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Introduction

PROTECTING COASTAL AND ESTUARINE RESOURCES— CONFRONTING THE GULF BETWEEN THE PROMISE AND PRODUCT OF ENVIRONMENTAL REGULATION

ROBERT V. PERCIVAL*

I. INTRODUCTION

Nearly two decades ago our Nation launched a public law revolution to protect the environment.¹ Despite some winning battles, victory over pollution remains an elusive goal. Nowhere is this more evident than in the Nation's coastal and estuarine waters.² Toxic pollution and excessive nutrient loadings have severely damaged the aquatic resources of the Chesapeake Bay—the Nation's largest and most productive estuary.³ Throughout the country the

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1. The explosive growth of federal environmental law began with the enactment of the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4370a (1982 & Supp. III 1985). Other major environmental legislation followed in rapid succession including the Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1376 (1982 & Supp. III 1985), and the Clean Air Act, 42 U.S.C. §§ 7401-7642 (1982 & Supp. III 1985), in 1972; the Toxic Substances Control Act, 15 U.S.C. §§ 2601-2629 (1982 & Supp. IV 1986), and the Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901-6987 (1982 & Supp. IV 1986), in 1976; and the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §§ 9601-9657 (1982 & Supp. III 1985), in 1980.

2. See, e.g., *Hearings Before the Subcomm. on Fisheries and Wildlife Conservation and the Environment of the House Merchant Marine and Fisheries Comm.*, 100th Cong., 1st Sess. (1987) (testimony of George R. Hampson); OFFICE OF TECHNOLOGY ASSESSMENT, WASTES IN MARINE ENVIRONMENTS (1987); *Efforts to Combat Marine Pollution Not Keeping Pace with Growth, State Group Told*, 18 Env't Rep. (BNA) No. 34, at 1934 (Dec. 18, 1987); Reinhold, *Invasion of Trash from Sea Overwhelming*, N.Y. Times, July 10, 1987, at A1, col. 1.

3. There are numerous indicators that document the decline of aquatic life in the Chesapeake Bay. Because of the drastic decline in commercial finfish harvests, the striped bass fishery has been closed. Shellfish harvests remain at all-time lows and submerged aquatic vegetation has declined precipitously since the 1960s. CHESAPEAKE EXECUTIVE COUNCIL, SECOND ANNUAL PROGRESS REPORT UNDER THE CHESAPEAKE BAY AGREEMENT 8-19 (Feb. 1987). The Chesapeake's oyster beds have been devastated by pollution and disease (MSX and dermo). In Maryland alone, the harvest of oysters has declined from as much as 15 million bushels a year in the nineteenth century to less than half a million bushels. Greer, *Difficult Harvest: Maryland's Oyster Fishery*, 8 MD. SEA GRANT

declining quality of coastal and estuarine areas is reflected in the closings of contaminated beaches⁴ and shellfish beds,⁵ fish kills, and discoveries of growing areas of oxygen-depleted waters.⁶ This rapid destruction of resources has forced a fundamental re-examination of past policies as new and more ambitious preservation initiatives are developed.⁷

This issue of the *Maryland Law Review* focuses on the difficult issues raised by efforts to protect coastal and estuarine resources. Although attempts to protect these resources are nearly two decades old,⁸ such efforts have intensified in recent years. For example, last year Congress reauthorized the Clean Water Act with new, more stringent directives for protecting the Nation's waters.⁹ Congress also enacted legislation banning the disposal of plastic materials by vessels at sea.¹⁰ Additionally, Maryland, Virginia, Pennsylvania, the District of Columbia, and the U.S. Environmental Protection Agency strengthened their historic Chesapeake Bay Agreement, pledging to implement more comprehensive measures to protect the Bay.¹¹ Furthermore, other states embarked on ambitious initiatives to clean up coastal waters and to protect valuable

1 (1987); *Boosting Oysters Could Help Clean Bay, Biologist Says*, *The Sun* (Baltimore), Apr. 1, 1988, at B3, col. 1.

4. See *Waterways, Declining, Focus of Laws*, *N.Y. Times*, Jan. 5, 1988, at B1, col. 2.

5. See *State Closes Most Clam, Oyster Beds Due to Rain, and Disease Reports Hurt Maryland's Oyster Market*, *Waterman's Gazette*, Dec. 1987, at 1, cols. 1 & 2.

6. See, e.g., *Even Ecologists Don't Always Know*, *The Sun* (Baltimore), Dec. 15, 1987, at 13A, col. 1; *Dead Water on the Chesapeake*, *MD. MARINE NOTES* 1 (Aug. 1987).

7. *Roemer Wins Gubernatorial Election, Promises Action on Pollution, Erosion*, 18 *Env't Rep.* (BNA) No. 28, at 1711 (Nov. 6, 1987); *Diverse Forum Will Work at EPA's Request to Recommend Better Ways to Protect Wetlands*, 18 *Env't Rep.* (BNA) No. 13, at 855 (July 24, 1987).

8. The importance of protecting the Nation's waters and coastal resources was recognized by Congress in 1972 when it enacted the Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1376 (1982 & Supp. III 1985), the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464 (1982 & Supp. IV 1986), and the Marine Protection, Research and Sanctuaries Act (Ocean Dumping Act), 33 U.S.C. §§ 1401-1445 (1982).

9. Water Quality Act of 1987, Pub. L. No. 100-4, 101 Stat. 7 (to be codified at scattered sections of 33 U.S.C.). When it amended the Clean Water Act, Congress recognized the importance of maintaining the health and ecological integrity of the Nation's estuaries in the face of the increased threats facing them. See H.R. REP. 1004, 99th Cong., 2d Sess. 147 (1986). The new amendments establish a National Estuary Program authorizing the convening of interstate and international management conferences to develop comprehensive plans for protecting estuaries, including Long Island Sound, Narragansett Bay, Buzzards Bay, Puget Sound, New York-New Jersey Harbor, Delaware Bay, Delaware Inland Bays, Albemarle Sound, Sarasota Bay, San Francisco Bay, and Galveston Bay. Water Quality Act of 1987, Pub. L. No. 100-4, § 320(a)(2)(B), 101 Stat. 6, 62 (1987) (to be codified at 33 U.S.C. § 1330(a)(2)(B)).

10. Act of Dec. 29, 1987, Pub. L. No. 100-220, 101 Stat. 1458.

11. 1987 Chesapeake Bay Agreement (Dec. 14, 1987) (available at the *Maryland Law Review*).

wetland areas.¹²

II. THE NATIONAL ENVIRONMENTAL SYMPOSIUM

The articles that follow are products of a National Environmental Symposium on the Chesapeake Bay, sponsored last fall by the *Maryland Law Review* at the University of Maryland School of Law. The Symposium marked the establishment of the University of Maryland's new, interdisciplinary environmental program—the Chesapeake Coastal and Estuarine Policy Program.¹³

Because protection of coastal and estuarine resources is a multidisciplinary challenge, speakers at the National Environmental Symposium included experts in science, law, economics, philosophy, and communications. The articles in this issue of the *Maryland Law Review* reflect this multidisciplinary perspective. They include contributions from a law professor, a journalist, an environmental lawyer, three scientists, and an economist.

Oliver Houck opens with a critical reflection on why current laws have not stemmed the destruction of coastal and estuarine resources. Professor Houck, who teaches environmental law at Tulane Law School, chronicles the impact of relentless development pressures on the Nation's coastal and wetland areas. He concludes that these pressures have simply overwhelmed the regulatory system, and fundamentally new approaches are needed if there is to be any hope for saving America's coastal zone.

Next, Thomas Horton discusses the difficult challenge of reversing the decline of the Chesapeake Bay. As a veteran environmental reporter for the *Baltimore Sun*, Mr. Horton has long witnessed the development of environmental policy in the Chesapeake region. His recently released book, *Bay Country*,¹⁴ has confirmed his reputation as one of the Nation's finest environmental journalists. Currently on leave from the *Sun*, Mr. Horton directs the Chesapeake Bay Foundation's Smith Island Educational Center.

12. *Ten Million Dollar Hazardous Waste Cleanup Fund Created by Bill Signed by Connecticut Governor*, 18 Env't Rep. (BNA) No. 11, at 777 (July 10, 1987). New Jersey, for example, enacted legislation that protects 323,000 acres of wetlands from development. See *Pine-lands Protection Act*, N.J. STAT. ANN. §§ 13:18A-1 to -49 (West 1987).

13. The Chesapeake Coastal and Estuarine Policy Program is a joint venture between the Law School, the Center for Environmental and Estuarine Studies, and the School of Public Affairs. The program combines faculty and students from the three schools in interdisciplinary research, education, and public service on the problems facing the region's unique coastal and estuarine resources, including the Chesapeake Bay, the Nation's largest estuary.

14. T. HORTON, *BAY COUNTRY* (1987).

James Tripp and Michael Oppenheimer discuss specific steps that can be taken to reduce nutrient loadings and to protect wetland areas in the Chesapeake Bay watershed. Mr. Tripp, who is general counsel of the Environmental Defense Fund, has been a principal architect of legal strategies for protecting wetlands. Dr. Oppenheimer, an atmospheric physicist, reveals new data on the impact of atmospheric pollution on nutrient levels in the Chesapeake Bay.

Alan Krupnick, an economist with Resources for the Future, discusses the economics of measures to control nutrient enrichment of the Chesapeake Bay. Dr. Krupnick's study focuses on the new commitment by the Chesapeake Bay states to achieve at least a 40 percent reduction of nitrogen and phosphorus entering the Bay by the year 2000. He explores the difficulties confronting efforts to assess whether the target is an appropriate one and to determine the most efficient way to allocate nutrient reductions among sources.

Ian Morris, director of the University of Maryland's Center for Environmental and Estuarine Studies, and his assistant, Dr. Wayne Bell, end the Symposium with an international perspective on the "Save the Bay" movement. Dr. Morris serves as chairman of the Coastal Seas Governance Project, a comparative, international study of efforts to protect coastal and estuarine waters. The authors discuss the preliminary findings of this project and their implications for protection of coastal and estuarine areas in the United States.

III. ENVIRONMENTAL REGULATION: THE GULF BETWEEN PROMISE AND PRODUCT

The authors appear profoundly pessimistic about the prospects for reversing generations of environmental damage. Oliver Houck questions whether resources are disappearing so rapidly that we may not have the technological, economic, or political capacity to save them.¹⁵ Thomas Horton's most optimistic prognosis is for winning battles in a losing war.¹⁶ James Tripp complains of a legal system that is far more effective at protecting private use of land than in preventing destruction of the natural environment.¹⁷

As the authors recognize, enormous efforts have been made to protect coastal and estuarine areas. Yet, as Thomas Horton

15. Houck, *Ending the War: A Strategy to Save America's Coastal Zone*, 47 MD. L. REV. 358, 358 (1988).

16. Horton, *Protection of the Chesapeake Bay: Environmentally Legal, Eminently Uninhabitable?*, 47 MD. L. REV. 406, 414-16 (1988).

17. Tripp & Oppenheimer, *Restoration of the Chesapeake Bay: A Multi-State Institutional Challenge*, 47 MD. L. REV. 425, 448-50 (1988).

predicts, these efforts may succeed only in providing us with an environment that is "legally sufficient" though "increasingly less pleasant."¹⁸ Oliver Houck goes further and concludes that the regulatory system has simply been asked to do too much; it is incapable, by itself, of overcoming enormous economic and political pressures favoring development.¹⁹

The authors' observations reflect a chronic complaint of students of environmental policy: the gulf between the laws' promise and the results actually achieved by environmental regulation. Despite the explosive growth of environmental regulation in recent years, an enormous disparity remains between the environmental standards articulated in our laws and the actual quality of the environment. Certainly the Nation's environment is cleaner and safer than it would be without such laws, but environmental results consistently have fallen far short of the laws' ambitious rhetoric. Why has this happened? Are the laws too ambitious? Has the effort to implement them been too half-hearted? Or have regulators simply been using the wrong approach?

James Tripp suggests that part of the problem lies with the implementation of the laws. In addition to implementing ambitious new land use controls, like those mandated by Maryland's Critical Area Law,²⁰ new measures to protect wetlands and to reduce nutrient loadings (such as an advanced identification program for wetlands or numerical water quality standards for nutrients) can be imposed under the authority of existing laws, such as the Clean Water Act. Regulators need to be more aggressive and more creative in using their existing authority.

Oliver Houck agrees that there is much more that could be done using existing regulatory authority. He suggests, however, that the more fundamental problem is that existing regulatory programs have been expected to do too much by themselves. Until the economic and political forces powering the development of coastal areas are confronted directly through national prohibitions on coastal development, the regulatory system can do little more than slow the destruction.

Thomas Horton stresses the difficulty reconciling differences between individual and societal goals. Everyone wants to save the Bay, but no one wants to bear the brunt of environmental controls.

18. Horton, *supra* note 16, at 406.

19. Houck, *supra* note 15, at 358.

20. Chesapeake Bay Critical Area Protection Program, MD. NAT. RES. CODE ANN. §§ 8-1801 to -1816 (Supp. 1987).

For example, Horton describes the testimony of a real estate agent opposing Maryland's Critical Areas legislation who stressed the need to save the Chesapeake Bay so that more people would move to the region.²¹ Similar tales often are told about Chesapeake watermen deploring the depleted state of the public fishery, while vowing to compete to be the one to harvest the last oyster.

These observations illustrate some of the fundamental reasons why America's environmental revolution has not achieved more effective environmental results. Policymakers rarely have been successful in predicting and preventing environmental problems before they occur; instead they have concentrated on the more difficult and expensive task of cleaning up after damage has been done. Public demands for environmental protection have produced comprehensive statutory protections that have not been translated into effective regulatory programs. Efforts to develop new, more effective regulatory approaches have been frustrated by both opponents and proponents of environmental regulation.

A. The Tardiness of Preventive Regulation

The Symposium last fall and the subsequent signing of a new Chesapeake Bay Agreement reflect an extraordinary consensus in favor of stronger measures to protect the Chesapeake Bay. Public opinion polls show strong public support for tougher environmental regulations, even when people are reminded that it may cost them money.²² No one doubts that the public values the Nation's coasts and estuaries and wants to save them. But what is difficult to understand is why it takes so long to respond to environmental threats. Why did public policy not respond more rapidly to the decline of the Chesapeake Bay as vast areas of underwater vegetation disappeared, shellfish production was devastated, and the popular striped bass fishery was pushed to the brink—all in the shadow of the Nation's capital?

The agents of environmental damage always are easier to identify after the damage has been done. Scientific predictions are made more confidently after experiments have been performed, and nature too often is humanity's laboratory.

Yet the decline of the Chesapeake did not happen without

21. Horton, *supra* note 16, at 415.

22. See, e.g., NATIONAL CLEAN AIR COALITION, THE CLEAN AIR ACT 7-10 (1985) (reporting Louis Harris survey); COUNCIL ON ENVIRONMENTAL QUALITY, PUBLIC OPINION ON ENVIRONMENTAL ISSUES: RESULTS OF A NATIONAL OPINION SURVEY (1980).

warning. As Thomas Horton notes, major "Save the Bay" conferences were held in 1968 and 1977, and they ended with enthusiastic support for measures to prevent pollution of this precious estuary.²³ Warnings about depletion of the Chesapeake's resources were heard even at the turn of the century.²⁴ Yet these warnings were not heeded.

Ian Morris' international study confirms the importance of a major "event" to galvanize public demand to protect coastal resources.²⁵ Such "events" often are acute incidents of severe environmental damage.²⁶ Thus, environmental policy more frequently is shaped by incidents of acute, high-level environmental damage than by damage from chronic exposures to lower levels of harmful pollutants.²⁷

Environmental policy's "early warning system" leaves much to be desired. Citizens respond swiftly (and often hysterically) after their neighborhood is contaminated. While it is easy to focus public concern on demands for cleanup, it is more difficult to generate sustained public pressure for preventive measures. Environmental policy lurches from one crisis to another, grappling with the difficult and expensive task of cleaning up damage after it has been done more frequently than shaping preventive policies.²⁸

23. Horton, *supra* note 16, at 415. See also Eichbaum, *The Chesapeake Bay: Major Research Program Leads to Innovative Implementation*, 14 *Env'tl. L. Rep. (Env'tl. L. Inst.)* 10,237, 10,240 (1984). A report in 1968 warned of evidence that the Bay was approaching the "critical point" where it was becoming "too rich in nutrients." REGIONAL PLANNING COUNCIL, *A RECONNAISSANCE STUDY OF THE CHESAPEAKE BAY*, at xi (1968). In 1977, another report noted that since 1916 at least 50 reports about the Bay and Baltimore Harbor had been prepared; although many agreed on the conclusions about the nature of the problems, only a few of the several proposals had been implemented. CITIZENS LEAGUE OF BALTIMORE, *THE CHESAPEAKE BAY AND THE PORT OF BALTIMORE: IT IS TIME TO MANAGE THE BAY AS A TOTAL UNIT AND THEREBY GUARANTEE THE PORT'S EXISTENCE* 7 (1977).

24. See W.K. Brooks, *THE OYSTER* (2d ed. 1905) (urging better maintenance of oyster beds and water resources in Maryland). For a comprehensive history of the politics of pollution control concerns with respect to the Chesapeake, see J. CAPPER, G. POWER & F.R. SHIVERS, *CHESAPEAKE WATERS: POLLUTION, PUBLIC HEALTH & PUBLIC OPINION 1607-1972* (1983).

25. Morris & Bell, *Coastal Seas Governance: An International Project for Management Policy on Threatened Coastal Seas*, 47 *MD. L. REV.* 481, 487 (1988).

26. *Id.*

27. See Silbergeld & Percival, *The Organometals: Impact of Accidental Exposure and Experimental Data on Regulatory Policies*, in *NEUROTOXICANTS AND NEUROBIOLOGICAL FUNCTION: EFFECTS OF ORGANOHEAVY METALS* 328, 347 (H. Tilson & S. Sparber eds. 1987).

28. This is illustrated most dramatically by the size of the \$8.5 billion Superfund program, recently supplemented by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, 100 Stat. 1613, which is designed to remediate contamination by toxic waste. It has been estimated that the eventual cost of this program will

Environmental policy must always be made in the face of substantial uncertainties. Even after environmental damage has become painfully apparent, its causes, sources, and subsequent impact often are incompletely understood, particularly when the damage is done to a tremendously complicated ecosystem. Yet one can easily question whether damage to the Chesapeake Bay would have been prevented had policymakers known twenty years ago what they know today. Policymakers' insatiable appetite for information often can provide a ready excuse for deferring difficult regulatory decisions in favor of additional study—even though research rarely can dispel all important uncertainties.²⁹ As a result, regulatory policy often is biased toward minimizing costs in the short run, creating substantial environmental burdens for future generations.

B. A "Victorian Compromise" in Environmental Policy?

Laws on the books promise the public comprehensive environmental protections: the elimination of pollutant discharges in surface waters,³⁰ protection from "any known or anticipated adverse effects" of air pollution,³¹ "adequate" or "ample" margins of safety against conventional and hazardous air pollutants,³² and proper control of hazardous waste from "cradle to grave."³³ The gulf between these ambitious promises and the reality of environmental damage suggests that the laws actually may perform a function very different from that formally articulated in the law books. They may function in a manner akin to what Lawrence Friedman has described

be \$100 billion over the next 50 years. OFFICE OF TECHNOLOGY ASSESSMENT, SUPERFUND STRATEGY 3 (1986). This is far more than will be spent on governmental programs to prevent hazardous waste mismanagement under the Resource Conservation and Recovery Act, 42 U.S.C. § 6901-6987 (1982 & Supp. IV 1986). Because it is so expensive to remedy environmental damage after it has occurred, some are questioning whether, in many instances, it is even worth it to try. See *Toxic Cleanup Plan Moves Slowly Amid Criticism from Two Fronts*, N.Y. Times, Jan. 10, 1988, at 20, col. 1. These critics apparently ignore the impact of relaxing cleanup standards on incentives to prevent future contamination.

29. See Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1283-84 (1985). In 1969 it was reported that more than 1450 studies had been made of the Chesapeake Bay and that the Bay "experts agree, is the most thoroughly studied tidewater estuary in the world." The Bay was described as "being slowly strangled in a morass of 'paper pollution' as well as water pollution." Mills, *A Morass of Red Tape Is Strangling Solution of Water Pollution Problem*, reprinted in THE CHESAPEAKE AT BAY 36 (W. Perkinson, B. Burton & D. Mills eds. 1969).

30. Federal Water Pollution Control Act § 101(a)(1), 33 U.S.C. § 1251(a)(1) (1982).

31. Clean Air Act § 109(b)(2), 42 U.S.C. § 7409(b)(2) (1982).

32. *Id.* § 109(b)(1), 42 U.S.C. § 7409(b)(1) (1982).

33. Resource Conservation and Recovery Act of 1976, § 1003(4), 42 U.S.C. 6902(4) (1982).

as the "Victorian compromise" that prevailed in late nineteenth-century America.³⁴

In the late Victorian era, American laws prohibited a variety of conduct on moral grounds, even though officials quietly tolerated such behavior. So long as forbidden behavior remained hidden, it did not openly threaten moral norms, and the notion of enforcing the official moral code was not taken seriously.³⁵

Like the tough, moral laws of nineteenth-century America that promised citizens an environment free of vice and immorality, contemporary environmental laws are "laws with a strong, healthy ethical surface."³⁶ They reassure the public that their environment will be clean and healthy because the law has declared that it must be. Drinking water will be safe to drink,³⁷ rivers will be fishable and swimmable,³⁸ and the environment will be free from noise that jeopardizes health or welfare.³⁹ These promises occasionally are qualified by words tucked into the statutory fine print, like "wherever attainable"⁴⁰ or "to the extent feasible."⁴¹ But the laws generally convey to the public that they and their environment will enjoy the most comprehensive protections possible.

Perhaps this explains the great fanfare that accompanies the launching of each new environmental initiative.⁴² It serves to reassure the public that they are protected; laws have been enacted that will take care of the problem if they are patient. Lost in the excitement is the disquieting reality that each new initiative was necessary

34. See L. FRIEDMAN, *A HISTORY OF AMERICAN LAW* 585 (2d ed. 1985) (defining the Victorian compromise as "a certain toleration for vice, or at least a resigned acceptance, so long as it [remains] in an underground state").

35. See Friedman, *Notes Toward a History of American Justice*, 24 *BUFFALO L. REV.* 111, 119-20 (1974).

36. *Id.* at 120.

37. Safe Drinking Water Act, 42 U.S.C. § 300f to 300y-10 (1982 & Supp. III 1985).

38. Federal Water Pollution Control Act § 101(a)(2), 33 U.S.C. § 1251(a)(2) (1982).

39. Noise Control Act of 1972, 42 U.S.C. § 4901(b) (1982) ("The Congress declares that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare.").

40. Federal Water Pollution Control Act § 101(a)(2), 33 U.S.C. § 1251(a)(2) (1982).

41. Occupational Safety and Health Act, 29 U.S.C. § 655(b)(5) (1982).

42. For example, when a new Chesapeake Bay Agreement was signed recently, an elaborate public ceremony was held, and thousands of citizens were sent printed invitations. The signing ceremony was held in a huge auditorium and was accompanied by the performance of marching bands. The "historic agreement" was widely hailed, and officials basked in the favorable publicity it drew. Shortly after the signing ceremony, the Governors of Maryland and Delaware met in another "historic" meeting at which Delaware officials volunteered to join the Chesapeake Bay Agreement. *Maryland, Del. Leaders Agree to Joint Effort to Clean Bay*, *The Sun* (Baltimore), Jan. 6, 1988, at 3G, col. 1.

because the problems have gotten worse.⁴³

The relationship between law and social behavior is one of extraordinary complexity.⁴⁴ Yet it is difficult to understand why our legal system has not translated broad public support and strong legal directives into more effective environmental regulation.

The "Victorian compromise" may reflect that it is easier to pass laws prohibiting evils—like vice and pollution—than it is to appropriate the resources necessary to combat them. And it is easier to appropriate funds to combat such generalized evil than it is to know how to spend such funds wisely and effectively.

To ensure that administrative agencies perform their regulatory responsibilities, the environmental laws provide substantial opportunities for public participation in the development and enforcement of regulations. Public participation in rulemaking proceedings is guaranteed by law⁴⁵ and expressly encouraged by official policy.⁴⁶ Most federal laws also authorize citizen suits against those who violate environmental regulations.⁴⁷ Thus, unlike nineteenth-century

43. The day before the signing ceremony for the new Chesapeake Bay Agreement, officials were embarrassed by the release of the results of toxicity tests performed on the effluents of major companies discharging into the Bay. *Officials Are Surprised by Wastes Found in Bay*, *The Evening Sun* (Baltimore), Dec. 14, 1987, at 1, col. 6. The results showed toxicity problems in virtually all such discharges. The following day, a political cartoon appeared showing federal and state officials gathered for the signing ceremony next to a pipe discharging toxic wastes. The caption on the cartoon was: "This Is Embarrassing—We'll Have It Looked Into Immediately." *The Sun* (Baltimore), Dec. 15, 1987, at 12A, col. 3. One columnist, a distinct minority, questioned the reason for all the official back-slapping, noting that where he lived on the Bay, ducks, aquatic grass, oysters, and rockfish continue to disappear rapidly. Phillips, *While Politicians Cheer Their Actions, Chesapeake Is Dying from Inaction*, *Wash. Post*, Jan. 12, 1988, at E2, col. 1.

44. One of the best explorations of the complex relationship between law and social behavior is L. FRIEDMAN, *THE LEGAL SYSTEM: A SOCIAL SCIENCE PERSPECTIVE* (1975).

45. The Administrative Procedure Act authorizes citizens to petition administrative agencies to institute rulemaking proceedings. See 5 U.S.C. § 553(c) (1982 & Supp. IV 1986). It also requires federal agencies to provide public notice of proposed rulemaking actions and guarantees interested persons an opportunity to participate in rulemaking proceedings. *Id.* § 553(b). Most environmental statutes provide additional protections for public participation. For example, the Resource Conservation and Recovery Act requires that states administering federally delegated hazardous waste programs must provide public participation requirements at least as generous as those available under federal law. See 42 U.S.C. § 6974 (1982 & Supp. III 1985). The Toxic Substances Control Act authorizes citizens to petition the Environmental Protection Agency (EPA) to institute certain rulemaking actions and permits citizens to obtain *de novo* review in federal court if their petition is denied. See 15 U.S.C. § 2620 (1982).

46. See Ruckelshaus, *The Citizen and the Environmental Regulatory Process*, 47 *IND. L. J.* 636 (1972).

47. See, e.g., Clean Air Act § 304, 42 U.S.C. § 7604 (1982); Toxic Substances Control Act § 20, 15 U.S.C. § 2619 (1982 & Supp. IV 1986); Federal Water Pollution Control Act § 505, 33 U.S.C. § 1365 (1982); Endangered Species Act of 1973 § 7(2), 16 U.S.C.

morals legislation, contemporary citizens can initiate direct legal action to ensure that the environmental laws are implemented and enforced.

Yet these provisions rarely result in effective input from the general public in the development of environmental regulations.⁴⁸ Public participation in the regulatory process has been confined largely to the affected industries and a handful of national environmental groups. Industries affected by environmental regulations have every incentive to oppose regulatory action vigorously and to seek variances, delays, and extensions of regulatory requirements.⁴⁹ Because key decisions are made by "low visibility decisionmakers fearful of making controversial choices,"⁵⁰ administrative agencies often implement ambitious statutory requirements slowly, inadequately, or not at all.

The lack of effective public participation reflects in part the complexity and lack of visibility of the regulatory process. Environmental regulations can be awesomely complex and the process that produces them is a mystery to the average citizen. Regardless of their good intentions, environmental officials are chronically handicapped by inadequate resources for translating ambitious laws into effective policy. Legislatures are far more adept at imposing responsibilities on regulatory agencies than they are at appropriating the resources necessary for carrying them out.

The failure of administrative agencies to implement the environmental laws with the speed and vigor demanded by Congress has

§ 1540(g) (1982); Safe Drinking Water Act § 1449, 42 U.S.C. § 300j-8 (1982); Resource Conservation and Recovery Act of 1976 § 7002, 42 U.S.C. § 6972 (1982 & Supp. III 1985).

48. Private interests have assumed such an important role in the development and implementation of regulatory policy that our system of administrative law has been described as conforming to an "interest representation" model. See Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1669, 1722-23 (1975). Although the private interests depicted in the "interest representation" model include influential public interest groups, the latter do not have the resources to participate in all regulatory decisions. See Percival & Miller, *The Role of Attorney Fee Shifting in Public Interest Litigation*, 47 LAW & CONTEMP. PROB. 233, 237-39 (1984). Thus, in many instances the primary private input into a regulatory decision comes from the regulated industry.

49. This is not meant as a pejorative statement concerning the behavior of industries affected by regulatory decisions. Affected industries generally oppose regulation not because they enjoy damaging the environment, but because such regulation costs them money.

50. See Schoenbrod, *Goals Statutes or Rules Statutes: The Case of the Clean Air Act*, 30 UCLA L. REV. 740, 753-54 (1983). While Schoenbrod's observation specifically addressed the problems of state implementation of the Clean Air Act, it can be applied more generally.

produced increasingly specific, and increasingly demanding, environmental legislation. When the gap between ambitious statutory directives and the reality of their inadequate implementation is exposed to public view, outbursts of public concern predictably follow.⁵¹ The failings of environmental agencies are condemned with the same vehemence that would have fallen upon those who publicly flouted official morality in nineteenth-century America.⁵² The typical legislative response to such concerns has been to impose new and more specific statutory requirements for action by administrative agencies.⁵³ But when agencies fail to perform statutory directives, it has proved to be very difficult for the courts to stimulate agency action.⁵⁴ And while more specific statutory requirements ultimately may help stimulate agencies to act, they do nothing to improve the quality of agency decisionmaking.⁵⁵

Environmental regulations that have significant impact may be vulnerable to judicial attack. As noted in the articles that follow, recent Supreme Court decisions⁵⁶ have raised the prospect that cer-

51. For example, in June of 1986, the Washington Post published a front-page story documenting widespread noncompliance with National Pollution Discharge Elimination System (NPDES) permits and lax enforcement of the Clean Water Act in the Chesapeake Bay region. Churchville, *The Poisoning of Chesapeake Bay*, Wash. Post, June 1, 1986, at A1, col. 1. This article caused a temporary outburst of public concern at a time when Bay cleanup measures were being widely hailed and helped spur improvements in compliance monitoring and enforcement in the region.

52. See, e.g., Florio, *Congress as Reluctant Regulator: Hazardous Waste Policy in the 1980's*, 3 YALE J. REG. 351 (1986).

53. These requirements increasingly take the form of statutory deadlines for agency action, accompanied occasionally by "hammer provisions" that specify the details of regulations that will take effect automatically if the agency fails to meet the deadline. See, e.g., Water Quality Act of 1987, Pub. L. No. 100-4, 101 Stat. 7; Asbestos Hazard Emergency Response Act of 1986, 15 U.S.C. §§ 2641-2654 (Supp. IV 1986); Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. §§ 6901-6987 (Supp. III 1985). See also Futrell, *Hazardous Wastes and Toxic Substances: Lessons from Superfund, RCRA and Other Environmental Laws*, 24 HOUS. L. REV. 125, 134-36 (1987); Percival, *The Bounds of Consent: Consent Decrees, Settlements and Federal Environmental Policy Making*, 1987 CHI. LEGAL F. 327, 329 & n.8.

54. See Beers, *Responses to J. William Futrell*, 24 HOUS. L. REV. 148, 150-53 (1987); Scalia, *Responsibilities of Regulatory Agencies Under Environmental Laws*, 24 HOUS. L. REV. 97, 98 (1987).

55. One of the few studies that has examined the impact of statutory deadlines on agency behavior concluded that they have been a crude, but useful, tool for influencing the speed of the EPA's administrative process. ENVIRONMENTAL AND ENERGY STUDY INSTITUTE, *STATUTORY DEADLINES IN ENVIRONMENTAL LEGISLATION: NECESSARY BUT NEED IMPROVEMENT* (Sept. 1985). The study noted, however, that EPA had met only 14% of its statutory deadlines. *Id.* at ii.

56. See *First English Evangelical Lutheran Church v. County of Los Angeles*, 107 S. Ct. 2378 (1987) (holding that the government could be liable for the payment of monetary damages as just compensation for even a "temporary taking"); *Nollan v. California*

tain environmental regulations, particularly land use controls, may constitute a taking of private property for which private landowners must be compensated by the government.⁵⁷ As the Supreme Court recognized in *Pennsylvania Coal Co. v. Mahon*,⁵⁸ government regulatory action can constitute a taking of private property for which the fifth amendment demands payment of just compensation if the regulation "goes too far."⁵⁹ Although the Supreme Court has repeatedly reaffirmed the importance of the takings concept to our constitutional notions of fairness, it consistently has refused to declare that regulatory action has "gone too far," even when it caused substantial economic damage, unless it involved actual physical occupation of private property.⁶⁰

Indeed, the Court's decisions last Term confirmed this pattern. Under facts virtually identical to those of *Pennsylvania Coal Co.*, the Court in *Keystone Bituminous Coal Association v. DeBenedictis*,⁶¹ refused to find that a taking had occurred. Also, even as it confirmed that a damages remedy was available for "temporary takings" in *First English Evangelical Lutheran Church v. County of Los Angeles*,⁶² the Court did not hold that a taking had occurred, but remanded for trial on the plaintiff's allegation that a regulation had denied it "all use of his property."⁶³ Thus, although *First English* and *Nollan v. California Coastal Commission*,⁶⁴ another taking case that Term, have given new encouragement to landowners who seek to resist land use regulations, it is doubtful that they have made it any easier to demonstrate that a taking has occurred.

The current state of taking doctrine actually may reflect a "Victorian compromise" of another sort. Taking doctrine reminds regulators of the importance of respecting constitutional ideals, even while the Court repeatedly refuses to declare that specific regula-

Coastal Comm'n, 107 S. Ct. 3141 (1987) (holding that the government could not require, without compensation, the granting of an easement over private property to afford physical access to a beach as a condition for approving a permit to build a structure that allegedly would impair visual access to the beach).

57. See Houck, *supra* note 15, at 394; Tripp & Oppenheimer, *supra* note 17, at 448-49.

58. 260 U.S. 393 (1922).

59. *Id.* at 415.

60. Compare *Hodel v. Virginia Surface Mining & Reclamation Ass'n*, 452 U.S. 264 (1981) (rejecting taking claims despite enormous economic impact of regulation) and *Penn Central Transp. Co. v. City of New York*, 438 U.S. 104 (1978) (same) with *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982) (finding even minimal physical occupation of property to be a taking).

61. 107 S. Ct. 1232 (1987).

62. 107 S. Ct. 2378 (1987).

63. *Id.* at 2389.

64. 107 S. Ct. 3141 (1987).

tions actually constitute taking. Therefore, although the recent decisions may deter government officials from engaging in regulatory excesses, it is doubtful that they signal the death knell of land use regulations—which increasingly are being recognized as essential to control nonpoint source pollution.⁶⁵

C. *Improving the Effectiveness of Environmental Regulation*

Recognizing that decentralized, nonregulatory measures had failed to stop pollution, Congress established national regulatory programs to protect the environment. Could the problem be that this is simply the wrong approach for fighting pollution?

Academic critics have harshly criticized the uniform, technology-based regulations mandated by the Clean Air Act and the Clean Water Act as inefficient and inflexible.⁶⁶ These critics claim that more flexible alternatives will provide better environmental protection at less cost. While acknowledging inefficiencies in existing regulatory approaches, others reject the notion that more flexible alternatives will improve environmental protection, based on experience with current environmental regulations.⁶⁷

Alan Krupnick's article⁶⁸ illustrates the difficulties in using economics to determine "appropriate" levels of environmental protection. Because it is impossible to quantify accurately all the costs and benefits of measures to protect environmental resources, economics is less useful in determining overall levels of environmental protection than in assessing the cost-effectiveness of alternative ways to

65. State-wide, comprehensive land use controls appear to be increasingly popular. See, e.g., Gold, *Governor Offers Vermont a Plan on Controlled Growth*, N.Y. Times, Jan. 13, 1988, at A14, col. 3.

66. See, e.g., S. BRYER, *REGULATION AND ITS REFORM* (1982); B. ACKERMAN & W. HASSLER, *CLEAN COAL/DIRTY AIR* (1981); Ackerman & Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333 (1985); Stewart, *Regulation, Innovation and Administrative Law: A Conceptual Framework*, 60 CALIF. L. REV. 1256 (1981).

67. Howard Latin, for example, maintains that, despite the acknowledged inefficiency of command-and-control regulations, it is doubtful that economically based approaches would achieve better environmental results. He notes that regulatory policy inevitably must operate in an environment of "pervasive uncertainty, high decisionmaking costs, and manipulative strategic behavior." Latin, *supra* note 29, at 1270 (footnotes omitted). Under these circumstances, he argues that the acknowledged inefficiency of uniform, technology-based standards does not demonstrate their inferiority. Latin argues that economically based regulatory approaches have greater informational costs; are less predictable, less consistent, and less accessible to public scrutiny and participation; are more vulnerable to political manipulation; and produce increased social dislocation and conflict between geographic areas. *Id.* at 1271.

68. Krupnick, *Reducing Bay Nutrients: An Economic Perspective*, 47 MD. L. REV. 452 (1988).

reach predetermined environmental protection goals. Dr. Krupnick explores various measures for improving the cost-effectiveness of the 40 percent nutrient reduction goal for the Chesapeake Bay. He recognizes the enormous complexities of designing a method for distributing nutrient load reductions that is not only efficient but also equitable and effective.

Welfare economics provides powerful support for government regulation to protect the environment.⁶⁹ Aside from a tiny group who oppose any governmental intervention in the marketplace, most economists recognize that "common property and other sources of market failure, such as externalities, irreversibilities and intergenerational issues, frequently necessitate government activity of some kind to ensure efficient use and allocation of natural resources."⁷⁰ Thus, environmental regulations can improve the efficacy of resource allocation. Yet proposals to make environmental regulations more efficient by increasing their flexibility have not won wide acceptance in environmental policymaking.⁷¹

One reason why flexible economic approaches to environmental regulation have not attained greater acceptance is that their proponents have not convinced policymakers that they will improve levels of environmental protection even as they relax "inefficient" environmental controls. Environmental groups who have embraced economics to promote alternatives that have clear environmental benefits have received a positive response.⁷² Arguments for greater flexibility more frequently are perceived, however, as efforts to weaken environmental standards.⁷³

69. The classic work usually cited as having laid the foundation for welfare economics is A. PIGOU, *THE ECONOMICS OF WELFARE* (1920). See also Willey, Book Review, 11 *ECOLOGY L.Q.* 95, 98 n.9 (1983) (reviewing W. TUCKER, *PROGRESS AND PRIVILEGE: AMERICA IN THE AGE OF ENVIRONMENTALISM* (1982)).

70. W.R.Z. Willey, *Economic Criteria in Environmental Regulation—Prospects for the 1980's*, 64 *AM. J. AGRIC. ECON.* 935 (1982).

71. Farber, *From Plastic Trees to Arrow's Theorem*, 1986 *U. ILL. L. REV.* 337.

72. See, e.g., D. ROE, *DYNAMOS AND VIRGINS* (1984) (describing how the construction of two coal-fired power plants was successfully opposed by an environmental group that proposed a more economic and benign environmental alternative). See also Emshwiller, *Power Struggles: Environmental Group, In Charge of Strategy, Is Stressing Economics*, *Wall St. J.*, Sept. 28, 1981, § 1, at 1, col. 1.

73. Experience with the regulatory review process established by the Reagan administration pursuant to Executive Order 12,291 illustrates how opponents of environmental regulations have used economics in a remarkably asymmetric way. Although the Executive Order provides that regulators shall attempt "to maximize the net benefits to society" of regulation, Exec. Order No. 12,291, § 2(c), 46 *Fed. Reg.* 13,193 (1981), the OMB's guiding principle has instead been an antiregulatory approach. Under the Executive Order, cost-benefit analysis is required before major regulations can be promul-

This does not imply that economists should give up their efforts to develop more efficient regulatory approaches. But they must be mindful that values other than efficiency are also important. The distributional impact of regulatory policy is of vital importance in a society in which votes are distributed more equally than income.⁷⁴ Thus, proponents of new regulatory approaches must concentrate on the development of approaches that offer substantial environmental, as well as economic, benefits.

IV. CONCLUSION

The competing interests involved in environmental policy issues sometimes seem so difficult to resolve that they appear to be antinomies—intractable conflicts or choices seemingly insoluble in light of existing knowledge. Environmental regulators must wrestle with competing principles of preservation and access, freedom and order, innovation and certainty, which are not capable of easy resolution.

The challenge of protecting the Nation's coasts and estuaries continually confronts us with such difficult questions: Can public policy protect critical natural resources while promoting increased public access to them? Can environmental contamination be prevented before it occurs if its source and impact are not fully understood until after damage is done? Can regulatory policy protect environmental quality when multiple point and nonpoint sources

gated; but it is not required to repeal such regulations. Thus, in February 1982 the EPA proposed to repeal limits on the maximum amount of lead additives used in gasoline without performing any cost-benefit analysis. 47 Fed. Reg. 7812 (1982) (to be codified at 40 C.F.R. Pt. 80) (proposed Feb. 22, 1982). Two years later, however, after the move to repeal the lead limits had failed, the EPA considered strengthening the standard. The cost-benefit analysis performed by the EPA demonstrated that more than \$1 billion in net benefits of reduced medical care and automotive maintenance expenses would be produced annually by virtually eliminating lead from gasoline. U.S. ENVIRONMENTAL PROTECTION AGENCY, COSTS AND BENEFITS OF REDUCING LEAD IN GASOLINE (Mar. 1984). Ironically, this is one of the rare examples of the use of cost-benefit analysis to strengthen environmental regulations.

74. Mark Sagoff has argued that maximization of economic efficiency is not a principle that individuals have adopted for making decisions left to the political process. Although individuals may seek to maximize their individual self-interest, and economically efficient policies are capable of generating a larger pie for distribution to individuals, individuals make political choices based on a conception of the common interest that may differ substantially from economic principles of efficiency. See, e.g., Sagoff, *We Have Met the Enemy and He Is Us or Conflict and Contradiction in Environmental Law*, 12 ENVTL. L. 283 (1982); Sagoff, *Economic Theory and Environmental Law*, 79 MICH. L. REV. 1393 (1981). For a critique of Sagoff's argument and an alternative exploration of why economics has not had more influence on environmental law, see Farber, *supra* note 71.

contribute a bewilderingly complex combination of pollutants? Can critical areas be preserved without interfering with constitutionally protected property rights?

Despite past disappointments, officials in the Chesapeake Bay region have strengthened their public commitment to "Save the Bay" by expanding their unique interstate agreement and pledging comprehensive and coordinated actions. The articles that follow offer some useful suggestions for turning this "official IOU" into effective policy that bridges the all too frequent gulf between the promise and product of environmental regulation.