportation policies to make them more responsive to environmental concerns. The nation's tax system levies the vast majority of taxes on labor and capital rather than on waste and pollution.<sup>215</sup> However, fundamental reforms in tax

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<sup>208</sup> Id.

<sup>209</sup> See Ike C. Sugg, *Beware Interior's "Greater Flexibility"*, Wall St J A19 (Sept 16, 1996) (complaining that such flexibility would allow selective exemptions from "regulations that might imperil local economies" and could be used "in an attempt to quell a grassroots property rights rebellion.").

<sup>210</sup> See Robert V. Percival, et al, *Environmental Regulation: Law, Science and Policy* 183 (Little, Brown 2d ed 1996).

<sup>211</sup> Rena I. Steinzor, *Regulatory Reinvention and Project XL: Does the Emperor Have Any Clothes?*, 26 Envir L Rptr 10527 (1996).

<sup>212</sup> Id at 10529-32.

<sup>213</sup> Id.

<sup>214</sup> Id at 10527.

<sup>215</sup> In 1996, the President's Council on Sustainable Development recommended that a national commission be appointed to explore shifting the tax burden from income taxes to pollution taxes and to review all existing tax and spending subsidies to ensure that they

or energy policy are quickly dismissed as politically unrealistic. Much more effort should be devoted to considering why such policies are so unattractive politically and what, if anything, can be done to change the political dynamics.

The enactment of consensus food safety and safe drinking water legislation in 1996 demonstrates continuing bipartisan support for environmental protection. It also demonstrates that legislative gridlock can be overcome when measures are perceived to provide some benefits to both industry and environmental interests that traditionally have been antagonistic. The enactment of further environmental legislation may require the use of consensus-building processes that foster compromises necessary to overcome legislative gridlock.

### CONCLUSION

Just as Stephen Jay Gould cautions against considering trends in isolation and assuming that evolutionary processes inexorably lead to biological progress, we should be cautious about predicting the future of environmental regulation and focus instead on the big picture. Viewed holistically, regulatory policy appears to be evolving in a progressive direction.

In the face of enormous uncertainties over the prospective costs and benefits of regulatory policy, society properly invested in a portfolio of regulatory choices that produced positive returns overall. Environmental compliance costs generally have proven to be far less, and regulatory benefits substantially greater, than *ex ante* estimates suggested. Instances of truly cost-blind regulation have been exceedingly rare. When regulatory policy threatened to impose truly draconian costs, political forces generally were successful in blocking or moderating its implementation. In other cases environmental policy has properly and explicitly pursued values other than efficiency.

Like human evolution, environmental regulation has progressed to levels of greater complexity along an imperfect path. This path has produced a rich and diverse mix of regulatory tools that are continuing to evolve in ways that enhance human ability to pursue multiple social goals.

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did not undermine environmental goals. President's Council on Sustainable Development, *Sustainable America* at 47 (cited in note 180). Cognizant of the political realities, the Council recommended that the commission evaluate alternative mechanisms for overcoming the political barriers to tax and subsidy reform. *Id.*



Rather than retreating from its commitment to environmental protection, the United States is refining its regulatory system to make it fairer and more efficient. These efforts will help defuse persistent tensions between private law and public law principles that were exacerbated by environmental law's swift transition from the common law system to the regulatory state. While U.S. environmental law has not fully achieved its promises of preventative regulation, it is moving in a direction that will bring greater harmony between contemporary policies and the common law principles from which it evolved.