
TOWARD A SUSTAINABLE URBANISM: LESSONS FROM FEDERAL REGULATION OF URBAN STORMWATER RUNOFF

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I. INTRODUCTION: THE SEARCH FOR A "SUSTAINABLE URBANISM"

The point of environmentalism today . . . may be to return to the concept of dwelling-place or habitat, to find nature, like the bluebird of happiness, in our own yards. It is to understand our . . . community with each other as a commitment to the places where we make our "earthly abode."¹

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1. Mark Sagoff, *Settling America or The Concept of Place in Environmental Ethics*, 12 J. ENERGY NAT. RESOURCES & ENVTL. L. 349, 393 (1992).

In the pursuit of environmental quality, we are, as the saying goes, all in it together.² The environment cannot accommodate all individual wants without limit; only the most vocal critics of controls on environmental degradation continue to believe in universal abundance and the indefinite expansion of the American culture of overconsumption.³ To one extent or another, then, the debate over the future of environmental policy involves a search for a transformative principle to guide social progress into the next century.⁴ Critics of existing environmental laws envision a future that emphasizes the primacy of private property rights,⁵ which would produce too many negative externalities.⁶ Consequently, the concept of "sustainability" has emerged as a potential alternative paradigm.⁷

2. For a recent, poignant use of this maxim in an environmental context, see *Oversight Hearing on Wolf Reintroduction, House Committee on Resources*, 104th Cong., 1st Sess. (Jan. 26, 1995) (testimony of Renee Askins, Executive Director, The Wolf Fund).

3. The root causes of unbridled growth have not been addressed effectively. Professor Arnold Reitze's outstanding review of the first twenty years of environmental law pointed to uncontrolled growth in population, consumption, and pollution as the sources of most global environmental degradation. Arnold W. Reitze, Jr., *Environmental Policy — It Is Time For a New Beginning*, 14 COLUM. J. ENVTL. L. 111 (1989). For a summary of the challenges to environmental progress, see Richard O. Brooks, *A New Agenda for Modern Environmental Law*, 6 J. ENVTL. L. & LITIG. 1 (1991).

4. David J. Willis, *Ecophilosophy and Natural Law*, 12 J. ENERGY NAT. RESOURCES & ENVTL. L. 419, 419 (1992) ("In varying degrees, participants from all corners of the environmental debate are seeking to formulate an environmentally sound philosophy of living and lawmaking which effectively balances and incorporates competing demands upon our wealth and natural resources.") (footnote omitted).

5. See generally Michael Allan Wolf, *Overtaking the Fifth Amendment: The Legislative Backlash Against Environmentalism*, 6 FORDHAM ENVTL. L. J. (forthcoming 1995) (copy on file with author) (describing the private property rights movement's attack on environmental laws).

6. See, e.g., ZYGMUNT J.B. PLATER ET AL., ENVIRONMENTAL LAW AND POLICY: A COURSEBOOK ON NATURE, LAW, AND SOCIETY 40-41 (1992). In a nonenvironmental context, see Margaret Chon, *Postmodern "Progress": Reconsidering the Copyright and Patent Power*, 43 DEPAUL L. REV. 97, 126 (1993) ("Optimism in a progress without externalities has been questioned and found wanting.").

7. "Sustainability" has been a basis for wide-ranging discussions about the long-term relationship between economic growth and environmental protection, and references to it in the context of environmental protection are accumulating rapidly. While a complete bibliography is beyond the scope of this Article, references consulted for this Article include: INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES, WORLD CONSERVATION STRATEGY: LIVING RESOURCE CONSERVATION FOR SUSTAINABLE DEVELOPMENT (1980); ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, ENVIRONMENTAL POLICIES FOR CITIES IN THE 1990S (1990) [hereinafter

At present, the notion of "sustainability" is too ambiguous to function as a universal standard for societal progress.⁸ It serves as a rallying cry for the environmental community,⁹ but its vagueness hinders more widespread application. Some use the term "sustainability," particularly when speaking of "sustainable development," to address equity concerns, such as achieving a just distribution of resources between developed and developing nations.¹⁰ Other authors use

OECD]; WORLD COMM'N ON ENVIRONMENT AND DEVELOPMENT, OUR COMMON FUTURE (1987); PETER CALTHORPE, THE NEXT GREAT AMERICAN METROPOLIS: ECOLOGY, COMMUNITY, AND THE AMERICAN DREAM (1993); JAMES HOWARD KUNSTLER, THE GEOGRAPHY OF NOWHERE: THE RISE AND DECLINE OF AMERICA'S MAN-MADE LANDSCAPE 246 (1993) (contrasting a "sustainable economy" of the future with "our present exhaustive economy"); ROBERT C. PAEHLKE, ENVIRONMENTALISM AND THE FUTURE OF PROGRESSIVE POLITICS 140 (1989); PHILIP SHABECOFF, A FIERCE GREEN FIRE: THE AMERICAN ENVIRONMENTAL MOVEMENT 198-99 (1993); DANIEL SPERLING, FUTURE DRIVE: ELECTRIC VEHICLES AND SUSTAINABLE TRANSPORTATION (1995); SUSTAINABLE CITIES: CONCEPTS AND STRATEGIES FOR ECO-CITY DEVELOPMENT (Bob Walter et al. eds., 1992); Helen Endre-Stacy, *Sustaining ESD in Australia*, 69 CHI.-KENT L. REV. 935 (1994); William Goldfarb, *Watershed Management: Slogan or Solution*, 21 B.C. ENVTL. AFF. L. REV. 483, 483 (1994) (comparing the use of "sustainability" and "watershed management"); Sagoff, *supra* note 1, at 409-11; Christopher D. Stone, *Deciphering "Sustainable Development"*, 69 CHI.-KENT L. REV. 977 (1994); A. Dan Tarlock, *City Versus Countryside: Environmental Equity in Context*, 21 FORDHAM URB. L. J. 461, 491-94 (1994) [hereinafter Tarlock, *City Versus Countryside*]; A. Dan Tarlock, *Environmental Protection: The Potential Misfit Between Equity and Efficiency*, 63 U. COLO. L. REV. 871 (1992) [hereinafter Tarlock, *Environmental Protection*] (describing the relationship between "sustainable development" and equity in environmental protection); Lurton W. Blassingame, *Edge City or Eco-City: Whither Urban America?* 8 (presented at the Urban Affairs Association 23rd Annual Conference, Indianapolis, Indiana, Apr. 24, 1993) (on file with author).

8. SHABECOFF, *supra* note 7, at 288 ("Sustainable development may now be regarded as a cliché . . ."); Tarlock, *Environmental Protection*, *supra* note 7, at 894 ("[S]ustainable development is, unfortunately, [not] a self-defining term.").

9. Goldfarb, *supra* note 7, at 483 (noting that "sustainability" has a "powerful prescriptive and hortatory meaning," and serves as a "valuable tool[] for articulating goals, stating general objectives, and mobilizing public support," but "tend[s] to] be employed as [a] manipulative and confusing slogan").

10. See MARTIN W. LEWIS, GREEN DELUSIONS: AN ENVIRONMENTALIST CRITIQUE OF RADICAL ENVIRONMENTALISM 201 (1992); SHABECOFF, *supra* note 7, at 199; Sagoff, *supra* note 1, at 416 ("The maintenance of a livable global environment . . . depends on the sustainable development of the entire human family.") (quoting W. Ruckelshaus, *Toward a Sustainable World: Government and Industry Policies Necessary for Sustained World Development*, SCI. AM., Sept. 1989, at 168); Tarlock, *Environmental Protection*, *supra* note 7, at 894; Blassingame, *supra* note 7, at 11.

In this context, Professor Tarlock sees "sustainable development" as having the potential to respond to the environmental justice movement's charge that environmental protection

“sustainable” to refer to increasing efficient use of energy and natural resources.¹¹ For example, political scientist Robert Paehlke posits that a sustainable society has a “revulsion to waste.”¹² This is not a new idea for contemporary environmentalists, who call for increased attention to pollution prevention and waste reduction strategies.¹³

Some authors have begun to define sustainability by emphasizing the interconnectedness between humans and the nonhuman environment. Under this approach, sustainability implies a sort of parity and respect between human and nonhuman systems.¹⁴ Achieving this parity will not be easy.¹⁵ Not only does it require “do less harm” strategies such

efforts have created fundamental disparities in the allocation of environmental costs and benefits. He notes that early environmental protection efforts may have minimized impacts on distributive equity, and that the environmental justice movement has forced reconsideration of equity concerns. Tarlock, *Environmental Protection*, *supra* note 7, at 884. See generally Richard J. Lazarus, *Pursuing “Environmental Justice”: The Distributional Effects of Environmental Protection*, 87 NW. U. L. REV. 787 (1993) [hereinafter Lazarus, *Pursuing “Environmental Justice”*] (describing changes to environmental protection efforts required to promote equity).

11. PAEHLKE, *supra* note 7, at 140-41; Ronald J. Kilcoyne, *A Sustainable Transportation Policy*, URB. ECOLOGIST, Fall 1992, at 5; Sagoff, *supra* note 1, at 410 (describing the efforts of economist H.E. Daly to “build an environmental macroeconomics . . . in terms of calibrating aggregate economic activity to the natural systems that contain and sustain it”); Tarlock, *Environmental Protection*, *supra* note 7, at 895; Blasingame, *supra* note 7, at 7.

12. PAEHLKE, *supra* note 7, at 164.

13. See generally Bradley C. Bobertz, *The Tools of Prevention: Opportunities for Promoting Pollution Prevention under Federal Environmental Legislation*, 12 VA. ENVTL. L. J. 1 (1992) (discussing opportunities for industrial pollution prevention under existing environmental laws); Thomas R. Mounteer, *The Inherent Worthiness of the Struggle: The Emergence of Mandatory Pollution Prevention Planning as an Environmental Regulatory Ethic*, 19 COLUM. J. ENVTL. L. 251 (1994) (discussing statutory mandates for planning for pollution prevention). The Pollution Prevention Act of 1990 “established a clear national policy that pollution should be prevented or reduced at the source whenever possible.” Bobertz, *supra*, at 1; Pollution Prevention Act of 1990, 42 U.S.C. §§ 13,101-13,109 (Supp. II 1990).

Minimizing deleterious impacts on the environment offers an inherent appeal. See, e.g., Sim Van der Ryn, *Building a Sustainable Future*, in SUSTAINABLE CITIES, *supra* note 7, at 68. With technologies available today, and with relatively little cost, we can make great strides in reducing harm to the environment. See, e.g., Bobertz, *supra*, at 6 (describing industrial process changes available for pollution prevention).

14. See DANIEL A. COLEMAN, *ECOPOLITICS: BUILDING A GREEN SOCIETY* 100-02 (1994).

15. Prof. Brooks, for example, sees this as requiring a complete reinterpretation of our environmental ethic:

as waste minimization and pollution prevention, but it also demands that we observe an ethic that respects nature's processes.¹⁶ We need to "describe the natural world and to evaluate our actions toward it in ways that presuppose . . . [a] community between nature and mankind."¹⁷ Thus, a working model of sustainability is an aspiration to move beyond our dominance of nature toward viewing ourselves as part of a community with nature. Maintaining our society requires that we cultivate nature as our habitat,¹⁸ and preserve that habitat for future generations.¹⁹ Our creations must respect nature and recognize that we are inextricably bound together.²⁰

This Article begins to examine the feasibility of a sustainable urban America,²¹ focusing on the "Edge Cities"²² growing on America's

Unfortunately, [environmental] ethical analysis has often been hermetically separated from a historical and legal study of these ideals and the ways in which these ideals are institutionalized in everyday practice.

. . . Viewing ourselves as part of this web of nature heightens our sense of respect for other parts of the system, thus giving a new meaning to the rights of nonhuman nature, a sense of sharing the environment in common, and redefining our environment in bioregional terms.

Brooks, *supra* note 3, at 15-16.

16. COLEMAN, *supra* note 14, at 100-02; PAEHLKE, *supra* note 7, at 140.

17. Sagoff, *supra* note 1, at 410.

18. *Id.* at 417. Professor Sagoff views "[t]he appropriate cultivation of nature as habitat — which is neither to preserve nature for its own sake or to industrialize it for the sake of maximizing wealth" as possibly "America's next great moral achievement." *Id.*

19. See, e.g., COLEMAN, *supra* note 14, at 105-07; Patricia L. Faux, *Cutting Edge in Saving the Planet, Retrofit with Ecology*, THE EDGE CITY NEWS (The Edge City Project, Manassas, VA), Mar., 1994, at 1, 2 (copy on file with author) ("Sustainability is the condition of leaving something in as good shape — or better — when you're done with it as it was when you received it").

20. COLEMAN, *supra* note 14, at 7 ("Ultimately, the crusade to save the planet must bring us home to find a better way of living for ourselves, our communities, and our species, based on the understanding that our political life as citizens and the natural ecology on which we depend are intimately bound together.").

21. This effort is well underway. The first national conference on sustainable communities took place in November 1993, in Washington, D.C., attracting over 300 participants. *Sustainable Conference*, THE EDGE CITY NEWS, Mar., 1994, at 7. A standing-room-only gathering opened the First Los Angeles Ecological Cities Conference in June 1991. See Bob Walter, *The New Partnership*, in SUSTAINABLE CITIES, *supra* note 7, at 5.

22. JOEL GARREAU, *EDGE CITY: LIFE ON THE NEW FRONTIER* (1991) first used this term to refer to new cities in America's suburbs.

urban fringe.²³ Until very recently, the notion of a “sustainable city” was considered oxymoronic; cities were generally thought to be completely separate from and inflicting damage on nature.²⁴ Viewing cities as part of the environmental problem, not as part of the solution, dates back to some early conservationists’ love of a pastoral America and deep-seated doubts about urban life.²⁵ To modern critics such as Theodore Roszak, cities are a “pox” that must be eradicated to save the health of the planet.²⁶

23. See *infra* notes 148-64 and accompanying text.

24. Tarlock, *City Versus Countryside*, *supra* note 7, at 493; Blassingame, *supra* note 7, at 7. Historically, environmental thought has rejected cities as an insult to nature, instead of recognizing them as sustainable entities. A “sustainable urbanism” would represent a substantial departure from the major traditions of environmental thought: preservationism and conservationism. Modern interpretations of the preservationists’ veneration of the wilderness or the conservationists’ utilitarian philosophy describe the essential character of our relationship with nature as dichotomous: nature stands apart from humankind. Sagoff, *supra* note 1, at 406.

Preservationists (such as John Muir) pursued autonomy for pristine wildernesses. Sagoff, *supra* note 1, at 403-04; Tarlock, *Environmental Protection*, *supra* note 7, at 879. See generally SAMUEL P. HAYS & BARBARA D. HAYS, *BEAUTY, HEALTH AND PERMANENCE: ENVIRONMENTAL POLICIES IN THE UNITED STATES 1955-1985* (1987) (describing the history of environmental thought).

Conservationists, influenced by scientists who had joined expeditions to the West, invoked the lessons learned from science and technology to manage nature for human benefit. Sagoff, *supra* note 1, at 404-05; see Tarlock, *Environmental Protection*, *supra* note 7, at 877-79 (discussing the conservationists and their influence on modern environmental thought). The most familiar modern legacies of the conservationist ideal are the federal land management statutes, which accommodate competing uses of federal lands through the managerial concept of “sustainable yield.” Federal Land Policy and Management Act of 1976 § 302(a), 43 U.S.C. § 1732(a) (1988) (FLPMA) (requiring management of federal lands under principles of multiple use and sustainable yield). See generally Marion Clawson, *FLPMA of 1976 in a Broad Historical Perspective*, 21 ARIZ. L. REV. 585 (1980) (discussing the historical context of the FLPMA).

25. See LEO MARX, *THE MACHINE IN THE GARDEN* 232 (1964) (describing Ralph Waldo Emerson’s “contempt for cities”); SHABECOFF, *supra* note 7, at 21; ANNE WHISTON SPIRN, *THE GRANITE GARDEN: URBAN NATURE AND HUMAN DESIGN* 291 (1984) (discussing an “anti-urban strain in American culture and literature”).

26. ROBERT GOTTLIEB, *FORCING THE SPRING: THE TRANSFORMATION OF THE AMERICAN ENVIRONMENTAL MOVEMENT* 88 (1993) (describing environmentalist Murray Bookchin’s argument that “[p]ollution and uncontrolled growth [has] pushed the antagonism between the land and the city to its breaking point”); LEWIS, *supra* note 10, at 88-89, 98 describing the views of “extremists” such as Jeremy Rifkin); THEODORE ROSZAK, *THE VOICE OF THE EARTH* 220 (1992) (“As a way of life, urbanism was never intended for more than a small minority of maniacal warlords, profit-frenzied merchants, and eccentric individuals”); Tarlock, *City Versus Countryside*, *supra* note 7, at 466.

Undeniably, cities contribute substantially to adverse environmental impacts. They consume far more resources than they produce.²⁷ Urban populations face a broad array of environmental insults: air and water pollution, noise and congestion, and seemingly intractable problems of waste disposal.²⁸ Edge Cities are some of America's most environmentally degraded cities, completely lacking the elements of genuine interaction with nature.²⁹ Claude Levi-Strauss called the city "the human invention par excellence," a "natural object and a thing to be cultivated" that stands "at the point where nature and artifice meet."³⁰ But Edge Cities mock Levi-Strauss' comparison of cities to symphonies and poems.

Today's cities are not sustainable, yet we need not abandon urban centers and return to rural living. Indeed, an environmentally sound society must have urban centers. Large-scale deconcentration of cities would probably add to, not resolve, our environmental ailments.³¹ Environmentalism needs to recognize that cities must coexist with pristine wildernesses — a notion that runs counter to the ideals of most modern environmentalists.³² While critics often overemphasize the

27. Ernest Callenbach, *The Fate of our Cities is the Fate of the Earth*, in SUSTAINABLE CITIES, *supra* note 7, at 10; SPIRN, *supra* note 25, at 240; Blassingame, *supra* note 7, at 7.

28. See OECD, *supra* note 7, at 21-27; SPIRN, *supra* note 25, at 41 (observing that the air in major urban centers remains unhealthy); Blassingame, *supra* note 7, at 7.

29. LEWIS, *supra* note 10, at 101 ("Environmentally, suburbs may be the worst of all possible worlds.") (footnote omitted). In this respect, the Edge Cities are the spiritual descendants of a number of failed urban planning theories. See *infra* notes 388-92.

30. SPIRN, *supra* note 25, at inside front cover (quoting CLAUDE LEVI-STRAUSS, TRISTES TROPIQUES (1955)).

31. LEWIS, *supra* note 10, at 8, 93; PAEHLKE, *supra* note 7, at 246. Our current population, which continues to grow, requires the environmental benefits that cities can provide. PAEHLKE, *supra* note 7, at 247-51 (describing a number of benefits of urban living, including enhanced energy efficiency).

32. KUNSTLER, *supra* note 7, at 249 ("Even environmentalists, committed to the rescue of wild places, have failed to address the problem of human ecology in the places where we live and work."); PAEHLKE, *supra* note 7, at 245-46 ("The development of an explicitly urban dimension to environmentalists' image of the future directly opposes the decentralism of . . . classic environmental works . . ."); Tarlock, *City Versus Countryside*, *supra* note 7, at 473 ("Environmentalists define 'environment' as the natural environment, and focus on its destruction by urbanization.").

ardor among many environmentalists for a decentralized society,³³ an antiurban bias does exist and it hampers environmental protection efforts in cities.³⁴

In short, we must have cities.³⁵ To make cities sustainable, however, they must be "integrated into the countryside, not set apart from it."³⁶ We need a new land ethic that attempts to find an equilibrium between the wilderness and the manufactured landscape³⁷ and views

33. Urbanization is more widespread in late 20th century America than it was in the heyday of the turn-of-the-century conservationists. Modern environmentalism, reflecting this trend, has focused more on urban problems such as air and water pollution than did early conservationism. See, e.g., GOTTLIEB, *supra* note 26, at 134-35. At times, the activities of mainstream environmental groups have an explicit urban orientation: eventually, "as [environmental groups] squint across decades of indifference to the plight of the cities, they are seeing the wreckage left behind when their parents and grandparents fled." Robert W. Collin, *Environmental Equity: A Law and Planning Approach to Environmental Racism*, 11 VA. ENVTL. L. J. 495, 518 (1992) (quoting Peter Steinhart, *What Can We Do About Environmental Racism?*, AUDUBON MAGAZINE, May, 1991, at 18, 20).

34. For many, the ideal society continues to be bucolic and decentralized, and urban environmental protection remains a secondary concern. LEWIS, *supra* note 10, at 101; Tarlock, *City Versus Countryside*, *supra* note 7, at 470-71 (describing the Arcadian antiurban bias in American environmentalism); see also Lazarus, *Pursuing "Environmental Justice"*, *supra* note 10, at 824-25 ("Not surprisingly, those who reside and work in polluted urban areas place greater priority on the urban and industrial environment than do those in the environmental community . . .").

35. The great urban writer Jane Jacobs perhaps put it best: Vital cities have marvelous innate abilities for understanding, communicating, contriving and inventing what is required to combat their difficulties. . . .

It may be romantic to search for the salves of society's ills in slow-moving rustic surroundings, or among innocent, unspoiled provincials, if such exist, but it is a waste of time. . . .

Dull, inert cities, it is true, do contain the seeds of their own destruction and little else. But lively, diverse, intense cities contain the seeds of their own regeneration, with energy enough to carry over for problems and needs outside themselves. JANE JACOBS, *THE DEATH AND LIFE OF GREAT AMERICAN CITIES* 447-48 (1961).

36. Tarlock, *City Versus Countryside*, *supra* note 7, at 492. See also SPIRN, *supra* note 25, at 244-46.

37. GARREAU, *supra* note 22, at 397-98 ("To have this fundamental problem of land ethics defined, or understood, as mainly 'a fight for the wilderness' hurts us . . .") (quoting Barry Lopez, *Unbounded Wilderness*, APERTURE, Late Summer, 1990, at 2); SPIRN, *supra* note 25, at 37 ("It is time to expand what has been a romantic attachment to the ornaments of nature into a commitment to reshape the city in harmony with the workings of nature."); Tarlock, *City Versus Countryside*, *supra* note 7, at 493 ("[T]he mainstream environmental movement must, as modern ecology is doing, abandon the distinction between human dominated and natural ecosystems.").

the city and countryside as a single system linked by the processes of nature.³⁸ It seems especially appropriate to design pollution control strategies to cope with the evolving landscapes of Edge Cities to achieve sustainability.³⁹

Stating that humans have the right and responsibility to chronicle and respect natural processes sounds dangerously close to insisting that we assume control of nature, a viewpoint discredited long ago. Although humans cannot control nature,⁴⁰ biologist Daniel Botkin's influential book on modern ecology suggests that even when we attempt to leave nature undisturbed, we still engage in some form of management.⁴¹ Unfortunately, we must make managerial decisions with imperfect information because we have a finite understanding of the complexities of nature and the outcomes of various actions.

To coexist in harmony with nature, we might establish a "biocentric democracy," in which humans and nonhuman species have coextensive rights. This is an alternative to anthropocentrism proposed by some

38. SPIRN, *supra* note 25, at 37; Sim Van der Ryn, *Building a Sustainable Future*, in SUSTAINABLE CITIES, *supra* note 7, at 63.

39. For example, pollution controls can be implemented during the development stages of an Edge City. See *infra* notes 139-47 and accompanying text.

40. See RACHEL CARSON, SILENT SPRING 297 (1962) ("The 'control of nature' is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man").

41. Each principal chapter in DANIEL B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY (1990), features a case study in ecosystem management that describes our impacts on our surroundings.

The literary and critical tradition of separating "nature" and "humanity" is a long one. In the powerful metaphor of Leo Marx, we are the "machine in the garden": once we become part of the landscape, the pristine character of the wild is disturbed forever. MARX, *supra* note 25. The effect of this metaphysical separation is our establishment of a remoteness from nature that desensitizes us to environmental despoliation. Sagoff, *supra* note 1, at 391-92. The work of Botkin and others suggests it is inappropriate to deny that we continually intervene in the natural world; in effect, the separation of humans and nature is impossible. See Reed F. Noss, *Some Principles of Conservation Biology, As They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 894 (1994) ("Almost all conservationists agree that some sort of 'ecosystem management' is necessary to maintain biodiversity and ecological integrity in today's world.").

Professor Sagoff states that when we attempt to "preserve" nature, we create art, not nature. What appears to us to be nature undisturbed is nothing more than our vision of an autonomous entity, not a true independent state of nature. Sagoff, *supra* note 1, at 408; see also GARREAU, *supra* note 22, at 390 ("[T]oday, even apparently untouched landscapes are usually deliberate human artifacts . . .").

“Deep Ecologists,” who insist that the rights of humankind must extend to all species.⁴² To propose this is to recognize one of its many inherent contradictions: humans would still make any determination of biological egalitarianism, which would be suspect on that ground alone.⁴³

Therefore, environmentalism should neither emphasize our remoteness from nature,⁴⁴ nor advocate that we dominate nature. The challenge facing environmentalism in the 1990s — refining the concept of the “community with nature”⁴⁵ — is one that will occupy environmental lawyers and policymakers for decades to come.⁴⁶ This Article focuses on the particularly vexing challenge of forging a sustainable urbanism in Edge Cities and analyzes regulatory attempts to control urban stormwater⁴⁷ runoff. If our task is to “describe the natural world and to evaluate our actions toward it in ways that presuppose . . . [a] community between nature and mankind,”⁴⁸ we must also characterize and address this source of considerable pollution,⁴⁹ which originates

42. See, e.g., LEWIS, *supra* note 10, at 28; ROSZAK, *supra* note 26, at 233.

43. LEWIS, *supra* note 10, at 8.

44. Professor Lewis states:

Many practicing ecologists, however, have begun to reassess the standard environmentalist view of the proper connection between people and nature. No longer, scientists like Botkin argue, can we dream of fitting passively within a preexisting balance. Not only do natural communities continually change, but the human impact itself is inescapably transforming. The best we hope for is to minimize our deleterious effects through wise management.

Id. at 57.

45. Sagoff, *supra* note 1, at 410.

46. See, e.g., PLATER ET AL., *supra* note 6, at 11 (“Law will be a participant in the mission to bring human kind and the planet into equilibrium, even if that sometimes appears to be a quixotic quest.”); Blassingame, *supra* note 7, at 22.

47. The EPA’s rules for control of stormwater runoff define “storm water” as “storm water runoff, snow melt runoff, and surface runoff and drainage.” 40 C.F.R. § 122.26(b)(13) (1994).

In this Article, I refer to “stormwater,” rather than “storm water,” unless citing to a source that presents the term as two words. In 1988, the EPA requested comments on this issue. 53 Fed. Reg. 49,416, 49,426-27 (1988). The EPA concluded that even though Congress used one word in the provision of the 1987 Water Quality Act addressing stormwater discharges, the EPA would henceforth use two words. 55 Fed. Reg. 47,990, 47,997 (1990). For consistency with the federal statute, I will use one word.

48. Sagoff, *supra* note 1, at 410.

49. See *infra* notes 67-99 and accompanying text.

from thousands of dispersed locations.⁵⁰

Unfortunately, environmental protection efforts have only begun to address the pollution of urban stormwater runoff.⁵¹ Parts II and III of this Article detail these largely unsuccessful attempts and conclude that the federal stormwater runoff pollution control program faces overwhelming and possibly insurmountable hurdles.⁵² Part IV examines the control of urban stormwater runoff in Edge Cities. While the federal stormwater program could, and should, address stormwater pollution prevention in these rapidly growing areas, it does not do so effectively. This shortcoming is amplified because it is more cost-effective to address incipient problems at an early stage of Edge Cities' rapid development than to correct them later.⁵³ This Article concludes that the federal program has not been successful in this regard and that state and local efforts may be more promising.

50. See *infra* notes 74-78 and accompanying text.

51. See *infra* part III.

52. See *infra* part III.F.

53. The challenge, of course, is to build Edge Cities that are more in harmony with nature. KUNSTLER, *supra* note 7, at 246 (“[W]e can’t have a sustainable economy unless we build a physical setting to house it.”); Blassingame, *supra* note 7, at 18 (suggesting that achieving harmony with nature is best done in designing cities).

II. STORMWATER POLLUTION: NOT JUST A "DROP IN THE BUCKET"?

*Our urban runoff problem has grown to this looming dimension precisely because we ignored it for decades. If we wait for the problem to worsen, we will be forced to spend scarce public dollars on remedial actions. It is far more financially, technically, and economically prudent to invest both public and private resources in preventative [sic] actions today.*⁵⁴

*Our homeless fill the streets, our hospital emergency rooms are too clogged to take emergencies, the economy is still stuttering, consumer debt is higher than a rock band, and our bridges really are falling down. But by God this country is going to have pure storm water runoff. Which ought to be a great comfort to the sick and the homeless, the commuting consumer, and especially the rock band.*⁵⁵

A. Stormwater Runoff's Contribution to Water Pollution

One important measure of a city's environmental success is stormwater management. Cities have struggled with stormwater drainage and other issues related to water quantity and quality — its supply, usage, and disposal — throughout history.⁵⁶ Storm sewer systems provide drainage for stormwater discharges onto developed lands.⁵⁷ A stormwater "discharge" occurs whenever rainwater falls. Unless rainwater percolates into the soil, it runs off, carrying materials from the ground's surface into waterways.⁵⁸ To address this runoff, municipali-

54. *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources*, 104th Cong., 1st Sess. (Feb. 24, 1995) (testimony of Jessica C. Landman, Senior Attorney, Natural Resources Defense Council) [hereinafter *Landman Testimony*].

55. Sally A. Longroy, *The Regulation of Storm Water Runoff and its Impact on Aviation*, 58 J. AIR L. & COM. 555, 560 n.25 (1992) (quoting Johnine J. Brown, *EPA's New Storm Water Regulations are a Costly Priority*, ILL. LEGAL TIMES, May, 1991, at 10).

56. SPIRN, *supra* note 25, at 143.

57. *See, e.g.*, 55 Fed. Reg. 47,990, 48,038 (1990); Claudia Copeland, *Stormwater Permits: Status of EPA's Regulatory Program*, Congressional Research Service Report for Congress, 94-811 ENR 1 (Oct. 24, 1994) [hereinafter Copeland, *Stormwater Permits*].

58. *See, e.g.*, THOMAS R. SCHUELER, METROPOLITAN WASHINGTON COUNCIL OF GOVTS., DEPT. OF ENVTL. PROGS., CONTROLLING URBAN RUNOFF: A PRACTICAL MANUAL FOR PLANNING AND DESIGNING URBAN BMPs 1.1 (1987).

ties have created artificial drainage networks, consisting of curbs, gutters, catch basins, storm sewers, and concretized channels,⁵⁹ which convey excess runoff from sites where rainwater falls.⁶⁰ A municipality's "separate" storm sewer system is one such system designed to carry only stormwater runoff.⁶¹ For convenience, this Article will refer to a "municipal separate storm sewer system" by its common abbreviation, "MS4."

The amount of stormwater flow from a particular site depends on rainfall patterns and a complex web of other factors. Thus, stormwater flow is both intermittent⁶² and unpredictable.⁶³ As urban development intensifies, the volume and rate of runoff increase tremendously.⁶⁴ Structures and impervious surfaces (such as paved parking lots, city streets, and driveways) cover soils, fill wetlands, and destroy vegetation that would otherwise slow and absorb stormwater runoff. This results in higher runoff rates, because the stormwater passes over a smoother surface.⁶⁵ Stormwater runoff flushes whatever substances are present on the surface into the system of drainage conveyances, and eventually into receiving waters. By the time this runoff reaches larger bodies of

59. See 55 Fed. Reg. 47,990, 48,036 (1990) (defining "municipal separate storm sewer" to include streets, catch basins, curbs, gutters, ditches, man-made channels, and storm drains); ROBERT W. ADLER ET AL., *THE CLEAN WATER ACT: 20 YEARS LATER* 193 (1993) ("Urban streams are concretized and channelized, [and] used as conduits for stormwater runoff . . .").

60. SCHUELER, *supra* note 58, at 1.1.

61. The regulatory definition of a separate storm sewer system excludes combined sewer systems (which carry sewage) and any conveyances that are part of a publicly owned treatment works. See 40 C.F.R. §§ 122.26(b)(8)(ii), 122.26(b)(8)(iii) (1994); see *infra* notes 114-33 and accompanying text (discussing the different regulatory approaches for separate and combined systems).

62. Goldfarb, *supra* note 7, at 494; Longroy, *supra* note 55, at 558.

63. Many factors are involved in measuring the amount of stormwater flow at any given location. These include the duration and intensity of rainfall events, the topography, the type of ground cover (including soil conditions and impervious cover such as pavements and structures) and the saturation point of the land due to any previous rainfall. See 55 Fed. Reg. 47,990, 48,038 (1990); SCHUELER, *supra* note 58, at 1.10-1.15; SPIRN, *supra* note 25, at 166; Susan P. Schoettle & David G. Richardson, *Nontraditional Uses of the Utility Concept to Fund Public Facilities*, 25 *URB. LAW.* 519, 535 (Summer, 1993).

64. 55 Fed. Reg. 47,990, 48,038 (1990) ("NURP and other studies have verified that . . . pollutant loads from urban runoff strongly depend on the total area and imperviousness of developed land, which in turn is related to population.").

65. Frank E. Maloney *et al.*, *Storm Runoff Control: A Model Ordinance for Meeting Local Water Quality Management Needs*, 20 *NAT. RESOURCES J.* 713, 717 (1980).

water, it is usually contaminated enough to warrant controls.⁶⁶

Stormwater conveyances "short-circuit [the] hydrologic cycle, with disastrous results."⁶⁷ Rainfall drained from urban streets and other heavily populated areas is often tainted with a wide variety of hazardous substances: road salts,⁶⁸ nutrients, suspended solids, trace metals, pesticides, herbicides, fungicides, fertilizers, petroleum products, and other chemicals⁶⁹ widely disposed of in urban areas.⁷⁰ Additionally, airborne pollutants, such as those contained in automobile emissions, are highly concentrated in urban areas and wash off into stormwater. Stormwater drains often become the repositories for used oil and antifreeze that wash off into drainage systems.⁷¹ Industrial dischargers

66. As the quote at the beginning of this Part suggests, there are those who believe that stormwater runoff pollution is an inconsequential problem. Minneapolis Mayor Donald Fraser, speaking on behalf of the National League of Cities at a recent Senate hearing, claimed that "Congress, EPA, and environmental groups have never convinced municipal officials that urban storm water runoff is a priority problem deserving of major local investments." *Water Pollution: Environmentalist, City Official Disagree on Storm Water Aspects of Senate CWA Bill*, 24 Env't. Rep. (BNA) 343, June 25, 1993.

Even those charged with addressing the nation's stormwater runoff problem occasionally wonder whether stormwater regulation should be a top environmental priority. Citing testimony before the subcommittee he chaired, Representative Henry Nowak (D-NY) once asked whether "simple street-cleaning could make a difference" in controlling stormwater. *Municipal Officials Charge Costs of EPA's Storm Water Rule Far Outweigh Benefits*, Ground Water Monitor (Business Publishers, Inc.), May 7, 1991.

In fact, street sweeping is a widely recognized practice for managing stormwater pollution. See *Street Sweeping and Stormwater Regulations*, PUB. WORKS, Oct., 1993, at 62. However, it is not always completely effective. Maloney *et al.*, *supra* note 65, at 720 n.45 ("Conventional street sweeping equipment is designed to remove litter and large particulate matter and thereby improve aesthetics. However, the remaining fine particulate matter contains much of the pollutants."). Unless vacuum sweeping equipment is used, the pollution will be washed off into storm drains. *Id.*

67. SPIRN, *supra* note 25, at 144.

68. The principal road salts used on American streets (sodium chloride and calcium chloride), together with additives such as chromium, run off into storm drains in high concentrations. Maloney *et al.*, *supra* note 65, at 718 n.35.

69. 55 Fed. Reg. 47,990, 47,991 (1990); SCHEULER, *supra* note 58, at 1.4; Copeland, *Stormwater Permits*, *supra* note 57, at CRS-1; *Storm Runoff Cleanup to Be Costly for Florida*, ENG'G NEWS-RECORD, June 1, 1989, at 11.

70. 55 Fed. Reg. 47,990, 48,052, 48,055 (1990); Maloney *et al.*, *supra* note 65, at 718; Debra K. Rubin, *EPA Stormwater Rules Hit Cities, Industry*, ENG'G NEWS-RECORD, Nov. 15, 1990, at 16 [hereinafter Rubin, *EPA Stormwater Rules*].

71. 55 Fed. Reg. 47,990, 47,992 (1990); Maloney *et al.*, *supra* note 65, at 718.

to municipal storm sewer systems⁷² and illicit dischargers also contribute significantly to the stormwater pollution problem.⁷³

It is difficult to measure runoff's impact on water quality because stormwater discharges occur over a diffuse surface area, not at a particular point.⁷⁴ Furthermore, the irregular nature of the polluting event (rainfall) makes sampling stormwater discharges difficult at best. Indeed, in heavy storms, it can be nearly impossible to sample stormwater effectively.⁷⁵ Moreover, any given MS4 has a large number⁷⁶ of discharge points, with low concentrations of pollutants at

72. Claudia Copeland, *Comprehensive Clean Air and Clean Water Permits: Is the Glass Still Just Half Full?*, 21 ENVTL. L. 2135, 2168-69 (1991) [hereinafter Copeland, *Comprehensive Clean Air*]. Copeland states:

Of the nearly one billion pounds of toxic pollutants discharged from industrial sources in 1988, sixty percent of the total was simply transferred to city sewers, rather than being treated at the source and subject to the more rigorous treatment and enforcement requirements that apply to industries that discharge under permits directly to rivers, streams, and lakes.

Id.

73. See 55 Fed. Reg. 47,990, 47,992 (1990) (“[I]llicit connections to storm sewers can create severe, wide-spread [sic] contamination problems.”).

74. See Daniel R. Mandelker, *Controlling Nonpoint Source Water Pollution: Can It Be Done?*, 65 CHI.-KENT L. REV. 479, 480 (1989).

75. 55 Fed. Reg. 47,990, 48,003-48,004 (1990). A recent article in a trade publication illustrates vividly the logistical complexities involved in obtaining accurate stormwater samples:

The practical aspect — the necessity for hands-on work — requires the “how to” knowledge. Catching storms is like winning football games — it takes the proper equipment, a good playing field, a committed team, and a lot of luck. Even with everything in the right place at the right time, a “representative storm” may not occur. When the storm does happen, equipment preparation, personnel readiness, sampling techniques during the storm event, safety precautions, and sample handling and preservation are the prerequisites for a winning team.

Charles T. Sinclair and John A. Ray, *The How-To of Stormwater Sampling — Not Just A Drop in the Bucket*, PUB. WORKS, Oct., 1993, at 44.

76. See 55 Fed. Reg. 47,990, 48,038 (1990) (“[Because] discharges from municipal storm sewers are highly intermittent, and are usually characterized by very high flow rates occurring over relatively short time intervals . . . [M]unicipal storm sewers are usually designed with an extremely high number of outfalls within a given municipality, to reduce potential flooding.”). The number of outfalls in any given municipality can range from “500 to 8,000 or more.” *Id.* at 48,046. As the EPA has noted, this characteristic of typical stormwater drainage systems limits the effectiveness of traditional techniques used to control pollution from “point source” discharges. *Id.* at 48,038 (“Traditional end-of-pipe controls are limited by material management problems that arise with high volume, intermittent flows occurring at a large number of outfalls.”); see *infra* notes 121-47 and accompanying text (discussing management practices to control stormwater runoff quality).

each.⁷⁷ To complicate matters, municipalities are not always aware of the locations and types of pipes and outfalls, let alone the water quality impacts of their discharges.⁷⁸ Nor do municipalities typically keep records of stormwater discharges from industrial polluters into their systems.⁷⁹ Assessments of pollution in stormwater runoff depend on detailed mathematical models of pollution loading,⁸⁰ which cannot

77. See 53 Fed. Reg. 49,416, 49,444 (1988) ("The concentration of many pollutants in discharges from municipal separate storm sewers are often low relative to many industrial process and POTW discharges. However, where a widespread area supports a high population, the cumulative impact of pollution loads associated with discharges from many municipal separate storm sewers can have significant water quality impacts.').

78. In many older municipalities, stormwater drainage systems incorporate underground streams paved over to form storm sewers. ADLER ET AL., *supra* note 59, at 193. Underground storm sewer systems often cross jurisdictional lines and merge with contiguous systems. The result is a confusing organization of pipes, conveyances, and outfalls that are difficult to locate effectively.

Some counties and municipalities use "Geographic Information System" (GIS) computer technology to map their storm sewer systems. Timothy C. McCormick, *Counties Turn to GIS for NPDES Solutions*, PUB. WORKS, June, 1994, at 66. Montgomery County, Maryland, for example, has designed a "Storm Drain Inventory System" that attempts to locate existing outfalls and stormwater management facilities, and maps facilities to be installed in projects approved by the County. *Id.* at 67.

79. Several municipalities told the EPA it is "impossible to monitor all storm water inlets to the municipal system" because they "do not maintain records identifying dischargers into the system." 53 Fed. Reg. 49,416, 49,427 (1988).

80. A number of different models for estimating the quality of stormwater runoff have been developed. See 53 Fed. Reg. 49,416, 49,452 (1988) (describing the U.S. Geological Survey's stormwater quality models); Richard Attanasio and Daniel Danicic, *Comparing Three Stormwater Pollutant Load Models*, PUB. WORKS, April, 1994, at 51-54. These models can become extremely complicated in their forecasts of the impacts of surface area qualities, pollutant characteristics, and resulting pollutant runoff rates. One "Simple Method" of estimating the stormwater pollution exported from sites of urban development relies upon the equation:

$$L = [(P)(P_j)(R_v)/12](C)(A)(2.72), \text{ where}$$

L = storm pollutant export, in pounds

P = rainfall depth

P_j = factor that corrects P for storms that produce no runoff

R_v = runoff coefficient, which expresses the fraction of rainfall which is converted into runoff.

C = flow-weighted mean concentration of the pollutant in urban runoff (mg/l)

A = area of the development site (acres).

12, 2.72 = conversion factors.

SCHULER, *supra* note 58, at 1.10.

For an excellent summary of the challenges involved in forecasting stormwater impacts in new areas of development, see William M. Marsh & Richard Hill-Rowley, *Water Quality, Stormwater Management, and Development Planning on the Urban Fringe*, 35

provide exact determinations of runoff quantities and qualities.⁸¹

Despite this catalog of barriers to assessing specific effects of stormwater runoff on water quality, the overall impact of stormwater pollution is well understood. Long-term studies of pollution in urban stormwater runoff conducted by the Environmental Protection Agency⁸² and others⁸³ have consistently identified stormwater runoff as one of the nation's largest remaining sources of water quality impairment.⁸⁴ In a

WASH. U. J. URB. & CONTEMP. L. 3 (1989) (evaluating impacts of stormwater runoff for a proposed development in Austin, Texas).

81. See Attanasio and Danicic, *supra* note 80, at 51 (concluding that no available model provides "exact answers"); Marsh & Hill-Rowley, *supra* note 80, at 4-5 (describing the flaws of traditional modeling approaches).

82. The best-known and most comprehensive EPA study of stormwater runoff pollution to date is the Nationwide Urban Runoff Program, an in-depth analysis of stormwater quality in twenty-eight cities across the country conducted jointly by the U.S. Geologic Survey and the EPA between 1979 and 1983. See U.S. ENVIRONMENTAL PROTECTION AGENCY, RESULTS OF THE NATIONWIDE URBAN RUNOFF PROGRAM (1983) [hereinafter NURP REPORT]. Other EPA studies include U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL IMPACTS OF STORMWATER DISCHARGES: A NATIONAL PROFILE (1992); U.S. ENVIRONMENTAL PROTECTION AGENCY, AMERICA'S CLEAN WATER—THE STATES' NONPOINT SOURCE ASSESSMENT (1985) (joint report with the Association of State and Interstate Water Pollution Control Administrators, indicating that 38 states described urban runoff as a major cause of water quality impairment); U.S. ENVIRONMENTAL PROTECTION AGENCY, URBAN STORMWATER MANAGEMENT AND TECHNOLOGY: AN ASSESSMENT (1974). The EPA also makes annual reports to Congress on the health of the nation's waters (including the impact of stormwater discharges on water quality). See, e.g., U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL WATER QUALITY INVENTORY REPORT TO CONGRESS (1992).

83. The National Oceanic and Atmospheric Administration (in three studies between 1988-90) has studied the harmful effects of pollution from urban stormwater runoff. Longroy, *supra* note 55, at 557 n.12.

84. See U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL IMPACTS OF STORMWATER DISCHARGES: A NATIONAL PROFILE 7 (1992):

While urban population areas take up only about 2.5% of the total land surface of the country, stormwater pollution from these urban areas and associated urban activities (i.e., storm sewers/urban runoff, combined sewers, hydromodification, land disposal, construction, urban growth, etc.) accounts for a proportionately high degree of water quality impairment (i.e., 18% of impaired river miles, 34% of impaired lake acres, and 62% of impaired estuary square miles reported under 319) when compared to that from rural activities (i.e., agriculture, silviculture and mining) which take up approximately 53% of the total land surface.

Numerous authors have acknowledged that urban stormwater runoff is a substantial cause of water quality impairment. See Copeland, *Comprehensive Clean Air*, *supra* note 72, at 2169-70 ("According to other EPA and state reports, the largest remaining source of water quality impairment is runoff from farms, cities, forests, and construction sites.")

typical urban area, runoff during the first sixty minutes of a rainstorm can carry more suspended solids than discharges from a secondary sewage treatment plant.⁸⁵ Urban stormwater runoff also contains high concentrations of heavy metals.⁸⁶ The resulting pollution causes

(quoting U.S. ENVIRONMENTAL PROTECTION AGENCY, CONGRESSIONAL BRIEFING: NONPOINT SOURCE CONTROL PROGRAM (1990)); Maloney *et al.*, *supra* note 65, at 719; Edwin A. Skoch II, *Regulation of Storm Water Discharges Under the Clean Water Act*, 23 ENVTL. L. 1087 (1993); James C. Buresh, Note, *State and Federal Land Use Regulation: An Application to Groundwater and Nonpoint Source Control*, 95 Yale L.J. 1433, 1437 (1986); Sara Burgin, *Local Governments Taking Charge of Water Quality — Is It a Good Idea?*, NAT. RESOURCES & ENV'T (A.B.A. Sec. Nat. Resources L.), Spring, 1991, at 19; Albert F. Appleton, *N.Y. Makes Waves With Nonpoint Source Pollution, Watershed Planning and the Clean Water Act*, NATION'S CITIES WEEKLY, Sept. 13, 1993, at 4; D'Vera Cohn, *Pollution Sources Right in Back Yard; Rain Carries Toxic Matter of Everyday Life*, WASH. POST, Dec. 3, 1989, at B1; *Storm Runoff Cleanup to Be Costly for Florida*, *supra* note 69, at 11 ("Stormwater from urban and agricultural sources is 'the single largest source of surface water pollution in Florida, accounting for an estimated 50 to 60% of all pollution loadings.'") (quoting Alfred B. Devereaux Jr., then assistant secretary of the Florida Dept. of Environmental Regulation). *But see* MONTGOMERY WATSON, *DEFINING THE URBAN STORMWATER RUNOFF PROBLEM 2* (1994) (report prepared for the National League of Cities and National Realty Committee) ("The urban stormwater problem has been overstated.").

Proposing legislation to fund "community-backed restoration programs" for polluted urban waters, Del. Eleanor Holmes Norton (D-D.C.) cited the EPA's 1992 report to Congress on water quality, and called for "more attention to urban watersheds." *Water Pollution: Norton Bill Proposes Community-Backed Restoration Programs for Urban Rivers*, DAILY ENV'T REP. (BNA) at DEN 35 d14 (Feb. 23, 1994). Norton mentioned the specific finding that "though urban areas comprise only about 2.5 percent of the total land surface of the country, pollution from these areas accounts for 18 percent of impaired river miles" *Id.*

85. The NURP report found that "urban runoff from residential, commercial and industrial areas produces a quantity of suspended solids and chemical oxygen demand that is equal to or greater than that from secondary treatment sewage plants." *NRDC v. EPA*, 966 F.2d 1292, 1295 n.3 (9th Cir. 1992) (citing the NURP REPORT); *see also* Maloney *et al.*, *supra* note 65, at 719 (citing G. AMY, ET AL., *WATER QUALITY MANAGEMENT PLANNING FOR URBAN RUNOFF V*, 4 & 8 (1974)).

A Natural Resources Defense Council study of urban runoff in Pennsylvania found that "8.5 million pounds of organic matter was delivered by runoff from Dauphin, Cumberland and Perry counties into the Susquehanna in 1989, more than three times as much as was delivered from sewage treatment plants in the area." Tom Troy, *Storm Run-off is Targeted by Bay Groups*, PR Newswire, Sept. 24, 1990, available in LEXIS, *Envirm Library*, *Arcnws File*.

86. *See* Clayton H. Billings, *Diffuse Pollution: Sources and Abatement*, PUB. WORKS, May, 1992, at 88 ("[I]norganic [] pollutants in stormwater runoff include [] toxic metals as the most prevalent. . . . 14 hazardous constituents, including asbestos, were detected. The most common metals were copper, lead, and zinc.") (citing studies, including the NURP REPORT); Marsh & Hill-Rowley, *supra* note 80, at 11 (listing loading rates for lead

biological and physical damage to ecosystems.⁸⁷ The EPA's respected body of independent scientists, the Science Advisory Board, has reviewed this evidence and identified pollution from nonpoint sources, including urban runoff, as a leading cause of ecological damage in surface waters⁸⁸ and an important priority for the nation to address.⁸⁹ The problem becomes even more acute as areas increasingly become more densely populated, because areas with higher densities have higher runoff rates, and thus produce more pollution.⁹⁰

and zinc, as well as those for phosphorus, nitrogen and sediment, predicted by a Northern Virginia Planning District Commission study).

The NRDC has developed "Poison Runoff Indexes" that indicate "that runoff rivals, and in some cases surpasses, factories and sewage plants as a source of [heavy metals]. For instance, in most of the urban areas modeled by NRDC, zinc loadings from runoff exceeded the loadings from factories." ADLER ET AL., *supra* note 59, at 194 (footnote omitted).

87. The NURP REPORT analyzes three types of adverse water quality impacts from urban runoff:

1. short-term receiving water impacts during or following storm events, where pollutant concentration is important;
2. longer-term downstream receiving water effects: the buildup of contaminants in the sediments of sinks — river mouths, lakes, and bays — where seasonal or annual pollutant mass loads are important (although NURP did not examine in detail this phenomenon, NURP data enable coarse estimates to be made of runoff annual mass loadings from large urban areas); and
3. physical effects of storm flows on the hydrology and geomorphology of urbanized watersheds, including stream channel scouring (NURP did not examine this third type of effect but acknowledged its existence).

ADLER ET AL., *supra* note 59, at 194 (quoting *NURP Report*, vol. 1, Final Report, at 5-8 to 5-9).

88. *EPA Document on Clean Water Act Policy Issues Related to Reauthorization*, Daily Env't Rep. (BNA), at DEN 113 d31 (June 15, 1994).

89. U.S. ENVIRONMENTAL PROTECTION AGENCY, UNFINISHED BUSINESS: A COMPARATIVE ASSESSMENT OF ENVIRONMENTAL PROGRAMS 68 (1987).

90. The EPA has referred to this relationship between increased development and increased pollution on many occasions. See, for example, the description accompanying its rules proposed in 1988 to control stormwater runoff:

As the percentage of paved surfaces increases, the volume and rate of runoff and the corresponding pollutant loads also increase. Thus, the amount of storm water from commercial and residential areas and the pollutant loadings associated with storm water runoff increases as development progresses and remains at an elevated level for the lifetime of the development.

53 Fed. Reg. 49,416, 49,458 (1988); see also Marsh & Hill-Rowley, *supra* note 80, at 8-9 (citing results from a study in the Washington, D.C. region reported in NORTHERN VIRGINIA PLANNING DISTRICT COMMISSION, GUIDEBOOK FOR SCREENING URBAN NONPOINT POLLUTION MANAGEMENT STRATEGIES 11-15 (1979)); Billings, *supra* note 86,

Some groups dispute the extent of environmental damage caused by stormwater runoff pollution. In a report prepared for the National League of Cities and the National Realty Committee,⁹¹ a consulting group stated audaciously that “[t]he urban stormwater runoff problem has been overstated.”⁹² The report based this assertion on the purported difficulty of segregating the water quality impacts of agricultural runoff⁹³ and wastewater overflows⁹⁴ from those of urban stormwater runoff.⁹⁵ However, the EPA and others have concluded that each of these is a significant pollution problem in its own right, and have deemed misleading the report’s statement that “[p]roposed programs for ‘urban stormwater runoff’ will not reduce the major causes [of] stormwater pollution.”⁹⁶ Urban runoff may not be as significant a cause of water pollution as runoff from farms, but it remains a major contributor to

at 88.

91. MONTGOMERY WATSON, *supra* note 84; see also *Water Pollution: Understanding of Runoff-Related Pollution Needed Before CWA Reauthorization*, 24 ENV’T REP. (BNA) 2,067 (Apr. 8, 1994).

92. MONTGOMERY WATSON, *supra* note 84, at 4.

93. Runoff from farms, containing nutrients from fertilizers and animal wastes, siltation from soil erosion, and pesticides, is an important source of nonpoint source water pollution, and generally recognized as even more serious than urban runoff pollution. See Copeland, *Comprehensive Clean Air*, *supra* note 72, at 2169 (“EPA estimates that nonpoint sources are responsible for sixty percent of current water quality standard violations and that agricultural sources contribute eighty percent of the total.”); George A. Gould, *Agriculture, Nonpoint Source Pollution, and Federal Law*, 23 U.C. DAVIS L. REV. 461, 464 (1990) (“Agricultural [runoff] is the most pervasive cause of nonpoint source water quality problems.”). Farmers have successfully avoided federal regulation of their stormwater discharges. The definition of a “point source” in the Clean Water Act specifically excludes from regulation agricultural stormwater discharges and irrigated agriculture return flows. Clean Water Act § 502(14), 33 U.S.C. § 1362(14) (1988). Albert Appleton, New York City’s Environmental Protection Commissioner, describes farmers’ reaction to a proposal to regulate agricultural stormwater in the two upstate watersheds from which New York draws its drinking water: “[The] proposals were met with immediate and vociferous resistance from the farm community, which claimed that the draft regulations would drive many farms out of business.” Appleton, *supra* note 84, at 4. These regulations were withdrawn. *Id.*

The Montgomery Watson report is correct in stating that agricultural runoff must be considered in evaluating the overall impact of stormwater pollution on the nation’s waters. It does not follow, however, that urban runoff is an insignificant cause of pollution.

94. Overflows from combined sewers contribute significantly to water pollution. See *infra* notes 114-19 and accompanying text.

95. MONTGOMERY WATSON, *supra* note 84, at 6-13.

96. *Id.* at 14.

water pollution.⁹⁷ Some witnesses before recent congressional hearings relied on the report and claimed Congress should continue to “study” the problem.⁹⁸ Yet even cities’ representatives concede that urban runoff causes “fifteen percent of the remaining pollution to our waterways from nonpoint sources,”⁹⁹ which is an amount that warrants regulatory attention.

B. *Controlling Pollution From Urban Stormwater Runoff*

Considerable obstacles block easy control of urban stormwater runoff. In most instances, owners of stormwater runoff locations have little or no control over the runoff because discharges are caused by rainfall.¹⁰⁰ Nor do property owners have incentives to control stormwater discharges. Stormwater flows do not respect political boundaries, and any problems created in one jurisdiction may simply be exported elsewhere.¹⁰¹ The catch basins, pipes and outfalls of an MS4 may be owned by more than one city, town, county, flood control district, or state transportation department.¹⁰² These entities have other

97. See, e.g., *Landman Testimony*, *supra* note 54:

Stormwater-caused resource damages are real, and growing, nationwide. The latest U.S. EPA National Water Quality Inventory (the 1992 Report to Congress) shows clearly that urban stormwater has grown considerably as a source of degradation. Urban stormwater is now second only to municipal sewage plants as a source of estuarine impairment; second only to agriculture as a source of lake impairment; and our third biggest source of river impairment nationwide.

98. See *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources*, 104th Cong., 1st Sess. (Feb. 9, 1995) (testimony of Doug Harrison, General Manager, Fresno Metropolitan Flood Control District, on behalf of the National Association of Flood and Stormwater Management Agencies) [hereinafter *Harrison Testimony*]; *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources*, 104th Cong., 1st Sess. (Feb. 9, 1995) (testimony of Stephen F. John, Council Member from Decatur, Illinois, on behalf of the National League of Cities) [hereinafter *John Testimony*].

99. *John Testimony*, *supra* note 98 (claiming that the federal stormwater program will only address “fifteen percent of the remaining pollution to our waterways”).

100. Mandelker, *supra* note 74, at 481 (“The nonpoint polluter does not control the discharge, which is produced by rainfall.”).

101. Problems caused by stormwater runoff are a “classic environmental externality that a local government can export outside its jurisdiction.” *Id.* at 489.

102. 55 Fed. Reg. 47,990, 48,040-44 (1990).

responsibilities besides stormwater runoff control and have varying legal authority and administrative and financial capabilities to address the stormwater runoff problem.¹⁰³ Furthermore, required control measures may be expensive, and stormwater system owners may be unwilling to adopt them, particularly if they perceive low benefits.¹⁰⁴ Can cities then truly “control” pollution from stormwater runoff? More than one writer has described controlling pollution from stormwater runoff and other nonpoint sources as potentially impossible.¹⁰⁵

American cities first viewed the “problem” of stormwater drainage as an engineering challenge,¹⁰⁶ primarily one of flood control, and only secondarily one of preserving water quality.¹⁰⁷ Boston’s experience is typical. In the eighteenth century, Boston paved new streets in a manner that allowed water to drain off to gutters at each side, and then into an extensive network of subsurface storm drains.¹⁰⁸ These storm drains emptied their detritus onto the tidal flats of the Back Bay Basin, relying on the tides to flush wastes out to sea.¹⁰⁹ By the 1870s, development

103. *Id.*

104. *See* Mandelker, *supra* note 74, at 483.

105. WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW, § 4.4, at 293-94 (2d ed. 1994) (“[A]ny description of nonpoint source legal controls is almost a deception because of the pronounced gap between the written word and empirical reality.”); *John Testimony*, *supra* note 98 (“No system has thus far been designed that can control or eliminate pollutants from rain runoff.”). The title of a leading article on nonpoint source pollution controls expresses this pessimism: *Controlling Nonpoint Source Pollution: Can It Be Done?* Mandelker, *supra* note 74.

106. Marsh & Hill-Rowley, *supra* note 80, at 24 n.22 (“[T]raditional practice in development planning . . . turns the problem of stormwater management exclusively over to the engineers.”).

107. *See* SCHUELER, *supra* note 58, at 2.2; SPIRN, *supra* note 25, at 144; Nilo Priede, *Stormwater Management Through User Fees*, AM. CITY & CT’Y, Oct., 1990, at 38 (“Historically, stormwater management has been limited to planning, designing and implementing storm drainage improvements. Water quality controls were not required.”); Schoettle & Richardson, *supra* note 63, at 526 (“[L]ocal stormwater programs [must] address not just drainage and flood control, areas with traditionally strong political support, but also water quality.”).

The primary technique for reducing flooding risks is the use of dry detention basins to store runoff from storms, to reduce the volume of peak stormwater discharges. *See* SCHEULER, *supra* note 58, at Introduction; J. Toby Tourbier and Richard Westmacott, *Looking Good: The Use of Natural Methods to Control Urban Runoff*, URB. LAND, Apr., 1989, at 32.

108. SPIRN, *supra* note 25, at 21.

109. *Id.* at 21-22.

had impeded the tidal flow. With nowhere for the wastes flushed by the efficient drain system to go, the Basin had become the "foulest marsh and muddy flats to be found anywhere in Massachusetts,"¹¹⁰ and floodwaters and sewage flooded the streets of nearby Roxbury after storms.¹¹¹ Frederick Law Olmsted's solution to this problem was to design a massive intraurban park, the "Fens," to temporarily retain flood waters and release them as necessary. While water quality improved in the nearby neighborhood,¹¹² Olmsted merely transferred the waste problem to the Charles River and Boston Harbor, where it remains today.¹¹³

110. *Id.* at 22 (quoting WALTER MUIR WHITEHALL, BOSTON: A TOPOGRAPHICAL HISTORY 180 (1968)).

111. *Id.* at 22.

112. The "Fenway" neighborhood, named for the Fens park, subsequently became one of the most desirable areas of residential Boston. *Id.* at 23.

113. *Id.* at 22-23. The following chronology, set forth in *United States v. Metropolitan Dist. Comm'n*, 930 F.2d 132, 133 (1st Cir. 1991), outlines part of the long history of modern efforts to clean up Boston Harbor:

- 1) The Commonwealth, for more than fourteen years, has unlawfully discharged sewage into Boston Harbor, in violation of the Federal Clean Water Act. 33 U.S.C. §§ 1251 *et seq.* The Conservation Law Foundation, in 1983, and the United States, in 1985, brought separate suits (later consolidated) to stop this discharge. On September 5, 1985, the district court found that the Commonwealth was guilty of "persistent and severe violations of the Act." *United States v. Metropolitan District Commission*, 23 Env't. Rep. Cas. (BNA) 1350, 1358 (D. Mass. 1985).
- 2) The district court, in developing a remedy for the violations of law, did not enjoin the further discharge of pollutants, although the statute made this remedy available. See 33 U.S.C. § 1342(h) (authorizing ban on new sewer hook-ups). Rather, together with the parties, the court developed a 15-year Compliance Plan. The Plan calls for the construction, by December, 1999, of a new \$6 billion sewage treatment system for the metropolitan Boston area. The detailed remedial schedule contains specific deadlines for the building and opening of numerous facilities.

Id.

A major component of the Plan was construction of a tunnel to carry effluent nine miles further out to sea, to be completed by July, 1995; that prompted opposition from environmentalists that endangered species in Massachusetts and Cape Cod Bays would be harmed. ZYGMUNT J.B. PLATER ET AL., SUPPLEMENT FOR ENVIRONMENTAL LAW AND POLICY 242 (1994). The case challenging the project on this ground was dismissed. *Id.* The tunnel project, however, continues to be plagued by cost overruns and missed deadlines. See Scott Allen, *MWRA: Sewage Deadline Won't be Met*, BOST. GLOBE, Nov. 17, 1993, at 33. It may be well into the 21st century before any cleanup of Boston Harbor takes place. See generally Charles M. Haar, *Boston Harbor: A Case Study*, 19 B.C. ENVTL. AFF. L. REV. 641 (1992) (relating the history of the Boston Harbor cleanup to environmental protection efforts in the republics of the former Soviet Union).

Given this legacy of his work, it is ironic that historians of the environmental movement

The federal stormwater control program described in this Article does not address Boston's problems or those of almost 1,100 other communities. Because most cities that designed their drainage systems in the nineteenth century were primarily concerned with removing animal wastes from streets, they frequently combined their sewage and stormwater systems to reduce costs.¹¹⁴ The development of a subsurface drainage network left Boston with one such "combined" sewer system, which carries a combination of stormwater runoff and domestic sewage.¹¹⁵ Municipalities with combined sewers face serious water quality problems, particularly when storms cause the systems to exceed sewage treatment plants' capacities, resulting in the discharge of raw effluent into water bodies. This phenomenon is known as "combined sewer overflow" (CSO).¹¹⁶ Cities no longer install combined sewer and stormwater systems. Instead, they separate stormwater systems and sewage systems, with the latter transporting effluent to publicly owned

frequently cite Olmsted as a modern environmental pioneer, praising his passion for developing urban parks such as the Fens and New York City's Central Park. *See, e.g., SHABECOFF, supra note 7, at 60.*

114. *See, e.g., Mark Luttner, President Clinton's Clean Water Act Initiative, EPA J., Summer, 1994, at 30.*

115. SPIRN, *supra note 25, at 23.*

116. *See Craig N. Johnston, Don't Go Near the Water: The Ninth Circuit Undermines Water Quality Enforcement, 24 ENVTL. L. 1289, 1291 (1994) (describing the combined sewer overflow problem in Portland, Oregon). See generally Questions the Reader Might Ask: An Interview With Robert Perciasepe, EPA J., Summer, 1994, at 36 (discussing solutions to the CSO problem). CSOs are a national problem; the EPA estimates that 800 to 1,000 communities have a total of 1,100 combined sewer systems with approximately 11,000 outfalls. ADLER ET AL., supra note 59, at 14-15; Johnston, supra, at 1293 n.21 (quoting NATURAL RESOURCES DEFENSE COUNCIL, WHEN IT RAINS . . . IT POLLUTES: A SURVEY OF RAW SEWAGE POLLUTION IN 14 U.S. CITIES 1 (1992)). These systems serve an estimated 40 million people, primarily in the Northeast and Midwest. ADLER ET AL., supra note 59, at 154.*

The annual volume of CSO pollution is staggering. ADLER ET AL., *supra note 59, at 154-55; Johnston, supra, at 1293.* For example, Atlanta discharges 5.3 billion gallons of CSO effluent each year into the Chattahoochee River, Chicago discharges 27 billion gallons into Lake Michigan, Seattle discharges 2.9 billion gallons into Puget Sound, and San Francisco discharges 1.7 billion gallons into the Pacific Ocean and San Francisco Bay. Additionally, approximately "720 million gallons pour into the coastal waters around Portland each year." David Urbinato, *Portland, Maine: Case of a Combined Sewer System, EPA J., Summer, 1994, at 22.* CSOs contributed to 2,619 days of beach closures in 1992, and bans or restrictions on 597,000 acres of shellfish harvesting areas in 1990. *EPA Document on Clean Water Act Policy Issues Related to Reauthorization, supra note 88; see also Longroy, supra note 55, at 558.*

treatment plants.¹¹⁷ The separate stormwater system is designed, as noted above, to flush only stormwater into receiving waters.¹¹⁸ Because CSO and stormwater runoff from a separate sewer system have different causes and water quality impacts, the federal programs designed to control them are different.¹¹⁹ This Article considers only the control of adverse water quality impacts associated with MS4s.¹²⁰

Controlling stormwater pollution would require collecting and treating all stormwater,¹²¹ which is not feasible, given the large number

117. Johnston, *supra* note 116, at 1292 n.17.

118. *Id.* at 1293. Separate storm and sanitary sewer systems do not always function as designed. If stormwater pipes leak, or are improperly connected to the sanitary sewer system, stormwater may enter the sanitary system and cause what is referred to as "sanitary sewer overflow" (SSO). This phenomenon, similar to CSO in that it causes overflows of raw effluent into water bodies, is also recognized as a source of water quality impairment. See Debra K. Rubin, *Plugging Holes in Sewer Rules*, ENG'RG NEWS-RECORD, Feb. 20, 1995, at 44. Because SSO is not strictly related to rainfall flows, however, the EPA has addressed it separately from stormwater runoff control. See, e.g., *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources*, 104th Cong., 1st Sess. (Feb. 21, 1995) (testimony of Robert Perciasepe, Assistant Administrator, Ofc. of Water, U.S. Environmental Protection Agency).

119. The statutory provision calling for stormwater runoff control applies to discharges "composed entirely of stormwater." Clean Water Act § 402(p)(1), 33 U.S.C. § 1342(p)(1) (1988). Thus, the EPA's rules that address control of stormwater runoff omit CSOs from coverage. See 53 Fed. Reg. 49,416, 49,442 (1988) ("It is important to note that the proposed permit application requirements for discharges from municipal separate storm sewers do not apply to discharges from combined sewers that are designed as both a sanitary sewer and a storm sewer. Discharges from combined sewer systems are not regulated under this proposed rule.").

In 1989, the EPA developed a "National Combined Sewer Overflow Control Strategy" to address the problem of CSO pollution; the program was "designed to complement the control programs for sanitary sewers and separate storm sewers." 54 Fed. Reg. 37,370 (1989). In 1994, the EPA issued a final national policy statement on CSOs, elaborating on the approach it outlined in 1989 and creating a site-specific approach to address the CSO problem. 59 Fed. Reg. 18,688 (1994).

In the ongoing debate over reauthorization of the Clean Water Act, Congress has addressed the control of CSOs and discharges from MS4s separately. See, e.g., H.R. 961, 104th Cong., 1st Sess. §§ 402, 403 (1995) (proposing provisions to address MS4s and CSOs).

120. Some critics have argued that this analytical separation is problematic, concluding that attempting to distinguish the water quality degradation caused by CSOs and that caused by separate storm sewer systems leads to overestimating the impact of the latter. See MONTGOMERY WATSON, *supra* note 84, at 1. This argument ignores the substantial water quality impairment caused by runoff from MS4s.

121. See SPIRN, *supra* note 25, at 145.

of outfalls in each city.¹²² Because runoff pollution does not originate from a single source and is produced by rainfall, it also proves difficult to control with numerical effluent standards.¹²³ Control measures, therefore, focus on three “second-best” strategies: controlling the amounts of pollutants created at sites, controlling the ways in which pollutants are removed from sites, and controlling pollutant transfers in MS4s.¹²⁴ Control strategies designed to minimize the removal and transfer of pollutants operate by retaining, detaining, or infiltrating stormwater runoff.¹²⁵ These techniques to control pollution, and reduce flooding, have been developed over the past two decades,¹²⁶ and are collectively known as “Best Management Practices” (BMPs).¹²⁷ To be effective, BMPs must be tailored to each individual site¹²⁸ because their costs and effectiveness vary widely.¹²⁹ Many localities developed BMPs primarily as flood control measures, not to control pollution.¹³⁰

122. See Maloney *et al.*, *supra* note 65, at 719 (noting the impracticality of this pollution control method).

123. G. Fred Lee & Anne Jones-Lee, *Stormwater Runoff Management: Are Real Water Quality Problems Being Addressed by Current Structural Best Management Practices?*, PUB. WORKS, Jan., 1995, at 54, 56 (“It is recognized by many that current EPA criteria and state water quality standards should not be used to regulate stormwater runoff-associated contaminants.”). Lee and Jones-Lee recommend that stormwater be cleaned to permit the “designated beneficial use” of the receiving water, not to meet existing water quality standards. *Id.* Industry groups and municipalities are strongly opposed to designing stormwater controls to meet water quality standards. See *infra* notes 293-98 and accompanying text.

124. Marsh & Hill-Rowley, *supra* note 80, at 25.

125. SCHEULER, *supra* note 58, at 2.11 to 2.12.

126. *Id.* at 2.1.

127. A “Best Management Practice” is a technique for slowing, retaining or absorbing pollutants produced by stormwater runoff. See SCHUELER, *supra* note 58, at Introduction; Mandelker, *supra* note 74, at 483.

128. SCHEULER, *supra* note 58, at 2.1; Goldfarb, *supra* note 7, at 495; Mandelker, *supra* note 74, at 483 (“Which BMP a nonpoint source should adopt and how a BMP should be designed depend on the physical suitability of the site as well as the stormwater and pollution control benefits it provides.”).

129. SCHEULER, *supra* note 58, at 2.3 to 2.14.

130. Lee and Jones-Lee, *supra* note 123, at 54. Lee and Jones-Lee charge that the historical use of BMPs for flood control, and the widespread familiarity of many structural BMPs, creates an “appearance of credibility and reliability [in BMPs] far beyond their real capabilities” if they are not chosen in an appropriate manner. *Id.* at 55.

Therefore, unless BMPs are designed, implemented, tested,¹³¹ and maintained¹³² with a focus on pollution control, they may not improve water quality.¹³³

BMPs are both structural¹³⁴ and nonstructural.¹³⁵ The latter category includes behavioral changes,¹³⁶ such as reducing the use of lawn fertilizers. Thus, the control of stormwater runoff relies both on

131. BMPs should, for example, be tested for their efficacy in removing specific pollutants from stormwater runoff. *Id.* This requires the entity implementing the BMP to have "thorough familiarity with aquatic chemistry, aquatic toxicology, and the behavior of various forms of chemical contaminants in different treatment processes." *Id.*

132. *Id.* Lee and Jones-Lee "strongly recommend[] that any structural BMP include as part of the facility's construction and operation cost sufficient funds to properly monitor its efficacy." *Id.* at 56.

133. *Id.*

134. Structural BMPs include detention ponds, infiltration trenches, and porous pavements. SCHEULER, *supra* note 58, at 2.11 to 2.12; Maloney *et al.*, *supra* note 65, at 720-21; Mandelker, *supra* note 74, at 483. See generally Tourbier and Westmacott, *supra* note 107, at 32 (describing vegetative-based structural controls such as wetland basins). A Natural Resources Defense Council study of urban runoff in Pennsylvania concluded that reducing runoff pollution requires the development of smaller parking lots, retention ponds and grass ditches to slow runoff. Troy, *supra* note 85; see also Marsh & Hill-Rowley, *supra* note 80, at 25-26 (noting Austin, Texas' preference for the use of filter berms and filtration basins, two structural BMPs).

There are many types of structural BMPs. See, e.g., 53 Fed. Reg. 49,416, 49,458 (1988) ("Commonly used structural technologies include a wide variety of treatment techniques, including first flush diversion systems, detention/infiltration basins, retention basins, extended detention basins, infiltration trenches, porous pavement, oil/grit separators, grass swales, and swirl concentrators."). The design of effective structural BMPs requires attention to the "most mundane details of pavement and channel design, to the coordination of soils, ponds, swales, and floodplains into a comprehensive drainage system." SPIRN, *supra* note 25, at 166.

135. Nonstructural BMPs include vegetative controls such as seeding and mulching. See 53 Fed. Reg. 49,416, 49,458 (1988) ("Non-structural practices can play a more important role. Non-structural practices can include erosion control, streambank management techniques, street cleaning operations, vegetation/lawn maintenance controls, debris removal, road salt application management and public awareness programs."); Marsh & Hill-Rowley, *supra* note 80, at 25 (noting that one management practice is "increasing the ratio of vegetated to impervious ground cover").

136. See SPIRN, *supra* note 25, at 154 ("The prevention of floods and the conservation and restoration of water will only be accomplished by the cumulative impact of many individual actions throughout the city."); Burgin, *supra* note 84, at 20 ("Controls must be implemented through development and implementation of individualized stormwater management practices [and] behavioral changes in the general population . . ."); Marsh & Hill-Rowley, *supra* note 80, at 25.

decreasing pollution and changing deleterious land use patterns,¹³⁷ neither of which have proven easy.¹³⁸

Attempting to control stormwater runoff in a developing urban area, however, is substantially different from doing so in one that is already highly urbanized. It is more cost-effective to develop measures to prevent or reduce pollution in stormwater during new development than to correct problems later.¹³⁹ In highly developed areas, retrofitting an existing stormwater drainage system — that is, improving runoff conditions at urban sites and building structural pollution controls into MS4s¹⁴⁰ — requires land which may be unavailable¹⁴¹ and municipal expenditures that may place heavy burdens on cities.¹⁴² Some cities

137. See Appleton, *supra* note 84, at 4 (“No nonpoint source pollution control program will be successful without addressing these problems.”).

138. For example, land use controls are traditionally the province of local governments, which may resist adopting controls over stormwater runoff sources. See Maloney *et al.*, *supra* note 65, at 714 (“Because the authority to promulgate land use regulations has traditionally been delegated to local governments, the responsibility for stormwater management rests most heavily upon counties and municipalities.”); James H. Wickersham, Note, *The Quiet Revolution Continues: The Emerging New Model for State Growth Management Statutes*, 18 HARV. ENVTL. L. REV. 489, 489 (1994) (“[E]xisting land use laws . . . leave control of land development almost solely in the hands of local governments.”). Professor Mandelker attributes the reluctance of municipalities to enact land use controls to a number of factors, including the fragmentation of governmental responsibility at the local level and the perceived cost of effective land use controls of nonpoint source pollution. Mandelker, *supra* note 74, at 483.

139. 55 Fed. Reg. 47,990, 48,042 (1990); ADLER ET AL., *supra* note 59, at 197; Maloney *et al.*, *supra* note 65, at 720. The savings over relying on treating polluted stormwater discharges may be as high as a factor of four. ADLER ET AL., *supra* note 59, at 197, n.71 (citing Robert D. Sykes, *Site Planning*, in MINNESOTA WATER POLLUTION CONTROL AGENCY, PROTECTING WATER QUALITY IN URBAN AREAS, BEST MANAGEMENT PRACTICES FOR MINNESOTA (1989), at ch. 3.1).

140. The Natural Resources Defense Council, for example, calls for:

2. . . . redevelopment and retrofitting of existing developed areas, runoff reduction through revegetation and impervious surface reclamation (for example, retrofitting parking lots with grass swales designed to capture and filter the lot’s runoff, thus preventing or severely reducing the need to discharge to a nearby stream); . . .

ADLER ET AL., *supra* note 59, at 197.

141. 55 Fed. Reg. 47,990, 48,055 (1990) (“The unavailability of land in highly developed areas often makes the use of structural controls infeasible for modifying many existing systems.”).

142. See SPIRN, *supra* note 25, at 168. For an estimate of the cost of overhauling the stormwater system in one major city, see Alicia M. Gebhardt and Greg Lindsey, *NPDES Requirements for Municipal Separate Storm Sewer Systems: Costs and Concerns*, PUB. WORKS, Jan., 1993, at 40, 42 (citing a study estimating the cost of stormwater

have successful programs for controlling stormwater runoff pollution in areas of new construction and renovation.¹⁴³ But most are not very successful in improving conditions where drainage structures already exist.

In contrast, developing areas offer a greater opportunity to reduce pollutants in stormwater discharges.¹⁴⁴ Land is more available for structural controls.¹⁴⁵ Additionally, BMPs that focus on pollution control can be more easily implemented during initial phases of development.¹⁴⁶ Focusing on new developments may enable stormwater pollution control programs to be integrated with other administrative procedures associated with new development, such as subdivision, grading, or building approvals.¹⁴⁷

C. *Stormwater Control on the "New Urban Frontier"*

Some of the rapidly developing areas where opportunities exist to implement stormwater runoff controls are the Edge Cities growing in America's suburbs. Suburbs are not a new phenomenon; the first suburb, as Lewis Mumford dryly observed, "probably appeared shortly after the construction of the first city wall."¹⁴⁸ Yet some of our suburbs have taken on an entirely new form, growing from bedroom communities into

infrastructure repairs in Indianapolis, Indiana alone at \$283 million).

143. Denver's stormwater program, for example, requires new and renovated buildings in dense, established areas to detain stormwater on their sites. See SPIRN, *supra* note 25, at 157-58, 161-62.

144. 55 Fed. Reg. 47,990, 48,055 (1990); see also *The Water Quality Act of 1994, And Issues Related to Clean Water Act Reauthorization (H.R. 3948): Hearing Before the House Comm. on Public Works and Transportation, Subcomm. on Water Resources and Environment*, 103rd Cong., 2d Sess. 20, 23-25 (1994) (testimony of Carol M. Browner, Administrator, U.S. Environmental Protection Agency) [hereinafter *Browner Testimony*].

145. 55 Fed. Reg. 47,990, 48,055 (1990). Tourbier and Westmacott describe a number of natural methods of runoff control, including vegetative filter strips and wetland basins, that require land for their implementation. Tourbier and Westmacott, *supra* note 107.

146. Preserving trees during construction, for example, can yield benefits in the control of stormwater, and is significantly less expensive than reforestation later. See SCHEULER, *supra* note 58, at 9.10 to 9.11.

147. 55 Fed. Reg. 47,990, 48,055 (1990); see generally Marsh & Hill-Rowley, *supra* note 80 (noting that stormwater impacts were considered in planning of the Steiner Ranch development project in Austin, Texas).

148. SPIRN, *supra* note 25, at 34 (citing LEWIS MUMFORD, *THE CITY IN HISTORY* 487 (1981)).

full-fledged economic centers of their own — Edge Cities.¹⁴⁹ These new cities have achieved “economic, social, and geographic independence” from the nearby central cities that spawned them.¹⁵⁰

Edge Cities have many of the attributes of traditional cities: concentrations of commercial and retail spaces,¹⁵¹ residences, and some civic activities. However, they generally have no consistent urban form,¹⁵² and are defined “more than anything else by highways and parking lots.”¹⁵³ This image is appropriate, because the foremost single factor contributing to the growth of Edge Cities has been the development of the Interstate Highway System, a subsidy to the proliferating

149. See GARREAU, *supra* note 22, for a discussion of development patterns in Edge Cities. See also THOMAS M. STANBACK, JR., *THE NEW SUBURBANIZATION: CHALLENGE TO THE CENTRAL CITY* 60 (1991) (“[T]here is considerable evidence that economic growth in the suburbs is increasingly focused on a restricted number of magnet areas in which locational advantages associated with agglomeration play a key role.”).

150. STANBACK, *supra* note 149, at 60 (quoting TRUMAN A. HARTSHORN & PETER O. MULLER, U.S. DEP’T OF COMMERCE, ECONOMIC DEV. ASS’N, *SUBURBAN BUSINESS CENTERS: EMPLOYMENT EXPECTATIONS* 3 (1986)); see also Tarlock, *City Versus Countryside*, *supra* note 7, at 472.

151. Joel Garreau defines an Edge City as containing at least 5,000,000 square feet of commercial space and 600,000 square feet of retail space (equal to a mid-sized regional shopping mall). GARREAU, *supra* note 22, at 6-7.

152. See CALTHORPE, *supra* note 7, at 33 (“Suburbs lack, as do many of the so-called modern new towns and ‘Edge Cities,’ the fundamental qualities of real towns: pedestrian scale, an identifiable center and edge, integrated diversity of use and population, and defined public space.”).

153. Michael Stern, *Visions for a Sustainable City: Owings Mills, Maryland*, located by Internet search (World-Wide Web) at Universal Resource Locator <http://jefferson.village.virginia.edu/stern/proposal.goals.html>; see also GARREAU, *supra* note 22, at 244 (“[Parking lots are] the most ubiquitous built form in Edge City.”).

A recent book refers to the landscape dominated by Edge Cities as “the geography of nowhere.” KUNSTLER, *supra* note 7, at 15.

number of automobile users.¹⁵⁴

For better or worse, Edge Cities are precursors to the postmodern urban future.¹⁵⁵ They have forced a wholesale reconsideration of the

154. KENNETH T. JACKSON, *CRABGRASS FRONTIER: THE SUBURBANIZATION OF THE UNITED STATES* 249-50 (1985); *see also* CALTHORPE, *supra* note 7, at 35 ("It is time to break the cycle of government investment in an 'interstate system' of highways which fundamentally breeds sprawl on the beltways of our cities while subsidizing decentralization."); SPERLING, *supra* note 7, at 5 ("[T]he rapid proliferation of automobiles has been a major influence on urban and suburban landscapes since the turn of the century.").

Many Edge Cities are located near junctions of Interstate Highways. GARREAU, *supra* note 22, at 37, 109-10; Paul L. Knox, *Capital, Material Culture and Socio-Spatial Differentiation*, in *THE RESTLESS URBAN LANDSCAPE* (Paul L. Knox, ed., 1993), at 2. Joel Garreau even named one Edge City after its highway junction: "287 & 78, New Jersey." GARREAU, *supra* note 22, at 26.

155. It is with some trepidation that I invoke the term "postmodern," which has been used frequently in the legal literature. Some contemporary uses include J. M. Balkin, *What is a Postmodern Constitutionalism?*, 90 MICH. L. REV. 1966 (1992); Chon, *supra* note 6; Anthony E. Cook, *Foreword: Towards a Postmodern Ethics of Service*, 81 GEO. L.J. 2457 (1993); Rosemary J. Coombe, *Authorizing the Celebrity: Publicity Rights, Postmodern Politics, and Unauthorized Genders*, 10 CARDOZO ARTS & ENT. L.J. 365 (1992); Stephen M. Feldman, *The Persistence of Power and the Struggle for Dialogic Standards in Postmodern Constitutional Jurisprudence: Michelman, Habermas, and Civic Republicanism*, 81 GEO. L.J. 2243 (1993); Sheila Foster, *Community and Identity in a Postmodern World*, 7 BERKELEY WOMEN'S L.J. 181 (1992); Barbara Johnson, *The Postmodern in Feminism*, 105 HARV. L. REV. 1076 (1992); Dragan Milovanovic, *The Postmodernist Turn: Lacan, Psychoanalytic Semiotics, and the Construction of Subjectivity in Law*, 8 EMORY INT'L L. REV. 67 (1994); Francis J. Mootz, III, *Is the Rule of Law Possible in a Postmodern World?*, 68 WASH. L. REV. 249 (1993); Francis J. Mootz, III, *Postmodern Constitutionalism as Materialism*, 91 MICH. L. REV. 515 (1992); Gary Peller, *Notes Toward a Postmodern Nationalism*, 1992 U. ILL. L. REV. 1095 (1992); Ben A. Rich, *Postmodern Medicine: Deconstructing the Hippocratic Oath*, 65 U. COLO. L. REV. 77 (1993); Peter C. Schanck, *Understanding Postmodern Thought and its Implications for Statutory Interpretation*, 65 S. CAL. L. REV. 2505 (1992); Carl F. Stychin, *Identities, Sexualities, and the Postmodern Subject: An Analysis or Artistic Funding by the National Endowment for the Arts*, 12 CARDOZO ARTS & ENT. L. J. 79 (1994); G. Edward White, *Transforming History in the Postmodern Era*, 91 MICH. L. REV. 1315 (1993).

However, both Edge City's critics and supporters view it as a "postmodern" phenomenon. *See* Edward Soja, *Inside Exopolis: Scenes From Orange County*, in *VARIATIONS ON A THEME PARK: THE NEW AMERICAN CITY AND THE END OF PUBLIC SPACE* 95, 121 (Michael Sorkin, ed., 1992) (describing Orange County, California as presenting itself as "a genuine re-creation of everyday life in a brilliantly recombinant postmodern world . . ." and claiming that similar "erosive postmodern geographies are being invented at a furious pace in every urban region in the country"); *see also* GARREAU, *supra* note 22, at 222 ("Edge City, of course, is that land of such apparently contradictory postmodernist future visions . . .").

traditional model of a city¹⁵⁶ — a manufacturing center influencing suburban and rural regions around it¹⁵⁷ — and have enjoyed more urban growth during the last fifteen years than central core cities.¹⁵⁸ Edge Cities are a new urban frontier,¹⁵⁹ a rapidly changing and evolving¹⁶⁰ laboratory of urban innovation where the next chapter of development may yet be written.

It may seem ludicrous to think of an Edge City such as “287 & 78, New Jersey” — a collection of faceless buildings defined only by the confluence of two Interstate Highways — as a place with the potential to become a future Boston or San Francisco. But historian Kenneth Jackson, whose book *Crabgrass Frontier*¹⁶¹ chronicles the growth of suburban America, reminds us that “Brooklyn was the first Edge City.”¹⁶² We have, says Jackson, developed settlements outside of

156. See Soja, *supra* note 155, at 95 (“Every day, more [outer cities] spring up . . . propelling the most spectacular transformation of urban landscapes, and of the language we use to describe them, since the industrial city first took shape in the nineteenth century. It is almost as if the urban is being reinvented to celebrate the millennium.”).

157. The social, economic, and environmental conditions in Edge Cities create “challenges that are different from those of the past” in America’s suburbs; they confront Edge City residents with distinctly “urban problems.” MARK BALDASSARE, *TROUBLE IN PARADISE: THE SUBURBAN TRANSFORMATION IN AMERICA* 15 (1986). This challenge forces the development of new modes of analyses. See Knox, *supra* note 154, at 2 (“[J]ust as it seemed that our theories and models might have captured the essential truths of urban geography, the transformation of cities themselves has made many of the models obsolete, forced a reevaluation of theory, and raised new issues that new models and revised theories must accommodate.”); Tarlock, *City Versus Countryside*, *supra* note 7, at 493.

158. STANBACK, *supra* note 149, at 6-7 (analyzing growth trends between 1970 and 1987). A large and increasing number of Americans now live and work in Edge Cities. Edge Cities “frequently exceed the old downtown[s] in size and activity.” Wickersham, *supra* note 138, at 494; see also GARREAU, *supra* note 22, at 8; KUNSTLER, *supra* note 7, at 15 (“It is where most American children grow up. It is where most economic activity takes place.”); STANBACK, *supra* note 149, at 60-64 (describing growth in Edge Cities).

159. GARREAU, *supra* note 22, at 14. Frontier imagery is pervasive in the literature about Edge Cities. See Soja, *supra* note 155, at 101 (“The exopolis . . . is fast becoming . . . the only remaining primitive society, Jean Baudrillard calls it: a primitive society of the future.”).

160. Edge Cities are “very much still in a state of evolution.” Burke Davis II, *Eco-City: Is it Actually Happening on the Edge*, *THE EDGE CITY NEWS*, *supra* note 19.

161. JACKSON, *supra* note 154.

162. Kenneth Jackson, Remarks at the Virginia Historical Society Meeting (Mar. 12, 1994).

central core cities that matured into cities of their own.¹⁶³ We have not, however, created new cities with the awareness we now possess of the profound social and environmental costs of urban growth. If we want sustainable cities for future generations, we must respond now, in a dynamic manner, to this proliferating urban form.¹⁶⁴

The environmental challenges in Edge Cities are substantial. Edge Cities seriously degrade the environment,¹⁶⁵ and polluted stormwater is one of the Edge Cities' more acute environmental problems.¹⁶⁶ In Edge Cities, stormwater runoff stems from many sources. Parking lots, driveways, streets, and patios, with impervious asphalt covers that facilitate runoff, take up enormous amounts of space.¹⁶⁷ Robert Cervero's study of "suburban employment centers" quotes a standard of four parking spaces per 1,000 square feet of building construction; at that rate, an Edge City office building has more space devoted to parking

163. Brooklyn, says Jackson, started the same way that many Edge Cities have: as a suburb. JACKSON, *supra* note 154, at 25-28. It matured into a city that, if considered on its own, would have been the fourth largest city in the U.S. by the end of the nineteenth century. *Id.* at 28-30.

164. KUNSTLER, *supra* note 7, at 260 (describing Peter Calthorpe's call to "retool" the suburbs).

165. *See, e.g.*, BALDASSARE, *supra* note 157, at 14 ("A series of environmental concerns has also crept into the suburban consciousness, [including] air pollution, land and water pollution, noise, overcrowding, and congestion."); CALTHORPE, *supra* note 7, at 19 (suggesting that suburban "sprawl" is responsible for traffic congestion and deteriorating air quality); ROBERT CERVERO, AMERICA'S SUBURBAN CENTERS: THE LAND USE-TRANSPORTATION LINK 33 (1989) (describing traffic congestion resulting from increases in intrametropolitan automobile travel); SPIRN, *supra* note 25, at 34 ("As [new towns and suburbs] grow older and as urbanization spreads around them, they exhibit many of the same environmental problems as earlier cities."); FAUX, *supra* note 19, at 2 (citing problems of air and water pollution). Citing a study by environmental consultant Brian Ketchum, one author estimates that the costs of traffic congestion in suburbia alone amount to \$168 billion per year. Elliott D. Sclar, *Back to the City*, TECH. REV., Aug./Sept., 1992, at 29, 31-32.

166. Faux, *supra* note 19, at 2 ("Unfortunately, Edge Cities have a poor record of handling storm water runoff.")

167. LEWIS, *supra* note 10, at 101; CERVERO, *supra* note 165, at 33.

Dolan v. City of Tigard, the Supreme Court's most recent case on "regulatory takings," centered on environmental impacts of a parking lot expansion in the Edge City of Beaverton-Tigard-Tualatin, Oregon. *Dolan v. City of Tigard*, 114 S. Ct. 2309, 2313-14 (1994); *see* GARREAU, *supra* note 22, at 435 (listing the area as an Edge City).

than to actual office use.¹⁶⁸ Trace metals from automobiles that park in these lots¹⁶⁹ wash off into drainage systems. Shopping centers, which, with an average of 90 percent impervious cover,¹⁷⁰ also promote runoff, are hallmarks of Edge Cities. Edge City drainage systems rely on concrete and asphalt;¹⁷¹ the natural features that previously enhanced drainage have been destroyed by the widespread expansion of roads¹⁷² and by clearing for office buildings and residences.¹⁷³ Developers add nonindigenous plants and expanses of lush lawns to the Edge City landscape when construction activity destroys natural vegetation. The resulting overwatering and abusive use of pesticides and fertilizers causes additional pollution runoff.¹⁷⁴

By destroying indigenous plants and failing to control stormwater, Edge Cities insulate themselves from nature,¹⁷⁵ and create an excellent example of "environmental opportunities lost."¹⁷⁶ Stormwater is not conserved, reused, or drained through natural systems to recharge

168. CERVERO, *supra* note 165, at 33; *see also* Michael Sorkin, *See You in Disneyland*, in VARIATIONS ON A THEME PARK, *supra* note 155, at 215 ("By one standard calculation, 1300 square feet of parking space are required for every 1000 square feet of office on the urban perimeter.").

169. These metals include copper from brake linings and zinc from tires. Tourbier and Westmacott, *supra* note 107, at 32.

170. Marsh & Hill-Rowley, *supra* note 80, at 9.

171. Faux, *supra* note 19, at 2 ("Too often, a runoff area consists, at best, of serious eyesores: Great gravel-lined pits surrounded by chain-link near parking lots or malls.").

172. ADLER ET AL., *supra* note 59, at 193; Wickersham, *supra* note 138, at 495.

173. Faux, *supra* note 19 at 2; ADLER ET AL., *supra* note 59, at 193 ("[G]roundwater springs and first-order and ephemeral streams [are] simply destroyed beneath the treads of earth-moving vehicles preparing the ground for new development.").

174. Bill Roley, *Home and Community Water Management*, in SUSTAINABLE CITIES, *supra* note 7, at 110. Roley describes the practice of "xeriscape" (appropriate landscape planting) as one way to reduce overwatering and runoff. *Id.*; *see also* SPIRN, *supra* note 25, at 238 (noting that chemicals used to maintain suburban lawns wash off into stormwater).

175. As the architect and urban planner Peter Calthorpe notes:

Communities which use their streams and indigenous plants are far more environmentally benign than those which line their waterways with concrete, sealing out the natural world in an all too literal way. They lose the unique quality of place and gain an artificial landscape that could be anywhere. And in the process they pollute and wastewater.

CALTHORPE, *supra* note 7, at 25.

176. *Id.*

groundwater; instead, it is principally used in Edge Cities (as in other modern cities) as a conveyance for runoff.¹⁷⁷ However, models for successful stormwater drainage systems for new developments abound. The comprehensive, natural drainage system of Woodlands, Texas, a new town thirty miles north of Houston, exemplifies the advantages of considering storm drainage, flood control, water quality, and water conservation in a single scheme.¹⁷⁸ As this and other examples show, the cost of stormwater pollution may be internalized, through land use controls,¹⁷⁹ as development is taking place.¹⁸⁰ Developers could bear the costs of controls initially, and then pass the costs of these controls on to consumers.¹⁸¹

Cities, including developing Edge Cities, therefore present an array of challenges to regulators attempting to control stormwater pollution. To address these challenges, the federal stormwater pollution controls should require controls appropriate to nonpoint sources of pollution and substantive performance standards to ensure that controls meet water quality objectives. Moreover, the federal program should require developers to implement controls during development of Edge Cities because it is less expensive to implement pollution prevention measures

177. Roley, *supra* note 174, at 103.

178. *Landman Testimony*, *supra* note 54. For a detailed description of the stormwater management planning process used in The Woodlands, see SPIRN, *supra* note 25, at 163-66.

179. See Mandelker, *supra* note 74, at 486:

Land use controls can reduce nonpoint pollution in two ways. The zoning ordinance and comprehensive plan can control the rate and type of growth and the location of new development. Subdivision controls, special overlay districts and site plan review can include measures that reduce nonpoint pollution generated by individual sources of pollution.

Id. (citing P. THOMPSON, POISON RUNOFF: A GUIDE TO STATE AND LOCAL CONTROL OF NON-POINT SOURCE WATER POLLUTION 128 (1989)).

180. *Id.* at 490.

181. This could be done through a system of charges imposed by localities on developers and owners of new buildings in Edge Cities. See, e.g., Barbara Rubin, *Mandating Controversy: As Local Governments Balk at Paying for Environmental Safeguards Mandated by Legislation like the Clean Water Act, Environmentalists Fear Years of Progress Will be Hobbled*, ENVTL. ACTION MAG., Mar. 22, 1994, at 10 [hereinafter Rubin, *Mandating Controversy*] (citing the NRDC's Robert Adler's statement that "[p]art of the burden for stormwater management should also be passed on to developers as a sliding fee depending on how much area they pave over, creating conditions ripe for storm water runoff . . .").

during new development than to correct problems later.¹⁸² Unfortunately, the federal stormwater control program has a mixed record of success in addressing these challenges.

III. THE TURBULENT HISTORY OF STORMWATER RUNOFF REGULATION

*Two decades after the 1972 law was passed, where do we stand on controlling the massive releases of pollutants from stormwater outfalls? . . . Most permits have not actually been issued, and compliance with these permits is years off. . . . It appears that the new century will arrive before all sources of storm water have even the most basic permits under the Clean Water Act.*¹⁸³

For over twenty years, federal attempts to control stormwater runoff have led to numerous battles in the courts, agencies, and Congress. The players are familiar: an antagonistic regulated community, featuring industry groups and municipal governments, a vigilant environmental group, the Natural Resources Defense Council (NRDC),¹⁸⁴ an apparently concerned but reluctant, and at times recalcitrant, EPA, and a frequently prodding, but occasionally merciful Congress.

Stormwater runoff regulation has passed through five distinct phases: (1) an initial set of regulations, proposed in the early 1970s, that narrowed the Clean Water Act's coverage but was successfully challenged in federal court, (2) a series of proposed and final rules between 1979 and 1985, (3) a mandate from Congress in the Water Quality Act of 1987, (4) a set of rules implementing the statutory mandate (and a largely unsuccessful court challenge), and (5) an effort by the EPA to implement Phase I of the regulatory program.

182. See *supra* note 139 and accompanying text.

183. ADLER ET AL., *supra* note 59, at 153-54.

184. While other environmental groups have been active in fighting for effective stormwater controls, the NRDC has been the most prominent, commenting extensively in Agency proceedings and bringing a number of lawsuits challenging the Agency's stormwater policy. At times, its vigil has been a lonely one indeed. The NRDC was the only commenter of more than 120 to oppose the EPA's 1991 extension of permit deadlines for industrial stormwater discharges. See *NRDC Submits Only Public Comment Opposing Stormwater Deadline Rule*, 1991 Air/Water Pollution Rep. (Business Publishers, Inc.), May 13, 1991.

A. *The 1973 Rulemaking: EPA Misses the Congressional Mark*
(NRDC V. Costle)

Federal attempts to control stormwater runoff began with the enactment of the Federal Water Pollution Control Act Amendments of 1972, the landmark act that rewrote the nation's water pollution control law (now commonly known as the Clean Water Act).¹⁸⁵ The Clean Water Act divides its regulatory universe into "point sources" and "nonpoint sources." The National Pollution Discharge Elimination System (NPDES) requires permits for discharges of pollutants from point sources into navigable waters.¹⁸⁶ By the Act's logic, stormwater runoff

185. Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251-1376 (1988)). In this Article, I will refer to the amended federal water pollution control statute as the "Clean Water Act" unless I refer to a separate law that amended the Clean Water Act (e.g., the 1972 Amendments, or the Water Quality Act of 1987).

In the 1972 Amendments, Congress chose to replace a federal program first established in 1948 with a new, more effective course. Pub. L. No. 80-845, 62 Stat. 1155 (1948) (superseded 1972). The Federal Water Pollution Control Act of 1948 was a modest attempt at federal involvement in water pollution control that did not significantly improve the quality of the nation's water resources. Its effectiveness was severely hampered by a requirement that a court "giv[e] due consideration to the practicability and to the physical and economic feasibility of securing abatement of any pollution proved" before ordering relief from water pollution. See RODGERS, *supra* note 105, § 4.1, at 253 (quoting Pub. L. No. 80-845 § 29(d)(7), 62 Stat. 115 (1948)).

In 1972, Congress found that the nation's surface waters were being used to dispose of ever increasing amounts of waste. S. REP. NO. 414, 92d Cong., 1st Sess. 7 (1971), reprinted in 2 A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972 1425 (1973) [hereinafter LEGISLATIVE HISTORY, FWPCA 1972]; 117 CONG. REC. 38,797-98 (daily ed. Nov. 2, 1971) (remarks of Sen. Edmund Muskie), reprinted in 2 LEGISLATIVE HISTORY, FWPCA 1972, at 1253-54.

The 1972 Amendments significantly expanded the degree of federal control, mandating actions to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Clean Water Act § 101(a), 33 U.S.C. § 1251(a) (1988); PUD No. 1 of Jefferson County v. Washington Dep't of Ecology, 114 S. Ct. 1900, 1905 (1994). The 1972 Amendments established a goal of eliminating discharges of pollutants into navigable waters by 1985. Clean Water Act § 101(a)(1), 33 U.S.C. § 1251(a)(1) (1988). "Navigable waters" include "the waters of the United States, including the territorial seas." Clean Water Act

§ 502(7), 33 U.S.C. § 1362(7) (1988). This has been held to be a broader definition than waters which are navigable, including such bodies as wetlands adjacent to navigable waters. See *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121 (1985).

186. Clean Water Act § 301(a), 33 U.S.C. § 1311(a) (1988), prohibits the unauthorized "discharge of any pollutant." A "discharge" is "any addition of any pollutant to navigable waters from any point source." Clean Water Act § 502(12), 33 U.S.C. § 1362(12) (1988).

Under § 402 of the Clean Water Act, the EPA is authorized to "issue a permit for the

originates from nonpoint sources,¹⁸⁷ and is discharged into rivers and harbors from discrete conveyances (outfalls) that are point sources subject to the NPDES permit requirement.¹⁸⁸

The 1972 Amendments did not require permits for discharges with nonpoint source origins.¹⁸⁹ As a result, the next twenty years were

discharge of any pollutant" notwithstanding the prohibition on the discharge of that pollutant under § 301. Clean Water Act § 402(a)(1), 33 U.S.C. § 1342(a)(1) (1988). Congress defined "point source" to include "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." Clean Water Act § 502(14), 33 U.S.C. § 1362(14) (1988).

187. "For the purpose of [the Clean Water Act], urban runoff is considered to be a diffuse source or nonpoint source pollution . . ." 53 Fed. Reg. 49,416, 49,417 (1988); see also *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources and Development*, 104th Cong., 1st Sess. (Jan 31, 1995) (testimony of E. Benjamin Nelson, Governor, State of Nebraska, on behalf of the National Governors' Association) ("Although it is discharged at discrete outfalls, storm water is really nonpoint pollution generated by runoff from streets, parking lots, and land.").

188. "[L]egally, most urban runoff is discharged through conveyances such as separate storm sewers or other conveyances which are point sources under the CWA." 53 Fed. Reg. 49,416, 49,417 (1988). A stormwater outfall is a point source because it is a "discrete conveyance . . . from which pollutants are or may be discharged." Clean Water Act § 502(14), 33 U.S.C. § 1362(14) (1988). 40 C.F.R. § 122.26(b)(9) (1994) defines an "outfall" as "a point source where a municipal separate storm sewer discharges to waters of the United States . . ."

189. This does not mean Congress was unconcerned about these discharges. Indeed, the statutory goal of restoring the health of the nation's waters "presupposes control of both point and nonpoint sources." RODGERS, *supra* note 105, § 4.4, at 296.

Section 208 of the 1972 Amendments established a planning process, under which each state was to evaluate its nonpoint source problem, and prepare an assessment of what it felt to be the most effective mix of available prevention and control techniques for its nonpoint source problems. Clean Water Act § 208, 33 U.S.C. § 1288(b)(2) (1988); RODGERS, *supra* note 105, § 4.4, at 296-97 (quoting the EPA's 1973 Water Strategy Paper); see also FREDERICK R. ANDERSON ET AL., ENVIRONMENTAL PROTECTION: LAW AND POLICY 384-87 (2d ed. 1990). It became clear that the Section 208 program would not yield obligations enforceable on the states. From the beginning, it was criticized for its lack of enforceable and meaningful sanctions against states that did not implement control measures embodied in their plans. See Buresh, *supra* note 84, at 1435 (citing William Goldfarb, *Water Quality Management Planning: The Fate of 208*, 8 U. TOL. L. REV. 105, 123 (1976)); see also Goldfarb, *supra* note 7, at 502-03 ("[S]ection 208 of the Clean Water Act of 1972, . . . for the most part, failed to control nonpoint sources of pollution . . .").

The failure of § 208's planning program can be traced to local resistance to the imposition of land use controls to reduce nonpoint source pollution. See Mandelker, *supra*

devoted to a futile quest to control stormwater runoff in the same manner as point source discharges.¹⁹⁰ At first, the EPA and the courts focused on a threshold issue: whether a specific stormwater discharge was from a point source.¹⁹¹ In 1973, the EPA issued proposed regulations that exempted most stormwater discharges from the NPDES permit requirement.¹⁹² The Agency justified its refusal to act by asserting administrative convenience — regulating stormwater dischargers would require it to issue a “tremendous number” of NPDES permits for stormwater point sources,¹⁹³ diverting its attention away from higher priority environ-

note 74, at 490 (“Experience with the section 208 regional water quality planning program authorized by the Clean Water Act provides little encouragement that these problems can be resolved by mandated land use controls.”). In 1987, Congress acted to remedy this failure, adding Clean Water Act § 319 in an effort to control nonpoint source pollution. Clean Water Act § 319, 33 U.S.C. § 1329 (1988); *see also* RODGERS, *supra* note 105, § 4.4, at 296-97. This program has proven no more successful than § 208 in controlling pollution from nonpoint sources. Mandelker, *supra* note 74, at 501.

190. Since 1972, commentators have criticized the Clean Water Act’s focus on requiring permits only for discharges from “point sources.” *See, e.g.*, Amanda G. Birrell, *Brother, Can You Paradigm?*, SONREEL NEWS (A.B.A. Sec. Nat. Resources, Energy, and Envtl. L.), Fall 1994, at 1 (copy on file with author) (describing Professor Michael E. Tigar’s criticism of the use of point source analysis). Professor Tigar describes the inaptness of point source control techniques as similar to inspecting the wreck of his home after his ten-year-old daughter entertains several friends at a slumber party, entering her room, “retrieving a single hamburger wrapper from the chaos I find there, and posing the question, ‘Now, who did *this*?’” *Id.* at 1.

191. Permits were not required for discharges from nonpoint sources. RODGERS, *supra* note 105, § 4.4, at 294-95. Since 1972, the definition of a “point source” has been the subject of much litigation. RODGERS, *supra* note 105, § 4.4 at 294-95.

192. “Separate storm sewers carrying stormwater runoff uncontaminated by industrial or commercial activity” were not regulated unless an EPA Regional Administrator, state water pollution control agency, or interstate agency identified a separate storm sewer as a “significant contributor of pollution.” 38 Fed. Reg. 13,527, 13,530 (1973) (codified at 40 C.F.R. § 125.4(f) (1974)). The 1973 regulations exempted several other categories of discharges from the NPDES permit requirements that the EPA believed would be difficult to control: silvicultural point sources; confined animal feeding operations below a certain size; irrigation return flows from areas of less than 3,000 contiguous acres or 3,000 noncontiguous acres that use the same drainage system; and nonfeedlot, nonirrigation agricultural point sources. *NRDC v. Train*, 396 F. Supp. 1393 (D.D.C. 1975), *aff’d sub nom.* *NRDC v. Costle*, 568 F.2d 1369, 1373 n.5 (D.C. Cir. 1977) (citing 40 C.F.R. § 125.4 (1975)).

193. *NRDC v. Train*, 396 F. Supp. at 1395. For example, affidavits filed with the District Court in *NRDC v. Train* indicate that if individual outfalls were regulated, there would be approximately 100,000 separate storm sewer point sources. *NRDC v. Costle*, 568 F.2d at 1380-81 n.23; *see also* Skoch, *supra* note 84, at 1088. In the floor debate on the 1987 Water Quality Act, Representative Robert Roe (D-N.J.) estimated that if

mental problems.¹⁹⁴

In *NRDC v. Costle*,¹⁹⁵ the NRDC successfully attacked this policy.¹⁹⁶ The United States Court of Appeals for the District of Columbia Circuit held that the EPA could not pursue a policy of selectively exempting broad classes of point source discharges from regulation, despite the perceived administrative infeasibility of regulating all point sources.¹⁹⁷

individual stormwater outfalls were regulated as point sources approximately one million stormwater discharge permits would be needed. 133 CONG. REC. 1006-07 (1987).

Given the large number of potential point sources, the EPA reasoned that problems caused by storm water discharges were better managed at the local level through nonpoint source controls. *NRDC v. Train*, 396 F. Supp. at 1395. The Administrator's sigh of relief at averting a purported administrative nightmare was almost palpable. See RODGERS, *supra* note 105, § 4.4, at 294-95 (quoting R. Zener, *The Federal Law of Water Pollution Control*, in ENVIRONMENTAL LAW INSTITUTE, FEDERAL ENVIRONMENTAL LAW 682, 766-67 (E.L. Dolgin & T.G.P. Guilbert eds., 1974)) ("EPA officials were concerned that . . . control techniques to make this system of regulation work may not exist.").

The Agency's contention that end-of-pipe controls were ill-suited to regulate the pollution from stormwater runoff turns out to be accurate, because the control of stormwater runoff requires a complex series of site-specific management practices. See *supra* notes 125-52 and accompanying text.

194. *NRDC v. Train*, 396 F. Supp. at 1400-01.

195. *NRDC v. Costle*, 568 F.2d 1369.

196. In affirming the lower court's opinion, the D.C. Circuit stated that the legislative history of the 1972 Amendments left no doubt that Congress intended to prohibit all water pollution from point sources, except that authorized by an NPDES permit. *Id.* at 1374-75 (citing H. REP. NO. 911, 92d Cong., 2d Sess. 100 (1972); S. REP. NO. 414, 92d Cong., 1st Sess. 42 (1971)).

197. The EPA had contended that special characteristics of point sources of runoff pollution made case-by-case restrictions infeasible. The *Costle* court responded by stating that the EPA could employ methods necessary to address the administrative burden, such as general permits or area permits. *Id.* at 1381. A general permit establishes pollution limits for "a class of point source dischargers, subject to notice and opportunity for public hearing in the geographical area covered by the permit," rather than setting limits on a case-by-case basis. *Id.* Area permits allow a permit authority to require jurisdiction-wide permits covering an entire geographic area, rather than setting limits for each pipe or outfall, in the hope that all discharges in the permitted area would be adequately considered during the drafting stage of the permit. *Id.*

The court also decided that permits could simply proscribe industry practices in order to eliminate point source pollution when numeric effluent limitations were infeasible. *Id.* Echoes of this discussion surfaced again in the debate over the EPA's 1990 stormwater regulations, when industry groups and municipalities claimed that stormwater discharges could not be cleaned to meet numerical water quality standards. See *infra* notes 296-300 and accompanying text.

On February 4, 1977, the EPA proposed a general permit program for MS4s. 42 Fed.

B. *EPA Responds, and Responds Again: The 1980, 1984, and 1985 Regulations*

The *Costle* court believed that the EPA could regulate stormwater runoff by designing a creative point source regulatory program. Despite the court's optimism, a comprehensive program was not soon in place.

Costle spurred the EPA to include a set of stormwater provisions in NPDES regulations published on June 7, 1979 and again on May 19, 1980.¹⁹⁸ Municipalities, industry groups, and the NRDC promptly challenged these regulations.¹⁹⁹ The EPA issued proposed rules in

Reg. 5846 (1977). The 1987 Water Quality Act subsequently incorporated a similar approach into Clean Water Act § 402(p). See *infra* part III.C.

198. 44 Fed. Reg. 32,854 (1979), *republished* at 45 Fed. Reg. 33,290 (1980) (codified at 40 C.F.R. Parts 122, 124 and 125). The EPA republished its 1979 rule after President Jimmy Carter issued Executive Order 12,044, which required agencies to reform their procedures for issuing regulations. Exec. Order 12,044, 3 C.F.R. 152 (1978). Responding to President Carter's directive, the EPA issued "Consolidated Permit Regulations" (CPR) to streamline the NPDES procedures and permit procedures under several other environmental statutes. 45 Fed. Reg. 33,290, 33,290; see also *NRDC v. EPA*, 673 F.2d 392 (D.C. Cir. 1980), *cert. denied, sub nom. Chemical Mfrs. Ass'n v. EPA*, 459 U.S. 879 (1982).

While the Court of Appeals' review of *NRDC v. Train* was pending, the EPA issued a final rule establishing a comprehensive permitting program for stormwater discharges. 41 Fed. Reg. 11,303 (1976) (codified at 40 C.F.R. § 124.83(a)(1) (1976)). However, the EPA's claim that this rule substantially increased the number of stormwater discharges subject to the NPDES program was only partially correct. The rule stated that an NPDES permit would be required for a separate storm sewer, defined in the rule as "[a] conveyance or system of conveyances . . . located in an urbanized area and primarily operated for the purpose of collecting and conveying storm water runoff." *Id.* at 11,303. Individual permit applications, however, were not required for separate storm sewers, and the EPA stated only that it planned to study such discharges and issue general or area permits as necessary. *Id.* at 11,306. This did not obviate the need for the *Costle* decision.

The CPR reiterated that separate storm sewer outfalls in urban areas were point sources for which permits would be required, and defined a "separate storm sewer" as "a conveyance or system of conveyances . . . primarily used for collecting and conveying storm water runoff and which is either: (i) Located in an urbanized area as defined by the Bureau of the Census . . . ; or (ii) [designated by the Director of the NPDES program on a case-by-case basis]." 40 C.F.R. § 122.57 (1980). The EPA retained the right to require individual permit applications for all such point sources. 45 Fed. Reg. 33,290, 33,446 (1980) (codified at 40 C.F.R. § 122.57(a) (1980)).

199. These petitions for judicial review were consolidated in the U.S. Court of Appeals for the District of Columbia. *NRDC v. EPA*, 673 F.2d at 392. The litigants identified more than 50 issues of disagreement over the scope of the NPDES program. See *NRDC v. EPA*, 822 F.2d 104, 109 (D.C. Cir. 1987).

November 1982 that reflected the terms of a settlement agreement with industry groups²⁰⁰ and cut back sharply on the number of stormwater conveyances that would be considered point sources. Under the proposal, the EPA would only require permits for storm sewers discharging effluent contaminated with specific pollutants, such as processed wastes, raw materials, toxic pollutants, certain hazardous pollutants, and grease and oil.²⁰¹ It was as if the *Costle* opinion had never been written. In their comments to this proposal, the NRDC and others argued that the EPA had no authority to limit the universe of point sources.²⁰²

In its final rule, promulgated in September 1984,²⁰³ the EPA discontinued its attempt to narrow the definition of a stormwater point source,²⁰⁴ but retained the two-tiered approach to regulating stormwater discharges first described in the 1982 proposal.²⁰⁵ The most significant

200. After almost two years of settlement negotiations, the EPA entered into an "NPDES Settlement Agreement" on June 9, 1982, with industry groups, which covered a majority of the issues of concern to them. See 47 Fed. Reg. 52,071, 52,072 (1982); NRDC v. EPA, 822 F.2d at 109. This accommodation of business interests, of course, was a characteristic of many agreements between the EPA and industry groups in the early 1980s. See generally *Burford Resigns From EPA Post Under Fire*, 1983 CONG. Q. ALM. 332 (1983) (describing the pro-business climate under then-EPA Administrator Anne Gorsuch Burford).

After the filing of the Agreement, the Court of Appeals remanded the 1980 NRDC v. EPA proceeding to the EPA, ordering it to promulgate rules implementing the Agreement. See NRDC v. EPA, 822 F.2d at 109. In the meantime, the EPA issued a nonenforcement letter notifying cities that they would not face enforcement actions if they waited for final permit rules. See 49 Fed. Reg. 37,998, 38,012 (1984). Because the final rules were not forthcoming until September 1984, the letter permitted unlawful discharges to take place for over two years without penalty. This "nonenforcement policy" did not apply to existing enforcement actions, or any suit by a state or citizens group against a storm water discharger. See 53 Fed. Reg. 49,416, 49,420 (1988).

The NRDC was not a party to this Agreement, and continued its court challenge of the 1980 rules. 47 Fed. Reg. 52,071, 52,072 (1982); see also NRDC v. EPA, 822 F.2d at 109 n.2.

201. 47 Fed. Reg. 52,071, 52,073 (1982) (proposed Nov. 18, 1982).

202. 49 Fed. Reg. 37,998, 38,013 (1984).

203. 49 Fed. Reg. 37,998 (1984) (codified at 40 C.F.R. §§ 122.21, 122.22, 122.26 (1985)) (proposed Sept. 26, 1984). The preamble to the EPA's 1988 notice of proposed rulemaking contains a detailed history of the 1984 regulations and their origin. See 53 Fed. Reg. 49,416, 49,420 (1988).

204. 49 Fed. Reg. 37,998, 38,013 (1984).

205. The 1982 proposal defined "Group I storm water point sources" as those subject to effluent limitations guidelines, located at an industrial plant or plant-associated area, or

difference between the two tiers was a lengthier application process for Group I dischargers.²⁰⁶ The EPA believed Group II sources would be less troublesome and that additional information could be collected on these sources later.²⁰⁷ Once again, the Agency asserted that administrative convenience justified its approach.²⁰⁸

The 1984 regulations sparked tremendous controversy. In postpromulgation comments, industry groups criticized the rules harshly.²⁰⁹ Environmentalists complained that any change or delay would only exacerbate the EPA's failure to develop a viable stormwater control program.²¹⁰ In March 1985, the EPA responded to these

designated by the Director, and "all other stormwater point sources" as "Group II" sources. 40 C.F.R. § 122.26(b)(2) (1985) (Group I); 40 C.F.R. § 122.26(b)(3) (1985) (Group II). See 47 Fed. Reg. 52,071, 52,074 (1982) for a description of this element of the 1982 proposal.

The final rule also revoked the 1982 nonenforcement letter, and set new permit application deadlines: March 26, 1985 for Group I sources; and six months after the date of designation by the Director for Group II sources. 40 C.F.R. §§ 122.21(c)(2), 122.26(c) (1985).

206. Group I dischargers were required to complete the NPDES Application Form for industrial and commercial process wastewater discharges, which required the submission of sampling and testing data. Group II sources only needed to submit basic information to identify the type, number and location of discharges, and a narrative description of the drainage area, receiving water, and any treatment applied to the discharge. 40 C.F.R. § 122.21(f)(9) (1985) (exempting Group II dischargers from sampling requirements); see 49 Fed. Reg. 37,998, 38,013 (1984).

207. 49 Fed. Reg. 37,998, 38,013 (1984).

208. *Id.* (the EPA stated that it was "attempt[ing] to balance the environmental concerns associated with [stormwater] discharges against the practical limitations of individual NPDES permits and the reality of limited resources").

209. Industry groups claimed the new rules, which stated unequivocally that stormwater discharges were point source discharges, would subject thousands of industries to the NPDES program for the first time. See 50 Fed. Reg. 9362, 9363 (1985). This characterization was inaccurate, unless viewed against the baseline of the 1982 proposal, which had suggested cutting back on the definition of a stormwater point source. Industry commenters also claimed that the application deadline would be impossible for many dischargers to meet, arguing that "six months was not enough time to locate, identify, sample and test thousands of stormwater point sources." *Id.* at 9362-63.

210. *Id.* at 9364.

concerns by proposing changes to the stormwater regulations.²¹¹ The final rule, promulgated that August, extended the deadline for compliance with the regulations to December 31, 1987, for Group I point sources and June 30, 1989, for Group II sources.²¹² Therefore, the Agency would have no regulatory program in force for stormwater discharges before 1988, and an incomplete program until mid-1989.

C. *Congress Rushes In: Section 402(P) of the
Water Quality Act of 1987*

The NRDC challenged the August 1985 rule, contending that the EPA had acted unlawfully by extending the compliance deadlines.²¹³ With the battle continuing in the courts, Congress entered the fray and, in 1987, amended the Clean Water Act to force the EPA to implement an effective water pollution control program.²¹⁴ The legislative history of the Water Quality Act of 1987 shows that Representatives and Senators were dissatisfied with the EPA's failure to make substantial progress in reducing the widespread pollution of the nation's waters in the fifteen years since the enactment of the 1972 Amendments.²¹⁵

211. *Id.* at 9362 (to be codified at 40 C.F.R. Part 122) (proposed March 7, 1985). The EPA proposed to extend deadlines for applications and to modify the application requirements. *Id.* For most pollutants from Group I sources, the EPA would rely primarily on voluntary, written commitments containing quantitative data, instead of concrete sampling and testing data. *Id.* at 9364-65.

212. 50 Fed. Reg. 35,200 (1985) (codified at 40 C.F.R. § 122.21 (c)(2) (1985)).

In a separate proposal, the Agency requested comments on whether MS4s should be classified as Group I sources (as the Agency suggested) or as Group II sources. 50 Fed. Reg. 32,548, 32,552 (1985). After the publication of the September 1984 final rule, the Agency had been overwhelmed by telephone inquiries addressing the ambiguous reference to this issue. *See* 53 Fed. Reg. 49,416, 49,423 (1988).

213. *NRDC v. EPA*, No. 85-1803 (D.C. Cir.). Following the initial Congressional action to amend the Clean Water Act to include a stormwater program, the NRDC agreed to dismiss this lawsuit voluntarily. *See NRDC, EPA Seek to Drop Stormwater Suit; Water Act Provision Seen Resolving Issue*, 17 ENV'T REP. (BNA) 1864 (Mar. 6, 1987).

214. Water Quality Act of 1987, Pub. L. No. 100-4, 101 Stat. 7 (codified as amended in scattered sections of 33 U.S.C.). Congress' action prompted the D.C. Circuit to vacate the EPA's 1985 rule. *NRDC v. EPA*, No. 80-1607 (D.C. Cir. Dec. 4, 1987), *vacating* 40 C.F.R. §§ 122.26, 122.21(c)(2). On February 12, 1988, the EPA deleted the stormwater rules then in force, pursuant to the Court of Appeals' remand. 53 Fed. Reg. 4157 (1988). The EPA also deleted the deadlines for submittal of Group I and Group II permit applications. *Id.*

215. *See generally* Lawrence R. Leibesman & Elliott P. Laws, *The Water Quality Act of 1987: A Major Step in Assuring the Quality of the Nation's Waters*, 17 ENVTL. L. REP.

Congress recognized that unregulated stormwater discharges continued to be a major source of contamination of the nation's waters.²¹⁶ Senator Durenberger attributed this to the EPA's failure to control stormwater runoff, in blatant disregard of the unambiguous statutory mandate.²¹⁷ In response, Congress amended Section 402 of the Clean Water Act and established specific deadlines and permit requirements for stormwater discharges.²¹⁸ The new Section 402(p) stated that any stormwater discharge after October 1, 1994, without an NPDES permit, would be unlawful.²¹⁹ Congress was obviously reluctant to extend the statutory deadline already in force.²²⁰ However, Congress expected that municipalities could comply with the new deadline.²²¹ Congress singled out industrial dischargers for special attention, and required permits that would incorporate technology-based controls.²²²

10311 (1987) (describing the concern of Senators and Representatives about water quality protection).

216. In the floor debate on the Conference Report for the Water Quality Act, Senator Durenberger stated:

Runoff from municipal separate storm sewers and industrial sites contains significant volumes of both toxic and conventional pollutants. EPA's national urban runoff study found 63 toxic pollutants, including 13 toxic metals, in the discharge from municipal separate storm sewers that were studied. Of these, lead, copper, and zinc were the most pervasive; EPA found these pollutants in at least 91 percent of its samples. The same study also estimated that municipal separate storm sewers discharge 10 times the total suspended solids that the Nation's secondary sewage treatment plants discharge.

133 CONG. REC. 1289 (1987) (statement of Sen. David Durenberger).

217. Senator Durenberger stated:

The Federal Water Pollution Control Act of 1972 required all point sources, including stormwater discharges, to apply for NPDES permits within 180 days of enactment. Despite this clear directive, EPA has failed to require most stormwater point sources to apply for permits which would control the pollutants in their discharge.

Id. at 1279-85.

218. Water Quality Act of 1987 § 405, Pub. L. No. 100-4, 101 Stat. 69 (1988) (codified at 33 U.S.C. § 1342(p)) (1988).

219. *Id.*

220. In the floor debate, Senator Stafford stated: "... I generally do not support willingly any delays in environmental programs, especially a program to control a source of toxic pollutants as important as this one is. EPA should have developed this program long ago. Unfortunately, it did not." 132 CONG. REC. 32,381 (1986) (remarks of Sen. Stafford).

221. *See id.* at 32,381-82.

222. *See Clean Water Act* § 402(p)(3), 33 U.S.C. § 1342(p)(3) (1988); 55 Fed. Reg. 47,990, 47,992-47,993 (1990) (stating that permits are required to comply with technology-based standards). One commentator notes:

In Section 402(p)(3), Congress clarified the requirements for municipal stormwater discharge permits and provided that permits "may be issued on a system- or jurisdiction-wide basis," and must "include a requirement to effectively prohibit non-stormwater discharges into the storm sewers."²²³ Section 402(p) also required these permits to include "controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system [*sic*], design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants."²²⁴

The Act did not define the new standard of control: to the "maximum extent practicable" (MEP). The legislative history, however, indicates that satisfying this standard²²⁵ would require site-specific measures quite different from "end-of-pipe" point source control techniques.²²⁶ Indeed, one reason advanced for extending the deadline

Congress further singled out industrial storm water dischargers, all of which are on the high-priority schedule, and requires them to satisfy all provisions of section 301 of the CWA. Section 301 requires all point sources to comply with the technology based effluent limitations of: (1) Best Available Technology (BAT) for toxic and non-toxic, non-conventional pollutants; (2) Best Conventional Technology (BCT) for conventional pollutants; and (3) New Source Performance Standards (NSPS) for new sources of discharges. This means that industrial storm water dischargers may be required to use end-of-pipe pollution control equipment in addition to implementing pollution control programs to achieve these technology-based effluent limitations, especially if numerical limits are used.

Longroy, *supra* note 55, at 565-66 (footnotes omitted).

223. Water Quality Act of 1987 § 405, Pub. L. No. 100-4, 101 Stat. 69 (1988) (codified at 33 U.S.C. § 1342(p)(3)(B) (1988)). The authorization for system- or jurisdiction-wide permitting could be traced back to the *Costle* court's decision in 1977 that the EPA could issue permits without regulating discharges from individual stormwater conveyances. *NRDC v. Costle*, 568 F.2d 1379, 3369 (D.C. Cir. 1977). Congress did not define the geographical area to be covered by each "system- or jurisdiction-wide permit," and that issue would be decided in the courts.

224. Water Quality Act of 1987 § 405, Pub. L. No. 100-4, 101 Stat. 69 (1988) (codified at 33 U.S.C. § 1342(p)(3) (1988)).

225. Whether this was to be an enforceable substantive standard, not a hortatory objective, was eventually settled in the litigation over the EPA's regulations implementing § 402(p). See *infra* part III.E.

226. 55 Fed. Reg. 47,990, 48,038 (1990); 132 CONG. REC. 32,381 (1986) (remarks of Sen. Stafford) ("These permits will not necessarily be like industrial discharge permits. Often, an end-of-pipe technology is not appropriate for this type of discharge.").

The EPA later acknowledged that "much of the criticism" it had received regarding efforts to regulate MS4s with NPDES permits had "focused on the perception that the rigid

for obtaining permits was that municipalities would experience difficulty in developing programs to satisfy the MEP standard.²²⁷

Section 402(p) listed five types of discharges for which NPDES permits would be required by October 1, 1992, including discharges from any MS4 serving a population of 100,000 or more.²²⁸ The rationale for this early deadline was that certain stormwater discharges demanded the EPA's immediate attention.²²⁹ This enabled the EPA to divide the municipal stormwater control program into two phases. Phase I would address discharges from large MS4s and medium MS4s; Phase II would address all other discharges.

D. EPA's 1990 Rulemaking: Drowning in Reality

The EPA's slow response to Congress' mandate was not surprising, given the EPA's fifteen years of relative inactivity and the size of the regulatory effort required by Section 402(p).²³⁰ On December 7, 1988,

regulatory program applied to industrial process waters and effluents from publicly owned treatment works was not appropriate for the site-specific nature of the sources which are responsible for the discharge of pollutants from municipal storm sewers." 55 Fed. Reg. 47,990, 48,038 (1990).

227. See 55 Fed. Reg. 48,038 (1990).

228. Water Quality Act of 1987 § 405, Pub. L. No. 100-4, 101 Stat. 69 (1988) (codified at 33 U.S.C. § 1342(p)(2) (1988)) provided that permits for five types of discharges were required by October 1, 1992:

(A) A discharge with respect to which a permit has been issued under this section before February 4, 1987.

(B) A discharge associated with industrial activity.

(C) A discharge from a municipal separate storm sewer system serving a population of 250,000 or more.

(D) A discharge from a municipal separate storm sewer system serving a population of 100,000 or more but less than 250,000.

(E) A discharge for which the Administrator or the State, as the case may be, determines that the stormwater discharge contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

Congress ordered the EPA to promulgate the first set of permit application regulations by February 4, 1989. *Id.*

229. See Longroy, *supra* note 55, at 564-65 ("This two-step approach relieves the EPA and the states from the task of issuing permits to all storm water dischargers at one time, and gives higher priority to dischargers expected to be the major contributors to pollution.").

230. Congress intended that permits issued under § 402(p) be quite different from traditional NPDES permits, incorporating complex techniques deemed more appropriate to addressing nonpoint source pollution. 132 CONG. REC. 32,381 (1986) (remarks of Sen. Stafford, quoting an EPA official's explanation to the conferees) ("These are not permits

less than three months before the statutory deadline, the EPA proposed stormwater control regulations.²³¹ The 1988 proposal addressed responsibility for all industrial stormwater discharges into MS4s²³² and determined whether industrial stormwater discharges to MS4s and nonmunicipal stormwater conveyances required NPDES permits,²³³ which industrial discharges were required to comply with the permitting scheme,²³⁴ whether industrial facilities could submit individual or group

in the normal sense we expect them to be. These are actual programs. These are permits that go far beyond the normal permits we would issue for an industry because they in effect are programs for stormwater management that we would be writing into these permits.”); *see also* RODGERS, *supra* note 105, § 4.5, at 298 (the stormwater program is “[a]nother attempt to shift the world of nonpoint sources into the world of point sources”).

231. 53 Fed. Reg. 49,416 (1988) (to be codified at 40 C.F.R. Parts 122, 123, 124 & 150) (proposed Dec. 7, 1988). The EPA did not have final rules in place by the 1989 deadline, prompting a lawsuit to compel it to promulgate the missing regulations. *Williams v. Reilly*, No. 89-6265-E (D.Or., filed July 20, 1989). As a result of this lawsuit, the Agency entered into a consent decree requiring it to issue regulations by October 31, 1990, a deadline it subsequently missed, albeit only by a few weeks. *See* 55 Fed. Reg. 47,990, 47,994 (1990); Longroy, *supra* note 55, at 568-69.

232. 53 Fed. Reg. 49,416, 49,428-29 (1988).

233. *Id.* at 49,428.

234. The proposal excluded industrial point source discharges into large or medium MS4s from the permit requirement; these dischargers would need only notify municipalities of their discharges. *Id.* at 49,429. This led municipalities to complain that they would shoulder the entire administrative burden of controlling industrial dischargers. The letter of Pima County, Arizona (in which Tucson is located) was typical:

Pima County believes that EPA's only rationale for not requiring NPDES permits from industrial stormwater discharges into an MSSSS is administrative manageability. While that rationale might make complete sense to EPA, it has no commensurate appeal to local governments. EPA's approach would simply shift an enormous burden off the shoulders of the federal government, where it now rests, and on to the backs of local government agencies.

If the federal government refuses the responsibility, then it should devolve to the states

Letter from Pima County, Arizona to Tom Seaton, Permits Division, U.S. Environmental Protection Agency 3 (Mar. 3, 1989) (copy on file with author).

Smaller municipalities were especially critical of this proposal. Chet Fossum, President of the Board of City Commissioners of Williston, North Dakota, wrote:

We feel that industrial users that generate potentially polluted storm sewer water on a significant scale should be responsible for their own permit. The requiring of the municipality to take out the permit is an expensive mandate that we cannot afford

If the municipalities are to be required to take out a permit to encompass all industrial sources, the Federal Government should provide financial assistance in the sampling and permit regulatory provisions.

permit applications,²³⁵ and what information an industrial application would be required to contain.²³⁶

The proposal also defined a "large MS4" and "medium MS4," which in turn defined the entities that had to comply with Phase I requirements.²³⁷ Congress did not define Phase I's coverage, arguably

Letter from Chet Fossum, President, Board of City Commissioners, City of Williston, North Dakota, to Tom Seaton, Permits Division, U.S. Environmental Protection Agency (Mar. 3, 1989) (copy on file with author). The reference to the "expensive mandate" presaged the "unfunded mandates" criticism that would later be applied to the entire stormwater control program. See *infra* notes 320-30 and accompanying text.

In its final rule, the Agency relented and required permits for all industrial dischargers into MS4s and privately or federally owned stormwater conveyances. 40 C.F.R. § 122.26(c) (1994).

235. 53 Fed. Reg. 49,416, 49,428 (1988). The EPA also had to interpret the provision of § 402(p)(3), requiring only discharges "associated with industrial activity" to obtain a permit. Clean Water Act § 402(p)(2)(B), 33 U.S.C. § 1342(p)(2)(B) (1988).

The EPA believed it had latitude to exempt broad classes of discharge activities from the permitting requirement; it claimed in its final rule that Congress intended discharges "associated with industrial activity" to include only discharges "directly related to manufacturing, processing or raw materials storage areas at an industrial plant." 40 C.F.R. § 122.26(b)(14) (1994). This attempt to distinguish between industrial stormwater discharges and discharges associated with retail, service, or commercial activities (to be unregulated) was eventually rejected in *NRDC v. EPA*. The Ninth Circuit held that the Agency must regulate all industrial activities. *NRDC v. EPA*, 966 F.2d 1292, 1304-08 (9th Cir. 1992).

236. See, e.g., 53 Fed. Reg. 49,416, 49,433 (1988) (Form 2F, quantitative data).

237. 53 Fed. Reg. 49,416, 49,446-49 (1988). Phase I of the new regulatory scheme implemented § 402(p)'s mandate that permits be obtained for "large" and "medium" MS4s by October, 1992. Clean Water Act § 402(p), 33 U.S.C. § 1342(p) (1988).

At the time, the distinction between being regulated in Phase I and Phase II amounted to a regulatory delay of two years, because § 402(p) required permits for all stormwater discharges by 1994. Clean Water Act § 402(p), 33 U.S.C. § 1342(p) (1988); Letter from Pima County, Arizona, *supra* note 234, at 2 ("EPA's preferred approach only gains the agency two years before 'everyone else' is brought into the permitting system."). This, it would seem, was hardly worth much attention.

However, the EPA's record of regulatory delay led many municipalities to conclude they might not be regulated for some time to come if they were not regulated in Phase I. Given the high cost of permit applications, see *infra* note 259 and accompanying text, and the EPA's lax record of enforcement, this was not an irrational position. The prospect of regulatory lag led to a dispute between representatives of cities (particularly the National League of Cities, representing larger cities) and towns and counties about the scope of Phase I. Cities argued that Phase I should include all systems serving the requisite population. See, e.g., Letter from McGuire, Woods, Battle & Boothe on behalf of the City of Richmond, VA, and the City of Lynchburg, VA to Tom Seaton, Permits Division, U.S. Environmental Protection Agency (Mar. 7, 1989) (copy on file with author) (stating that "large and medium size cities and towns" and "comparably sized counties" should be

leaving the interpretation of the term “municipal separate storm sewer system” to the EPA. Although the Clean Water Act does define “municipality,”²³⁸ the EPA argued that this did not control the definition of a “municipal separate storm sewer system,” and that the EPA had discretion to define an MS4 as it saw fit to meet the statutory mandate.²³⁹ The Agency recognized that “ideally” stormwater should be controlled on a watershed basis, and stated that “watershed planning concepts and controls” should “ultimately [be incorporated] into permits.” However, it rejected a watershed-based approach to defining an MS4, citing “administrative burdens.”²⁴⁰

The Agency developed seven options for the definition of a large or medium MS4. Four would define the system in terms of its owner,

treated equally).

238. Clean Water Act § 502(4), 33 U.S.C. § 1362(4) defines a municipality as follows: Except as otherwise specifically provided, when used in this chapter:

...

(4) The term “municipality” means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 1288 of this title.

Id. The NRDC later contended that this controlled the definition of an MS4. See *infra* note 283 and accompanying text.

239. 53 Fed. Reg. 49,416, 49,444 (1988).

240. *Id.* at 49,455. The Agency felt a watershed approach would preclude it from complying with the statutory mandate based on population, because “it is difficult to accurately estimate the population served by a given watershed.” Moreover, the Agency claimed, it would face “administrative difficulties” in developing watershed stormwater control programs and defining the boundaries of watersheds, because “watersheds do not follow political boundaries” and are formed by smaller streams combining to form larger ones. *Id.*

The Agency also did not propose to define the scope of an MS4 in engineering terms (*i.e.*, in terms of the boundaries of actual interconnections of storm sewer pipes) “because of practical problems determining the boundaries of and the populations served by ‘systems’ defined in such a manner.” 55 Fed. Reg. 47,990, 48,039 (1990). The Agency did not elaborate on the nature of these “practical problems,” but it apparently had in mind the substantial difficulties associated with mapping the underground interconnections in each municipality. See *supra* note 78 and accompanying text (describing GIS techniques).

In addition, the Agency believed an engineering-based approach would not be sufficient to serve as the basis for a regime of site-specific controls: “[A]n engineering approach based on physical interconnections of storm sewer pipes by itself does not provide a rational basis for developing a storm water program to improve water quality where a large number of individual storm water catchments are found within a municipality.” See 55 Fed. Reg. 47,990, 48,039 (1990).

operator, or other entity with jurisdiction over it. The remaining three would define the system to include all MS4s within a specified geographic area. The first, and preferred, option (Option 1) would regulate MS4s "owned or operated by 'incorporated places'²⁴¹ with a population which exceeds the appropriate limit."²⁴² The EPA suggested that Option 1 would encourage the nation's largest cities to develop stormwater management programs.²⁴³

However, Option 1 was inconsistent with Section 402(p),²⁴⁴ and was flawed in its coverage. Discharges from systems serving a county with a large and highly urbanized population, but few incorporated towns or cities (for example, San Mateo County, California²⁴⁵), would not

241. 53 Fed. Reg. 49,416, 49,446 (1988). Earlier regulatory efforts had required permits from MS4s located in "urbanized areas," as designated by the Census Bureau. *Id.* at 49,449. The definition of an "incorporated place" would include "the District of Columbia, or a city, town or village that is incorporated under the laws of the State in which it is located." *Id.* at 49,446. The Census Bureau estimated that as of 1986 there were 60 "incorporated places" with populations greater than 250,000, and 122 with populations greater than 100,000 but less than 250,000. *Id.* The definition of "incorporated place" did not include county governments, flood control districts, or sewer districts. *Id.*

242. *Id.* at 49,446.

243. *Id.* at 49,446. This Option, claimed the Agency, "provides a reasonable and realistic basis for the initial phases of development of this program." *Id.* at 49,446-47. If stormwater discharges from these MS4s would have impacts on discharges from MS4s owned and operated by entities other than large and medium incorporated places (e.g., if the two systems were physically interconnected), the Director of the NPDES program could make discretionary decisions to regulate those other systems as well. *Id.* at 49,447.

244. In light of the legislative history of § 402(p), the Agency's choice of "incorporated place" seemed, as the NRDC later claimed, to "come[] out of thin air." Brief for Petitioner at 28, *NRDC v. EPA*, 966 F.2d 1262 (9th Cir. 1992) (No. 91-70200) [hereinafter *NRDC Brief for Petitioner*]. No Representative or Senator mentioned it in floor statements or the Conference Report. In fact, Members referred to MS4s serving the requisite number of people, regardless of a jurisdiction's incorporation status. *Id.* at 29 n.29. Senator Durenberger referred in his remarks to "communities" with the defined populations. 133 CONG. REC. 1276-77 (1987) (statement of Sen. David Durenberger); see also *NRDC Brief for Petitioner, supra*, at 29.

That its choice appeared anomalous seemed not to bother the Agency, which largely retained it (with changes discussed *infra*) in the final rule. 40 C.F.R. §§ 122.26(b)(4) [large MS4s], 122.26(b)(7) [medium MS4s] (1994).

245. "None of the people in . . . San Mateo County (population 613,500) live in incorporated places. The result: under EPA's formulation, . . . the densely populated suburbs of San Mateo . . . are not covered by the rule." *NRDC Brief for Petitioner, supra* note 244, at 29.

require permits; nor would discharges from systems serving highly developed counties with adjoining small municipalities (for example, Nassau County, New York);²⁴⁶ nor would discharges from systems serving the unincorporated areas of any highly urbanized county (for example, Santa Clara County, California, where permits would be required for systems serving 825,000 people, but not for systems serving nearly 600,000 residents in unincorporated areas).²⁴⁷ In all, Option 1 would exclude portions of 378 counties with populations of over 100,000 — including many major suburban areas.²⁴⁸

Three other proposed options were noteworthy. Option 3 would have added systems owned or operated by counties to those covered under Option 1. Option 6 would have regulated all systems in counties exceeding the statutory population limits. Finally, Option 7 would have regulated systems located in “urbanized areas,” as defined by the Census Bureau.²⁴⁹ Commenters later stated that each of these could address more pollution and incorporate the beginnings of a watershed planning approach.²⁵⁰ The EPA, however, believed these options were not

246. *Id.* at 30 n.30.

247. *Id.* at 29. Stating that “everyone acknowledges . . . the regional nature of stormwater quality and quantity problems,” one commenter wrote that because Option 1 would cover only incorporated areas of these counties, it threatened to establish permanent political “balkanization” of the regulatory program. Letter from Pima County, Arizona, *supra* note 234, at 2.

248. *NRDC Brief for Petitioner, supra* note 244, at 29.

249. 53 Fed. Reg. 49,416, 49,447-49 (1988).

250. The EPA summarized the comments as follows:

Many commenters, including environmental groups, believed that proposed Option 3 (systems owned or operated by counties), Option 6 (systems within the boundaries of counties), and Option 7 (systems in urbanized areas) were good approaches because more sources of pollution would be addressed. It was also maintained that Options 3, 6 and 7 could incorporate watershed planning which, in the view of some commenters, is the only effective way to address pollutants in storm water.

55 Fed. Reg. 47,990, 48,042 (1990).

Option 7, for example, held considerable potential to regulate stormwater discharges in areas undergoing rapid urban development, particularly if recent estimates of urbanization were used as the basis for regulation. The Agency, however, engaged in disingenuous reasoning on this subject. It claimed that using the Census Bureau’s 1980 definitions of urbanized areas would undercount areas experiencing rapid development since then, but “[u]sing more recent estimates of urban areas may create uncertainty in the regulatory definition.” 53 Fed. Reg. 49,416, 49,449 (1988). Moreover, it claimed, “areas of new development would not be addressed [by Option 7] until after the development had progressed significantly. . . .” *Id.* This is also the case with any definition based on incorporation: if urban development takes place in unincorporated areas of counties, rules

workable for Phase I.²⁵¹

Having intimated that its final rule would base the definition of an MS4 on a jurisdiction's incorporation status, the EPA next turned to the permit application requirements. The most immediate change from previous regulatory approaches was the system-wide permit approach authorized by Section 402(p)(3); municipalities would not have to write individual permit applications for each outfall. The Agency even provided that "co-permittees" (multiple municipal agencies) could submit joint applications.²⁵²

The proposal rejected earlier attempts to establish more lenient application requirements for some dischargers. It substituted a new, two-part approach for permit applications, based on "comprehensive system-wide evaluation of pollutant sources."²⁵³ Part 1 of the permit application would provide the basis for formulating a stormwater control strategy,²⁵⁴ Part 2 would provide the municipality an opportunity to

based on incorporation do not cover it.

251. 53 Fed. Reg. 49,416, 49,448 (1988). The EPA believed Option 3 would require too many permits and too many adjustments for variations in counties' abilities to implement the program, and would be overinclusive (because many rural counties have populations greater than 250,000). *Id.* Option 6 would also require permits from "an extremely large number of municipal entities," even though the Agency admitted it would "in larger urbanized areas, provide a geographic basis necessary for the planning of comprehensive programs to reduce pollutants in discharges from municipal separate storm sewer systems to the maximum extent practicable." *Id.* at 49,449. Option 7, as noted above, would force the Agency into the purportedly difficult task of deciding "which discharges are within the urban area," and would be difficult in regulating urbanized areas that did not follow political boundaries. *Id.*

The EPA proposed, as a possible variation of Option 7, to base the MS4 definition on "the population of a county which resides within urbanized areas that have been defined by the Census Bureau." *Id.* at 49,448. Because the Agency rejected Option 7, which relied solely on the definition of "urbanized areas," it also disfavored this variation.

252. *Id.* at 49,450.

253. *Id.*

254. Part 1 applications would be required to contain: (1) general information about the permit applicant or co-applicants; (2) a description of the existing legal authority of the applicant(s) and a plan to augment legal authority where necessary; (3) source identification information, including the location of known municipal separate storm sewer outfalls; (4) information characterizing the nature of system discharges (including the results of a field analysis to detect illicit discharges); (5) a proposed plan to characterize discharges from the MS4; and (6) a description of existing structural and nonstructural pollution controls. *Id.* at 49,451.

propose control measures to meet the MEP standard.²⁵⁵ The EPA, however, did not define the MEP standard, nor did it specify how the controls described in any permit application would meet the regulatory standard. Seven years later, the EPA still has not provided guidance on this crucial issue.²⁵⁶

The sweeping proposed rule prompted 450 replies to the EPA, including over 3,200 pages of comments from affected industries, trade associations, municipalities, state and federal agencies, environmental groups, and private citizens.²⁵⁷ Municipalities submitted many of the comments,²⁵⁸ challenging the EPA's optimistic estimates about permit application costs²⁵⁹ and expressing deep concern over administrative

255. The components of the proposed Part 2 permit application included: (1) a demonstration that the legal authority of the permit applicant satisfies regulatory criteria; (2) identification of "major outfalls"; (3) submission of quantitative data; (4) identification of a "proposed management program to control the discharge of pollutants to the maximum extent practicable, from municipal storm sewers"; and (5) estimates of the cost and likely effectiveness of proposed controls. *Id.*

256. Because the Clean Water Act requires that permitted discharges be treated to enable receiving waters to meet water quality standards, this issue takes on considerable importance. See *infra* notes 294-300 and accompanying text.

257. See 55 Fed. Reg. 47,990, 47,994 (1990).

258. Even municipalities not immediately affected by the rule commented on it. The EPA received comments from cities with populations of less than 100,000, which would be covered by Phase II rules. See, e.g., Letter from Chet Fossum, *supra* note 234.

259. Municipal commenters estimated the cost of a Part I and Part II application to be up to \$1 million. See Letter from the City of Raleigh to Tom Seaton, Permits Division, U.S. Environmental Protection Agency 3 (Mar. 3, 1989) (copy on file with author) ("In looking at the amount of detail needed in developing the plans and the additional work needed to develop a good inventory system of the storm sewers it is our opinion that these costs just for the application would probably be more than \$500,000 for the application . . ."); Letter from Ramon F. Miguez, Engineering Department, City of Phoenix to Tom Seaton, Permits Division, U.S. Environmental Protection Agency (Mar. 3, 1989) (copy on file with author) (estimating the total cost for Phoenix's permit application to be \$873,350).

Pima County, Arizona commented:

Pima County believes that EPA has significantly underestimated the costs of successfully submitting both Part One and Part Two of the application as proposed. We understand that [the] EPA estimates that it will take a municipality with a population of 250,000 or more approximately 8,500 man-hours to submit an application and that the typical municipality will spend \$32.00 per hour, for a total cost of \$272,000. This is a significant cost burden in and of itself. It is, however, probably an underestimate.

Letter from Pima County, Arizona, *supra* note 234, at 5.

Municipalities' fears may well have been justified, because application costs do appear

burdens.²⁶⁰ Officials from smaller municipalities believed the entire stormwater regulatory program was not only unaffordable,²⁶¹ but unnecessary.²⁶² A large number of commenters proposed modifications to the definition of a large or medium MS4.²⁶³

On November 16, 1990, the EPA published its final rules,²⁶⁴ which modified several aspects of the proposal. The Agency, knowing it was violating the statute,²⁶⁵ nevertheless extended the permit application deadlines.²⁶⁶ Additionally, the Agency disagreed with comments

to have exceeded EPA estimates. See L. Scott Tucker, *Stormwater Permit Costs Log Up into Tens of Millions*, NATION'S CITIES WEEKLY, June 22, 1992, at 10 ("The average cost of a permit application for a city or county is approximately \$760,000, a cost impact that well exceeds U.S. EPA's application estimates of \$50,000 for a system serving a population of 100,000-250,000 and \$75,000 for a system serving a population of more than 250,000."). The *Washington Times* noted that:

[Officials in Colorado Springs] tell the story of how EPA officials figured that the city would have to spend, oh, \$49,000 for thus-and-such storm-water permit. Well the latest figure is \$1 million and counting because the city still hasn't done enough to satisfy EPA. Likewise the agency also guesstimated that a stormwater permit for Columbus, Ohio, would run about \$77,000. The lowest bid from contractors, however, was almost \$1.78 million.

Editorial, *Shift and Shaft Federalism*, WASH. TIMES, July 27, 1992, at E2.

260. See, e.g., Letter from Morris L. Allen, Director of Municipal Utilities, City of Stockton to Tom Seaton, Permits Division, U.S. Environmental Protection Agency (Mar. 3, 1989) (copy on file with author). In his letter, Mr. Allen stated:

The City of Stockton is gravely concerned about the economic and administrative burden resulting from these provisions. What often appears to be "reasonable" under a presumed limited application can become a formidable and even impossible task when applied to a larger more complex situation We recommend that the Part II application process be incorporated into the 5-year NPDES permit. This would allow a practical development of the required data.

Id. at 2.

261. See, e.g., Letter from Chet Fossum, *supra* note 234, at 1.

262. See, e.g., Letter from the City of Minnetonka, Minnesota to Tom Seaton, Permits Division, U.S. Environmental Protection Agency 1 (Mar. 6, 1989) (copy on file with author) ("[N]ot only is Federal regulation in the area of storm water management unwelcome, but it is also unnecessary"). The City of Minnetonka has a population of "about 45,000," according to its letter, and would therefore be covered in Phase II. *Id.*

263. There were over 200 commenters on this issue alone. See 55 Fed. Reg. 47,990, 48,039 (1990).

264. *Id.* at 47,990 (codified at 40 C.F.R. § 122.26 (1994)).

265. *Id.* at 48,060 ("In establishing these regulatory guidelines, EPA is fully aware that they are not synchronized with the statutory deadlines established by Congress.").

266. 40 C.F.R. § 122.26(e) (1994). This action was taken in response to municipalities' comments that the proposed deadlines "are too tight and that the required information

that it should translate the MEP mandate into a specific, enforceable substantive standard.²⁶⁷ The EPA thought a uniform standard would be too inflexible to deal with "fundamentally different characteristics of many municipalities" that would require varying types of permits and controls.²⁶⁸

The EPA described its definition of large and medium MS4s as a combination of the proposed approaches.²⁶⁹ The EPA's definition included systems located within incorporated places of the requisite population size (as proposed in Option 1),²⁷⁰ and systems located within counties having areas designated as urbanized areas by latest decennial Bureau of Census estimates.²⁷¹ Responding to comments it

would not be available for submission within the required time frame." 55 Fed. Reg. 47,990, 48,060 (1990). Under the final rule, the EPA would require large MS4s to submit Part 1 by November 18, 1991, and Part 2 by November 16, 1992; medium MS4s would submit Part 1 by May 18, 1992, and Part 2 by May 17, 1993. These deadlines would give large systems two years to complete the application process, and medium systems 2 years and 6 months to submit applications. *Id.*

267. 55 Fed. Reg. 47,990, 48,053 (1990). In its comments, the New York State Department of Environmental Conservation stated:

The draft regulations are totally devoid of any implementable national objective for municipal storm water permits . . . [W]e believe that the phrase 'maximum extent practicable' is a meaningless objective for municipal storm water permits as presented in these draft regulations. . . . EPA is obliged to give the State a much better definition of MEP.

Comments on Draft EPA Regulations on Stormwater Permits, Division of Water, New York State Department of Environmental Conservation 1 (Mar. 1, 1989), *reprinted in* Excerpts of Record, *NRDC v. EPA*, 966 F.2d 1292 (9th Cir. 1992) (No. 91-70200) [hereinafter *NRDC Excerpts of Record*].

One commenter proposed that MS4 permits comply with a technology-based regulatory standard; another thought that the rule should enumerate specific BMPs required of each permittee. The EPA rejected both of these suggestions. 55 Fed. Reg. 47,990, 48,053 (1990).

268. 55 Fed. Reg. 47,990, 48,053 (1990) ("The language of CWA section 402(p)(3) contemplates that, because of the fundamentally different characteristics of many municipalities, municipalities will have permits tailored to meet particular geographical, hydrological, and climatic conditions."). The Agency also viewed a substantive standard as unwarranted in a rulemaking that focused on the permit application requirements; enforcement of individual permit conditions could be dealt with at a later date. *Id.*

269. *Id.* at 48,039.

270. The EPA provided a list of these systems in two appendices to the rules. See 40 C.F.R. Pt. 122, App. F, G (1994).

271. See 40 C.F.R. § 122.26(b)(4)(ii) (1994) (applying to large MS4s); *id.* at § 122.26(b)(7)(ii) (applying to medium MS4s). The populations of these "urbanized areas" would have to exceed 100,000, after subtracting the population of covered incorporated

received from the NRDC (among others) that Option 1 would not cover developing areas,²⁷² the Agency stated its refinement would include "a significant number of counties with highly developed or developing areas."²⁷³

The battle over the new regulations was just beginning. Not long after, deadlines were missed²⁷⁴ and the EPA was challenged in the federal courts.

E. NRDC v. EPA: *The Debate Over Definitions, with Chevron to the Rescue*

It is tempting to view *NRDC v. EPA*,²⁷⁵ decided by the Ninth Circuit Court of Appeals in November 1992, as merely another challenge to EPA's failure to comply with the deadlines for stormwater control set by Congress.²⁷⁶ However, the case also featured sharp battles over the

areas. See 40 C.F.R. § 122.26(b).

The EPA provided a list of these systems in two more appendices to the rules. See 40 C.F.R. Pt. 122, App. H, I (1994).

272. 55 Fed. Reg. 47,990, 48,042 (1990); see also Rubin, *EPA Stormwater Rules*, *supra* note 70, at 16.

273. 55 Fed. Reg. 47,990, 48,042 (1990).

274. See 56 Fed. Reg. 56,548 (1991) (extending the deadline for submission for NPDES individual permit applications for stormwater discharges associated with industrial activity from November 18, 1991 to October 1, 1992); 56 Fed. Reg. 12,098 (1991) (extending the deadline for submission of Part I of group industrial stormwater applications to September 30, 1991).

275. *NRDC v. EPA*, 966 F.2d 1292 (9th Cir. 1992).

276. Cases challenging the EPA's delays in meeting deadlines imposed by environmental statutes have become a prominent feature of the environmental litigation landscape of the 1980s and early 1990s. See, e.g., *NRDC v. EPA*, 22 F.3d 1125 (D.C. Cir. 1994) (per curiam) (holding that the EPA could not accept incomplete state implementation plan submissions under the Clean Air Act to postpone statutory deadlines); *Sierra Club v. EPA*, 992 F.2d 337 (D.C. Cir. 1993) (holding that the Resource Conservation and Recovery Act deadline for promulgation of revisions to criteria for solid waste landfills applied to all facilities that could receive such wastes, not just to municipal waste landfills); *NRDC v. EPA*, 797 F. Supp. 194 (E.D.N.Y. 1992) (holding that the EPA failed to justify its failure to comply with the Clean Air Act's mandatory deadline to promulgate regulations concerning motor vehicle inspection and maintenance programs); *Conservation Law Found. of New England, Inc. v. Reilly*, 755 F. Supp. 475 (D. Mass. 1991) (ordering the EPA to perform a preliminary assessment of facilities on the federal hazardous waste compliance docket and to include the appropriate facilities on the national priorities list by CERCLA's statutory deadline); *New York v. Gorsuch*, 554 F. Supp. 1060 (S.D.N.Y. 1983) (ordering the EPA to publish regulations establishing inorganic arsenic emission standards, after the

definition of an MS4 and the meaning of the MEP standard — battles the NRDC might have won under the administrative law standards prevailing at the time of the *Costle* decision. The NRDC's chances of forcing the EPA to expand Phase I's coverage and substantive bite had decreased dramatically after the Supreme Court's *Chevron U.S.A., Inc. v. NRDC*²⁷⁷ decision, which increased deference to the judgments of

EPA had failed to meet the CAA statutory deadline).

In *NRDC v. EPA*, the NRDC claimed that the EPA had unlawfully extended the statutory deadlines. The statute required permits for all stormwater discharges by 1994, and the NRDC argued that the delay in Phase I compliance would cause the Agency to miss the 1994 deadline for Phase II. *NRDC Brief for Petitioner, supra* note 244, at 23. This turned out to be rather prophetic. The EPA has not issued proposed regulations for Phase II as of early 1995. See *infra* notes 304-08 and accompanying text.

The Phase I delay prompted Judge Ferguson to deliver the Agency yet another rebuke, but not to issue an injunction ordering it to comply. *NRDC v. EPA*, 966 F.2d at 1299-1300. The court announced that, "the EPA does not have the authority to ignore unambiguous deadlines set by Congress." *Id.* at 1300. In refusing to issue an injunction, the court "decline[d] to take on [the] potentially extensive supervision of EPA" that would require. *Id.* at 1300.

The court noted that Congress had already acted twice to relax certain compliance deadlines for industrial stormwater discharges. For example, the Intermodal Surface Transportation Efficiency Act of 1991 extended the deadlines for stormwater discharges associated with industrial activity from facilities owned or operated by a municipality. Intermodal Surface Transportation Efficiency Act of 1991 § 1068, Pub. L. No. 102-240, 105 Stat. 2007 (1991); see also *NRDC v. EPA*, 966 F.2d at 1298 n.8. Congress had also "ratified the date of September 30, 1991 for part 1 of group applications for industrial dischargers." 966 F.2d at 1298 n.8. The National League of Cities had persuaded Senator Pete Domenici (R-N.M.) to attach an amendment to a supplemental appropriations bill to extend the original March 18, 1991 deadline. One day before the action on the rider, the EPA received a letter signed by 27 Senators, raising "significant concern" about the deadline. Dire Emergency Supplemental Appropriations Act of 1991 § 307, Pub. L. No. 102-27, 105 Stat. 307 (1991); *EPA's Stormwater Rule Hits Roadblocks in Senate*, OMB, Air/Water Pollution Rep. (Business Publishers, Inc.), Mar. 18, 1991, at 16.

The court held that unaffected compliance deadlines remained in effect. *NRDC v. EPA*, 966 F.2d at 1300. On a related issue, the court found that the final rules contained neither final approval nor compliance deadlines for large and medium MS4s. The court held that the EPA's failure to comply with this "key component of the statutory scheme" was arbitrary and capricious, and ordered the EPA to "inform the regulated community of the statute's outside dates for compliance." *NRDC v. EPA*, 966 F.2d at 1300-01.

277. 467 U.S. 837 (1984). The *NRDC v. EPA* court concluded that *Chevron* furnished the applicable standard of review for questions of statutory construction. *NRDC v. EPA*, 966 F.2d at 1297.

In *Chevron*, the Supreme Court established a now familiar two-step method for judicial review of an agency's interpretation of a statute that it administers. The threshold inquiry is whether Congress precisely addressed the issue in question; "[i]f the intent of Congress [in the plain language of the statute] is clear, that is the end of the matter; for the Court, as well as the agency, must give effect to the unambiguously expressed intent of

administrative agencies.

On the MEP issue the EPA argued that Section 402(p) did not require it to develop a detailed substantive standard.²⁷⁸ The effectiveness of individual programs, argued the Agency, would be decided in "the discretion of the permit writer, working jointly with the municipal applicant."²⁷⁹ The Ninth Circuit, relying on *Chevron*, dismissed virtually out of hand the NRDC's contention that the final rules violated the statutory mandate because the rules would not require any municipality to control its stormwater runoff and meet performance standards.²⁸⁰ The court rejected the NRDC's argument that Congress had given the EPA extra time because Congress intended the EPA to develop substantive performance standards.²⁸¹

As for the definition of an MS4, the court agreed with the EPA that Congress had not spoken clearly on this issue.²⁸² Without clear

Congress." *Chevron*, 467 U.S. at 842-43. In deciding whether the intent of Congress is clear, courts are to employ traditional rules of statutory construction. *Id.* at 843 n.9; see also *INS v. Cardoza-Fonseca*, 480 U.S. 421, 447-48 (1987) (holding that questions of congressional intent may be answered with reference to "traditional tools of statutory construction").

If a statute is "silent or ambiguous with respect to the specific issue," then, and only then, does a reviewing court proceed to the second step of a *Chevron* inquiry: "whether the agency's answer is based on a permissible construction of the statute." *Chevron*, 467 U.S. at 843. As long as an agency's interpretation of the statute is "reasonable," the reviewing court should defer to that interpretation and not impose its own construction on the statute. *Id.* at 844.

278. The National Association of Flood and Stormwater Management Agencies (NAFSMA), acting as an intervenor in the case, supported the EPA's contention on this issue. Robert J. Saner, *Ninth Circuit Upholds Bulk of Stormwater Rule*, NATION'S CITIES WEEKLY, June 22, 1992, at 10.

279. *Id.*

280. The court first found that Congress "did not mandate a minimum standards approach or specify that EPA develop minimal performance standards." *NRDC v. EPA*, 966 F.2d at 1302. The court then noted, "Congress could have written a statute requiring stricter standards, and it did not." *NRDC v. EPA*, 966 F.2d at 1308. It concluded, "[w]e must defer to EPA on matters such as this, where EPA has supplied a reasoned explanation of its choices. See 55 Fed.Reg. at 48,049, [sic]" adding, "[w]hether a specific permit complies with the requirements of section 402(p)(3)(B) would, of course, be another matter not controlled by this decision." *Id.* at 1308, 1308 n.18.

281. *Id.* at 1308.

282. The court stated, "Although [the legislative history] explains that a purpose of the permitting scheme was to attack the most serious sources of discharge first, this general goal is not helpful in discerning the specific meaning of 'municipal separate storm sewer system serving a population.'" *NRDC v. EPA*, 966 F.2d at 1302.

guidance from Congress, the court turned to the EPA's justification for its definition. The court found that the EPA had not impermissibly narrowed the coverage of both Phase I and Phase II by using incorporation as the regulatory touchstone.²⁸³ "The agency," the court stated, "proceeded on the reasonable assumption that cities possess the police powers needed effectively to control land use within their borders."²⁸⁴

The NRDC also argued that the EPA's choice to use 1980 census data and the Census Bureau's definition of "urbanized area" would leave unregulated those areas that had experienced rapid urbanization since then.²⁸⁵ The court dismissed this argument, stating, "EPA chose the 1980 census data because it was the most widely available decennial census data at the time of rule formulation and promulgation. Neither this choice nor its use of the Census Bureau's definition of urbanized area is arbitrary and capricious."²⁸⁶

F. *Implementation of Phase I: There Are No Guarantees*

NRDC v. EPA left the EPA's regulatory program largely intact.²⁸⁷ In Phase I, a total of 173 cities with populations of 100,000 or more, and 47 counties with urbanized area populations of 100,000 or more were required to file stormwater permit applications.²⁸⁸ Most of these

283. *Id.* at 1308; see *NRDC Brief for Petitioner, supra* note 244, at 23-37. The NRDC claimed the terms "municipality" and "municipal separate storm sewer system" in § 402(p) required consistent interpretation. *Id.* at 28-29; Clean Water Act §§ 402(p), 502(14), 33 U.S.C. §§ 1342(p), 1362(14) (1988). The NRDC argued this required the EPA to regulate all conveyances owned or operated by the full range of entities meeting the definition of "municipality" (including, for example, counties) that met the population requirements. See *NRDC v. EPA*, 966 F.2d at 1302.

The NRDC claimed that limiting regulation to incorporated places and urbanized areas of the requisite size would still leave out systems serving areas in over 350 counties with populations of over 100,000. *NRDC Brief for Petitioner, supra* note 244, at 29-30.

284. 966 F.2d at 1303. With respect to rapidly developing areas, the lack of incorporated jurisdictions with clear police powers should not have prompted the Agency to decline to regulate. However, it did so, and the Court of Appeals was unwilling to order it to do otherwise. *Id.* This regulatory decision had serious consequences. See *infra* part IV.

285. 966 F.2d at 1303.

286. 966 F.2d at 1304.

287. The regulatory structure and permit application process remained essentially unchanged. See 40 C.F.R. § 122.26 (1994).

288. 40 C.F.R. Pt. 122 (1994); *id.* App. F-I (listing these jurisdictions); see also ADLER ET AL., *supra* note 59, at 197; Gebhardt and Lindsey, *supra* note 142.

localities have filed Part 1 applications and conducted studies to develop the basis for programs to control stormwater to the "maximum extent practicable" (Part 2).²⁸⁹

The mere submission of permit applications does not ensure clean stormwater runoff in these municipalities. Several estimates indicate that permit compliance costs will be high for most cities — totaling as much as \$500 billion or more nationwide.²⁹⁰ These figures probably exceed the true costs of control measures,²⁹¹ which are nevertheless substantial enough to delay progress for years to come.²⁹² In addition, municipalities making expenditures to comply with the law will be engaging in a form of "trial and error."²⁹³ Although permit applications may provide for the use of BMPs,²⁹⁴ discharges from any source permitted under the

289. Gebhardt and Lindsey, *supra* note 142, at 40; Tucker, *supra* note 259, at 10 (citing results of a NAFSMA study that found that "73 or 75 city Part 1 applications were filed on or before the deadline [and a]bout the same number expect to file Part 2 applications on or before the deadline."). Nearly one-third of the applications involved committees in a regional municipal permit program. Tucker, *supra* note 259, at 10.

Jessica C. Landman, a senior attorney with the NRDC, described one success story in testimony before Congress. Montgomery County, Maryland (an urbanized county regulated by Phase I) had responded to the EPA's mandate by creating "new and expanded water program initiatives" to "improve the management of nonpoint source pollution and runoff quantity impacts." *Landman Testimony, supra* note 54.

290. *Harrison Testimony, supra* note 98 (describing study performed by the Southern California chapter of the American Public Works Association estimating nationwide compliance costs at \$500 billion); *John Testimony, supra* note 98 (estimating that compliance costs could "well exceed \$1 trillion"); *see also* Schoettle & Richardson, *supra* note 63, at 52 ("[A]ctual implementation of stormwater pollution control and drainage mechanisms can easily generate annual budget requirements [for individual municipalities] in the millions [of dollars]."); Tucker, *supra* note 259, at 10 ("What we see in the application costs does not account for permit compliance costs, it is simply the paperwork that will support permit-writers' efforts to develop permit limitations.").

291. The NRDC's Robert Adler criticizes cities' compliance cost estimates as exaggerated, because "[c]ities counted in their expenses costs they would incur anyway to accommodate growth or for basic water and sewer service." Rubin, *Mandating Controversy, supra* note 181, at 10.

292. "[H]ow can our impoverished cities — in an era of federal fiscal restraint — afford the billions of dollars it will cost to control stormwater discharges?" PLATER ET AL., *supra* note 6, at 845.

The EPA estimates that the annual cost of compliance with the stormwater mandate is \$23 billion nationwide. These figures were outlined in a Agency document, the *1992 Needs Survey Report to the Congress. Harrison Testimony, supra* note 98.

293. *John Testimony, supra* note 98.

294. 40 C.F.R. § 122.26(d)(2)(iv) (1994) (stating that Part 2 of the permit application is to include a "proposed management program," one component of which is proposed

NPDES program must include "any more stringent limitation" necessary to meet water quality standards established to protect bodies of water.²⁹⁵ This is an important issue for cities because if bodies of water receiving stormwater runoff are not clean enough to meet water quality standards, cities may have to retrofit using more expensive measures. However, cities and other affected interests claim MS4 permits cannot be designed with effluent limitations to meet water quality standards.²⁹⁶

BMPs).

295. This is required by Clean Water Act § 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C) (1988). In 1991, the EPA's General Counsel issued a memorandum stating that the extension of the statutory deadline and creation of the MEP requirement had not relieved municipalities of the obligation to clean stormwater to meet water quality standards. *See Compliance with Water Quality Standards in NPDES Permits Issued to Municipal Separate Storm Sewer Systems*, Memorandum from E. Donald Elliott, Ass't Admin'r & General Counsel, U.S. Environmental Protection Agency, Ofc. of Gen'l Counsel, Jan. 9, 1991 (copy on file with author) ("All permits for MS4s must include any requirements necessary to achieve compliance with WQS"); *Harrison Testimony*, *supra* note 98 (referring to the EPA General Counsel's determination that stormwater discharges must be controlled to meet water quality standards).

296. *See, e.g., John Testimony*, *supra* note 98 ("The objective of the stormwater program is to ensure that run-off from municipal streets meets water quality standards — an objective that no one knows how to accomplish"); *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources and Environment*, 104th Cong., 1st Sess. (Feb. 16, 1995) (testimony of David Parks, Vice President, Trammel Crow Company, on behalf of the National Realty Committee) ("Let me be clear: the emphasis current law places on attaining numeric water quality standards will not work for nonpoint source discharges").

Scott Tucker, Chairman of the Stormwater Committee of the National Association of Flood and Stormwater Management Agencies (the trade association that represents the interests of stormwater management, flood control, and wastewater related districts), told the group's 1991 annual meeting that "it is impossible to achieve water quality standards with storm water." He preferred that Congress clarify the stormwater policy to require only the use of management practices. *Water Pollution: Numerical Effluent Limits for Storm Water Impossible to Achieve, NAFSMA Members Say*, 22 ENV'T REP. (BNA) 1658 (Nov. 1, 1991).

In the case of stormwater, numerical standards are difficult to establish. Craig Johnston's explanation of the standard-setting process with respect to CSOs (which features the same challenges as controlling stormwater discharges) details the many problems involved. Johnston, *supra* note 116, at 1312-13. Cities claim the EPA's existing methods for setting water quality standards fail to take into account such factors as the difference between wet weather flows, which are short-term and intermittent, and dry weather flows. *John Testimony*, *supra* note 98; *see also* Lee and Jones-Lee, *supra* note 123, at 54 (describing the flaws in the process for establishing TMDL for copper discharges into San Francisco Bay, and stating that "over-estimation [of water quality impacts] is magnified for urban stormwater discharge evaluation because of the short-term,

Some authors believe that the permitting process, by incorporating BMPs, may be successful in improving water quality even if discharges are not

episodic nature of stormwater discharges"). Cities have also cited regional climate variations as important. For example, an article describing the development of a "stormwater master plan" for Tucson, Arizona stated that "available performance data [to support the development of water quality standards] were collected in humid regions of the United States, and may not be characteristic of a semiarid environment." As a result, the Tucson plan focused on a qualitative evaluation of BMPs, "at least until adequate performance data becomes available." Tim Morrison et al., *Comprehensive Stormwater Management Study*, PUB. WORKS, Feb., 1994, at 40.

The cities' claims that numerical water quality standards cannot be set for stormwater runoff have interesting implications for citizen enforcement of the stormwater permit requirement. Cities fear that they will be subject to citizens' suits for failures to control stormwater to meet water quality standards. See, e.g., *John Testimony*, *supra* note 98. One court has held, however, that concerned citizens cannot use the citizen suit provision of Clean Water Act § 505 to sue a municipality for a violation of an effluent restriction, unless it is expressed as a numerical standard. *Northwest Env'tl. Advocates v. City of Portland*, 11 F.3d 900 (9th Cir. 1993); see *Johnston*, *supra* note 116, at 1290.

If Congress bowed to political pressure and amended the Clean Water Act to exempt municipalities from controlling stormwater discharges to meet numerical water quality standards, and if *Northwest Environmental Advocates* were followed elsewhere, citizens' suits to enforce the stormwater control program would be effectively precluded. President Clinton's Clean Water Initiative recognized this and called upon Congress to "[c]onfirm and clarify that narrative discharge limits contained in NPDES permits are fully enforceable by the United States and by citizens, reversing the decision in *Northwest Environmental Advocates v. City of Portland*." See *President Clinton's Clean Water Initiative Submitted to Congress*, 1994 Daily Env't Rep. (BNA), Feb. 3, 1994, at DEN 22 d43.

The continuing viability of *Northwest Environmental Advocates* is in doubt after the Supreme Court's holding in PUD No. 1 of *Jefferson Cty. v. Washington Dep't of Ecology*, 114 S. Ct. 1900 (1994). Petitioners in *Jefferson County* argued that only numerical water quality criteria are enforceable to protect "designated beneficial uses" of water bodies, the uses that water quality standards are designed to support. 114 S. Ct. at 1910; see also Clean Water Act § 303(c)(2)(A), 33 U.S.C. § 1313(c)(2)(A) (1988). The Supreme Court, however, held that designated beneficial uses may be protected both through enforcement of numerical criteria and the imposition of broad, narrative criteria, such as: "there shall be no discharge of toxic pollutants in toxic amounts." 114 S. Ct. at 1911. If this holding is to have any meaning, citizens must be able to bring suits to enforce narrative water quality standards. See *Johnston*, *supra* note 116, at 1322.

required to meet water quality standards.²⁹⁷ Without substantive standards, however, there are no guarantees.²⁹⁸

The EPA has recently signaled that it is willing to put off the deadline for stormwater discharges to meet water quality standards. In 1994, EPA Administrator Carol Browner proposed delaying stormwater controls, citing (among other reasons) problems of technical feasibility with setting and enforcing water quality standards.²⁹⁹ At present, therefore, there is no enforceable performance standard for stormwater discharges.³⁰⁰

297. See, e.g., Bobertz, *supra* note 13, at 8-9 (noting that the EPA can use the NPDES permitting program to prevent pollution from industrial stormwater dischargers); Copeland, *Comprehensive Clean Air*, *supra* note 73, at 2170 ("Those who now favor managing nonpoint pollution through more traditional, regulatory approaches might consider [Clean Water Act NPDES] permits as the mechanism to impose land management practice requirements on sources that are not currently so regulated."); Gebhardt and Lindsey, *supra* note 142, at 40, 42 (citing municipal officials' statements that "the permit process may be useful to the extent that EPA requires BMPs").

298. The plans set forth in permit applications are just that — plans. Given the lack of an enforceable substantive standard, one cannot be optimistic about their implementation. See ADLER ET AL., *supra* note 59, at 197 ("[B]ecause EPA has not provided the states with substantive performance targets for the permits . . . urban citizens and stormwater utility ratepayers may have little or no assurance of permit program accountability and effectiveness.").

299. See *Browner Testimony*, *supra* note 144 ("By phasing in the requirements, States would have adequate time to develop appropriate water quality-based approaches for storm water, and EPA and cities would have time to determine the technical feasibility of establishing numeric effluent limits to meet water quality standards"). The EPA also wanted to limit Phase II to municipalities deemed "high-risk." *Id.*; Copeland, *Stormwater Permits*, *supra* note 57, at CRS-5.

Even the NRDC recently relented on this issue. *Landman Testimony*, *supra* note 54. An NRDC official testified that the group supports "an express exemption from chemical numeric end-of-pipe discharge limitations for municipal stormwater permits." *Id.* However, the NRDC continues to insist that Congress "maintain[] a duty to ultimately achieve water quality standards . . ." *Id.*

300. *Landman Testimony*, *supra* note 54; ADLER ET AL., *supra* note 59, at 196 ("EPA has not provided the states with substantive performance targets for the permits . . ."). President Clinton's "Clean Water Initiative," released in February, 1994, would have required the EPA to issue guidelines on practices deemed to meet the MEP requirement, but that request was not translated into action by the Agency. See *President Clinton's Clean Water Initiative Submitted to Congress*, *supra* note 296, at DEN 22 d43. The Senate's principal, and unsuccessful, Clean Water Act reauthorization bill of the 103rd Congress, S. 2093, would have directed the EPA to issue guidelines on practices deemed the "maximum extent practicable" to manage and control stormwater discharges. S. 2093, 103rd Cong., 2d Sess. § 610 (1992).

IV. CONTROLLING STORMWATER RUNOFF POLLUTION IN EDGE CITIES

*The effect of this provision [a Phase II stormwater exemption] would be to permanently excuse local governments and commercial developers, in the most rapidly developing areas of the country, from having to build prevention designs into their planning and zoning activities.*³⁰¹

A. *The Shortfalls of the NPDES Permitting Scheme*

The NRDC has concluded that Phase I does not regulate stormwater discharges in the majority of rapidly urbanizing areas, including most growing Edge Cities.³⁰² An analysis of emerging Edge Cities listed in Joel Garreau's book *Edge City* confirms this finding.³⁰³ The EPA

301. *Landman Testimony*, *supra* note 54.

302. Even the expanded definition of a large or medium MS4 to include certain "urbanized counties" does not count areas maturing into Edge Cities. See ADLER ET AL., *supra* note 59, at 197.

The 220 Phase I NPDES municipalities have a combined urban population of 78 million. The remaining 80 million people located in urbanized areas are outside of Phase I municipalities. Most urban growth occurs in the urban fringe areas outside of core cities. For example, between 1970 and 1980, the population of incorporated cities with a population of 100,000 or more (Phase I cities) increased by only 0.6 million, with the population of many of those cities decreasing. Between 1970 and 1980, the population of urbanized areas outside of cities with a population of 100,000 or more increased 30 times more (an increase of 18.9 million) than the population of these core cities.

Id. (quoting U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL IMPACTS OF STORMWATER DISCHARGES: A NATIONAL PROFILE 11 (1992)).

303. An analysis was performed for this Article, cross-referencing Garreau's list of Edge Cities and Appendices F-I of the EPA's 1990 final rules for Phase I (listing the entities covered by Phase I). See GARREAU, *supra* note 22, at 425-39; 40 C.F.R. Pt. 122, App. F-I (1994).

Garreau's list includes ten major metropolitan areas for which he provides approximate geographic locations (in the book's text) of Edge Cities and "emerging" Edge Cities. Of the emerging Edge Cities in these areas — places where pollution control measures should go hand-in-hand with new development — nearly 45% are not covered by Phase I. Moreover, this analysis almost certainly overestimates Phase I's coverage. Major metropolitan areas are those most likely to be covered by Phase I; Edge Cities growing elsewhere are less likely to be covered.

"Emerging" Edge Cities in exurban counties such as Loudoun County, Virginia (a county west of Washington, D.C., not covered by Phase I) have grown rapidly since the 1991 publication of *Edge City*. These developing areas are most likely to be omitted from Phase I. Analysis of Edge Cities Covered by Phase I (March, 1995) (on file with author).

professes concern that Phase II proceed expeditiously;³⁰⁴ however, it is almost certain to be delayed for years to come. There are no regulations in place for Phase II, and none are likely soon.³⁰⁵ By late 1994, the EPA appeared to be close to promulgating a "Direct Final Rule" for Phase II.³⁰⁶ Three months later, the Agency backed off, announcing it was working on a rule that would delay compliance deadlines for Phase II sources for up to six years.³⁰⁷ In early 1995, therefore, all areas not covered by Phase I discharged their stormwater without NPDES permits, in violation of the Clean Water Act.³⁰⁸

The EPA's reversal on Phase II was almost certainly a response to

304. *EPA Readies Phase II SW Extension; State, Cities Seek Broader Reform*, Air/Water Pollution Rep. (Business Publishing, Inc.), Feb. 20, 1995.

305. See *Landman Testimony*, *supra* note 54.

The EPA solicited comments and conducted a series of public meetings to gather input on the structure of Phase II regulations. See NPDES, Announcement of Meetings to Consider Options for Controlling Sources of Stormwater Pollution Under Section 402(p)(6) of the Clean Water Act, 58 Fed. Reg. 8,595 (1993); NPDES, Announcement of National Meetings to Consider Options for Controlling Sources of Stormwater Pollution, 57 Fed. Reg. 21,918 (1992); Benjamin H. Grumbles and Kenneth J. Kopocis, *The Water Resources Development Act of 1992: Expanding the Corps of Environmental Engineers*, 23 *Env'tl. L. Rep. (Env'tl. L. Inst.)* 10,379, 10,386 n.108 (June, 1993).

Clean Water Act § 402(p)(6), 33 U.S.C. § 1342(p)(6) (1988) required the EPA to issue Phase II regulations "[n]ot later than October 1, 1992." That already represented an extension of Section 402(p)'s original deadline; in the Water Resources Development Act of 1992, Pub. L. No. 102-580, 106 Stat. 4797, Congress granted the EPA an extra year to comply. See Grumbles and Kopocis, *supra*, at 10,386 (discussing the impact of this delay). The EPA did not, however, issue any rules by the statutory deadline. The NRDC then notified the Agency that it would bring yet another lawsuit against it for failing to meet this deadline. See *NRDC Warns EPA It Will File Lawsuit Over Late CWA Stormwater Program*, Air/Water Pollution Rep. (Business Publishing, Inc.), Nov. 21, 1994.

306. See *Landman Testimony*, *supra* note 54; *CWA: Rewrite Effort to be Revived; EPA to Seek Administrative Fixes*, Nat'l Env't Daily (BNA), Jan. 9, 1995 (citing a Dec. 16, 1994 statement of Michael Cook, Director, Office of Wastewater Management, U.S. Environmental Protection Agency, that "[t]he water office is mulling a direct final rule that would regulate smaller storm water dischargers").

307. *EPA Readies Phase II SW Extension*, *supra* note 304; see also *John Testimony*, *supra* note 98 (noting that during the Phase II extension, the EPA intended to engage stakeholders in negotiated rulemaking to develop a viable program).

308. See, e.g., *John Testimony*, *supra* note 98; *Landman Testimony*, *supra* note 54 ("Last October, the moratorium [on the NPDES permit requirement] for smaller cities, commercial zones, and other stormwater sources expired . . .").

In a move reminiscent of its "non-enforcement" policy of the early 1980s, the EPA announced it would not bring enforcement actions against these communities. *EPA Readies Phase II SW Extension*, *supra* note 304.

the new political climate in Washington.³⁰⁹ Before the November 1994 election, Congress had signaled its intent to extend the Phase II compliance deadline, and to relax other requirements (including the deadline for compliance with water quality standards).³¹⁰ The Repub-

309. In testimony before Congress, a representative of the National League of Cities indicated that reexamination of stormwater policies was warranted:

I would also like to explain that while the National League of Cities has significant and extensive policy on the municipal view of the Clean Water Act, these policies were developed prior to last November's election. Over the next year NLC's policies will be reviewed and adjusted to reflect the new political realities in federal, state, and local relations.

John Testimony, supra note 98. Robert Perciasepe, the Assistant Administrator for the EPA's Office of Water, stated the EPA's reversal on Phase II was "not intended to render the issue moot before Congress can act on the issue." *EPA Readies Phase II SW Extension, supra* note 304. Others, such as Carol Kocheisen, the National League of Cities' Washington environmental lobbyist, disagreed. Kocheisen called the delay of the Phase II rules "an effort to foreclose the move to legislate broader improvements to the stormwater program." *Id.*

310. In the 103rd Congress, both the House and Senate acted on Clean Water Act reauthorization proposals without success; comprehensive reauthorization bills were not enacted before the end of the Congress. See Copeland, *Stormwater Permits, supra* note 57, at CRS-5.

In the House, Representative Norm Mineta (D-CA), the Chairman of the House Committee on Public Works and Transportation (the committee with primary jurisdiction over the Clean Water Act), and Representative Sherwood Boehlert (R-NY), introduced their Clean Water Act reauthorization proposal, H.R. 3948, on March 3, 1994. H.R. 3948, 103rd Cong., 2d Sess. (1994). H.R. 3948 would have relaxed compliance deadlines for most MS4s and provided a fifteen-year extension of the requirement that permitted discharges meet water quality standards. Section 402(3)(B)(iv) of H.R. 3948 called for permits to require "reasonable progress toward attainment of applicable water quality standards under this Act as expeditiously as possible, but not later than December 31, 2009." *Id.* § 402(3)(B)(iv). The NRDC opposed this provision, claiming "Fifteen years is much too long to wait for water quality standards to have a phased-in relationship with municipal stormwater programs." See *Landman Testimony, supra* note 54.

H.R. 3948 failed to emerge from the committee after a rival proposal (the so-called "Bipartisan Alternative," developed by Representatives Bud Shuster (R-PA) and Jimmy Hayes (D-LA)), that would have weakened the stormwater program and other Clean Water Act mandates even further, garnered enough support to prevent Chairman Mineta from acting upon his legislation. See *Congress Begins Clean Water Rewrite*, ENG'RG NEWS-RECORD, Feb. 20, 1995, at 27. Representatives Shuster and Hayes proposed, for example, that stormwater permits only promise to make reasonable progress to meet water quality standards; unlike H.R. 3948, this proposal set no deadline for compliance.

The Senate's eleventh-hour "compromise" on stormwater, S. 2507, failed to pass the Senate before the end of the session. S. 2507, 103rd Cong., 2d Sess. (1994). S. 2507 would have imposed a ten-year moratorium (applicable to both Phase I and Phase II) on the requirement that stormwater meet water quality standards. Section 2 of S. 2507 provided in relevant part that:

lican-controlled 104th Congress appears poised to cut back further on the stormwater control program or even dismantle it. Representative Bud Shuster (R-PA), the Chairman of the House Committee on Transportation and Infrastructure, recently introduced a sweeping proposal to overhaul the Clean Water Act.³¹¹ Shuster's bill, the product of vigorous lobbying³¹² by municipalities³¹³ and other affected interests,³¹⁴ would eliminate the Section 402(p) program altogether.³¹⁵ The bill would repeal Section 402(p),³¹⁶ and replace it with a largely voluntary management program modeled after the nonpoint source program of

Notwithstanding Section 301 and this Section, during the 10-year period beginning on the date of enactment of this subparagraph, a permit issued pursuant to this subsection for discharges from municipal storm sewers composed entirely of stormwater shall not require compliance with numeric effluent limitations and water quality standards shall not be applied or enforced as effluent limitations.

Id. § 2; see also Carol Kocheisen, *Delay on Stormwater Fix Will Cost Municipalities*, NATION'S CITIES WEEKLY, Oct. 17, 1994, at 8. S. 2507 would also have delayed the implementation of Phase II until at least the year 2001, and permanently exempted "nonurbanized areas" from the permit requirement. S. 2507, § 2.

311. H.R. 961, 104th Cong., 1st Sess. (1995). Chairman Shuster unveiled a revised version of this bill on March 22, 1995 [hereinafter "Chairman's Markup Vehicle"]. *Shuster Unveils Revised CWA Rewrite; New Measure Receives Mixed Response*, Nat'l Env't Daily (BNA), Mar. 24, 1995.

312. To write his bill, Representative Shuster met with five "task forces" consisting of committee staffers and industry, agricultural and municipal lobbyists. See *Shuster Unveils Revised CWA Rewrite*, *supra* note 311. One task force wrote the bill's stormwater provisions. *Id.* When Democratic Members, EPA officials, and environmental groups claimed that the use of these task forces had made the bill's drafting process "deliberately exclusive," Chairman Shuster responded that "this should not be surprising or unexpected." *Id.*

313. The National League of Cities, for example, described "enactment of a long-term rational solution" for stormwater as its "primary short term environmental priority." *John Testimony*, *supra* note 98.

314. See, e.g., *Legislation to Reauthorize and Amend the Federal Water Pollution Control Act: Hearing Before the House Comm. on Transportation and Infrastructure, Subcomm. on Water Resources and Development*, 104th Cong., 1st Sess. (Feb. 9, 1995) (testimony of Steve Bartlett, Mayor, Dallas, Texas, on behalf of the U.S. Conference of Mayors) ("The Conference [of Mayors] joins with the National League of Cities in urging the adoption of a moratorium on any further federally-directed permitting under this program."); *EPA Readies Phase II SW Extension*, *supra* note 304 ("[T]he State and Local Coalition of associations representing mayors, governors and state legislatures is lobbying hard on Capitol Hill to not only obtain a Phase II stormwater-control delay but to convince Congress to make deeper revisions to the CWA program.").

315. H.R. 961, Chairman's Markup Vehicle, § 318.

316. *Id.* § 318(c).

Section 319 of the Clean Water Act. The Section 319 program is widely acknowledged as ineffective in reducing nonpoint source pollution³¹⁷ — and it is likely to be weakened still further by provisions of Shuster's bill.³¹⁸

A rewrite of the Clean Water Act may not survive the gauntlet of the legislative process.³¹⁹ However, an element of the "Contract With America" — the Unfunded Mandates Reform Act of 1995, which President Clinton signed into law on March 22, 1995 — will limit federal ability to force states and localities to control stormwater pollution.³²⁰ The new law exempts many existing federal laws and regulations,³²¹ including the Phase I stormwater regulations.³²² But

317. See, e.g., Copeland, *Comprehensive Clean Air*, *supra* note 72, at 2170 ("[F]ederal policy has traditionally relied on 'carrots' (for instance, subsidies provided to farmers for certain resource conservation practices) more than 'sticks.' Yet there is little evidence that these [voluntary] approaches have yielded significant progress in controlling nonpoint source pollution.").

318. See, e.g., *Landman Testimony*, *supra* note 54 ("The section 319 revisions contained in this bill weaken an already weak State polluted runoff program; thus, subjecting stormwater sources to this program would be a mistake.").

319. The Transportation and Infrastructure Committee approved H.R. 961 on April 6, 1995. Before this action, Rep. Robert Borski (D-PA), a leading Democratic Member of the committee, expressed his hope that the bill would "roar through the House, get to the Senate, and never see the light of day." *Shuster Unveils Revised CWA Rewrite*, *supra* note 311.

320. Unfunded Mandates Reform Act of 1995, Pub. L. No. 104-4, 109 Stat. 48 (1995). The new law provides that a point of order may be invoked in the House or Senate to prevent the consideration of legislation that would "increase the direct cost" of any "Federal intergovernmental mandate," unless funding is provided for the mandate. *Id.* § 101. The law defines a "Federal intergovernmental mandate" in part as "any provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or tribal governments." The legislation containing a federal mandate must provide either: "[B]udget authority or new entitlement authority in the House or direct spending authority in the Senate in an amount that exceeds [its] direct costs . . . or An authorization of appropriations" and a mechanism to ensure the mandate is only effective to the extent funding is provided in appropriations acts. If legislation funds the mandate, it must do so for each fiscal year. *Id.*

321. *Id.* The statute provides that the "direct costs" of a federal mandate "shall not include . . . estimated amounts that the State, local, and tribal governments . . . would spend . . . to comply with or carry out all applicable Federal, State, local, and tribal regulations in effect at the time of the adoption of the Federal mandate for the same activity as is affected by that Federal mandate." *Id.*

322. The Phase I regulations are not immune from attack. The new law sets up a process for eliminating some existing federal mandates, requiring the Advisory Commission on Intergovernmental Relations to report to the President and Congress on

the Phase II regulations, if ever promulgated, would be subject to a thicket of procedural hurdles. These regulations would certainly include a “[f]ederal mandate that may result in the expenditure of State, local, and tribal governments, in the aggregate, or by the private sector, of \$100,000,000 or more”³²³ The EPA would have to make the regulatory choice that was the “least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule”³²⁴ or be in violation of the Unfunded Mandates Reform Act, unless the EPA Administrator published a satisfactory explanation with the final rule.³²⁵

The EPA would also be required to issue a detailed written statement of a rule’s costs and benefits.³²⁶ The new law expressly precludes lawsuits against the EPA for perceived inadequacies in the statement or explanation for not choosing the least costly alternative.³²⁷ Nothing, however, prevents opponents of regulatory activity from using the *information* provided in these statements in subsequent legal challenges to the rule itself. Therefore, it is likely that opponents can use the new law to paralyze the EPA.

In the case of stormwater regulations, there can be little doubt that this is exactly what proponents of the unfunded mandates law intended. The mandates of environmental laws were at the top of the list of federal requirements cited as unjust by the law’s proponents.³²⁸ Witnesses

obsolete and duplicative federal requirements and on existing mandates that should be modified or repealed. *Id.* § 302.

323. *Id.* § 202(a).

324. *Id.* § 205(a).

325. *Id.* § 205(b)(1).

326. *Id.* § 202(a).

327. *Id.* § 401(b). Section 401(b) provides:

(b) Judicial Review and Rule of Construction. Except as provided in subsection (a) [providing judicial review of the failure to issue a detailed statement]:

(1) any estimate, analysis, statement, description or report prepared under this Act, and any compliance or noncompliance with the provisions of this Act, and any determination concerning the applicability of the provisions of this Act shall not be subject to judicial review; and

(2) no provision of this Act shall be construed to create any right or benefit, substantive or procedural, enforceable by any person in any administrative or judicial action.

328. See Thomas Sowell, *Benefits Must Be Weighed Against Costs: Unfunded Mandates — An Exercise in Arrogance*, ATLANTA CONST., Mar. 21, 1995, at A10 (unfunded mandates legislation is necessary in part because “[n]o one wants to breathe air full of

testifying before Congress³²⁹ and municipal representatives pressing for passage of the unfunded mandates law³³⁰ singled out the stormwater provisions as a particularly notorious unfunded federal regulatory program.

A full analysis of the unfunded mandates law's impact on the environmental laws is beyond the scope of this Article.³³¹ The Unfunded Mandates Reform Act, however, will further delay the issuance of Phase II regulations for stormwater control. This delay will ensure that Edge Cities will be built without federal attention to stormwater pollution prevention.

Moreover, the practical difficulties of assuring that BMPs incorporated in permits will promote enhanced water quality, and the likelihood that urban stormwater discharges may never be required to meet water quality standards, ensure that no reliable measure of water

sulphur or drink water with sewage in it, so it makes sense to remove some impurities -- but not every trace of everything that every hysterical crusader can think of.").

The City of Columbus, Ohio's influential report that fueled the revolt against "unfunded mandates" concentrated on the costs of complying with environmental laws. See David L. Markell, *The Role of Local Governments in Environmental Regulation: Shoring Up Our Federal System*, 44 SYRACUSE L. REV. 885, 885 (1993).

329. See, e.g., *Unfunded Mandates (S. 1): Joint Hearing of the Senate Committees on Budget and Governmental Affairs*, 104th Cong., 1st Sess. (Jan. 5, 1995) (testimony of Carolyn Long-Banks, Council Member, City of Atlanta, on behalf of the National League of Cities). Council Member Long-Banks stated:

Simply put, an unfunded federal mandate is a law or regulation that requires a city or town to undertake an action and responsibility with consequent costs to the local budget, but no reimbursement by the federal government.

For instance, last October 1, an EPA rule was triggered into effect mandating every local government in the nation to obtain an EPA stormwater permit for every discharge point in a community. We know that the average cost for larger cities is \$625,000 per permit — or the equivalent of more than six police officers per year in a smaller city. . . .

Because of the civil and criminal penalties attached to unfunded federal mandates, local dollars must fund federal environmental programs — regardless of demonstrated need or effectiveness

330. See *Three Tennessee Mayors Call For End to Unfunded Mandates*, NATION'S CITIES WEEKLY, Apr. 27, 1992, at 8 (mayors of Knoxville, Nashville, and Chattanooga hold news conferences to call for an end to unfunded mandates, including the stormwater provisions); Markell, *supra* note 328, at 902-03 (describing a report by the city of Anchorage, Alaska on the costs of complying with stormwater mandates).

331. The Unfunded Mandates Reform Act and its companions in the so-called "Holy Trinity" (risk assessment and takings provisions) threaten to weaken existing environmental laws. See, e.g., Wolf, *supra* note 5 (discussing the impact of takings provisions).

quality will exist in developing Edge Cities. "The upshot," says one advocate of controls on stormwater runoff pollution, "is that well-known, cost-saving stormwater management designs will go unused, and the resulting, needless erosion and stormwater property damages, pollution loadings, and aquatic habitat damage will be passed on to future generations."³³²

B. *Toward Sustainable Management of Water Resources in Edge Cities*

The federal program for stormwater quality control should not, as some Congressional Republicans suggest, be relegated to the ash heap of history. The program is obviously "broken."³³³ The question those familiar with the program ask is, "how do we fix it?"³³⁴ Perhaps the program's greatest flaw is its attempt to graft a nonpoint source program involving direct federal regulation of land use practices³³⁵ onto the complicated body of point source controls. Commentators widely hail the point source program as a success in restoring the nation's water quality.³³⁶ Experience with the nonpoint source planning programs of Sections 208 and 319, however, indicates that federally mandated land use controls face stiff resistance at the state and local levels.³³⁷ "The

332. *Landman Testimony*, *supra* note 54.

333. *CWA: Rewrite Effort to be Revived*, *supra* note 306 (quoting Roberta Savage, Executive Director of the Association of State and Interstate Water Pollution Control Administrators).

Even the NRDC, a long-time proponent of federal stormwater controls, testified recently that "there are legal, administrative, and fiscal problems with the NPDES stormwater control program." *Landman Testimony*, *supra* note 54.

334. *CWA: Rewrite Effort to be Revived*, *supra* note 306 (quoting Roberta Savage, Executive Director of the Association of State and Interstate Water Pollution Control Administrators).

335. See Mandelker, *supra* note 74, at 482; Schoettle and Richardson, *supra* note 63, at 521 ("In contrast to past pollution control programs that focused on end-of-pipe treatment, EPA's stormwater program emphasizes prevention of water pollution and control of activities causing pollution through land-use planning, public facilities maintenance and management programs, and educational programs.").

336. Copeland, *Comprehensive Clean Air*, *supra* note 72, at 2168 ("Despite EPA's current problems with the stormwater permit provisions of the CWA, most observers agree that the CWA permit program and the CWA's core requirements on industrial and municipal point sources have enabled considerable progress towards the goals and objectives of the national policy set forth in section 101.").

337. See Mandelker, *supra* note 74, at 490.

political grit and federal funding needed to move state and local governments into an effective nonpoint source program," says Professor Mandelker, is lacking, and "[m]ore cannot be expected in the present political climate."³³⁸ While Professor Mandelker was referring to the Section 208 and Section 319 programs, similar problems face the Section 402(p) stormwater control program.

The familiar command-and-control regulatory model assumes the application of uniform national pollution control standards.³³⁹ Distrust of fragmented efforts by states and localities is the primary argument advanced for federal regulatory authority.³⁴⁰ The task of setting national standards for stormwater pollution reduction, however, is a constant exercise in frustration; for every step forward, there is an equal step backward.³⁴¹

Still, the federal government may have a role in stormwater runoff control. The Clean Water Act, like other federal environmental laws, promotes national consistency in pollution control.³⁴² Federal leadership ensures that states adopt programs designed to control pollution within their borders.³⁴³ Given the dismal record of state environmental programs, a federal presence is necessary.³⁴⁴

The federal program, however, should not foreclose state and local experimentation that might yield superior results. "[T]he answer as to what level of government should regulate activities[.]" one commentator

338. *Id.* at 501.

339. See generally Howard Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267 (1985) (discussing the need for national standards).

340. Colin Crawford, *Pinning Gulliver Down: An Environmental Case Study on the Place of Decentralized Power in Federal Administrative Law Doctrine*, 4 FORDHAM ENVTL. L. REP. 47, 59-60 (1992).

341. The "maximum extent practicable" language thus serves as an example of members of Congress engaging in "fakery," creating a vague, aspirational law that leaves decision-making to the future, perhaps putting it off indefinitely. William H. Rodgers, Jr., *The Lesson of the Owl and the Crows: The Role of Deception in the Evolution of the Environmental Statutes*, 4 J. LAND USE & ENVTL L. 377 (1989) develops this metaphor.

342. *Landman Testimony*, *supra* note 54.

343. Mandelker, *supra* note 74, at 490.

344. See generally Lynda L. Butler, *State Environmental Programs: A Study in Political Influence and Regulatory Failure*, 31 WM. & MARY L. REV. 823 (1990) (discussing the limitations of state environmental protection efforts).

writes, "need not be the same with respect to every issue and situation."³⁴⁵ A time lag already exists between the development of pollution problems in Edge Cities and the response of the section 402(p) program, which focuses only on urbanized areas. Even if permits were required in rapidly urbanizing Edge Cities, the environmental damage would be well underway by the time the permit application process (which can take years) could be completed. Given this, state and local programs must step in to help prevent environmental disasters in Edge Cities.³⁴⁶

The benefits of local initiatives are apparent.³⁴⁷ Programs focusing on new development can engage in aggressive pollution prevention and can be coordinated with other development controls. In addition, local initiatives can be based on a relationship to a watershed, unlike the federal program, which relies on defining "urbanized areas" and a jurisdiction's incorporation status.³⁴⁸ Stormwater control plans could focus on water quality impacts in a watershed, with small-scale, locally based watershed planning groups linking together with larger-scale groups (as envisioned in the recent proposal of the American Planning Association).³⁴⁹ New York City, for example, is experimenting with a "Whole Community Planning" approach to watershed protection.³⁵⁰

345. Crawford, *supra* note 340, at 62.

346. *Id.* at 48.

347. "[D]evolving [some] regulatory decisions to state and local administrators," in the words of Professor Richard Stewart, "might reduce the number of parties, simplify the issues, and thereby promote negotiated agreements." *Id.* at 71. "[T]he democratic reformer emphasizes the need for flexibility in seeking administrative reform through novel assignments of regulatory authority . . . at a grass roots level, working from the bottom up." *Id.* at 70.

More decentralized approaches to environmental protection might also "foster individual values through collective action," be more inclusive, provide "individuals with a greater voice in the affairs of their community," and avoid "the wheeling and dealing of pork barrel politics at the national level." Richard J. Lazarus, *Debunking Environmental Feudalism: Promoting the Individual Through the Collective Pursuit of Environmental Quality*, 77 IOWA L. REV. 1739, 1771-74 (1992) [hereinafter Lazarus, *Debunking Environmental Feudalism*].

348. See Goldfarb, *supra* note 7, at 484 ("American political boundaries do not, for the most part, correspond to water resources problem-sheds.").

349. See ADLER ET AL., *supra* note 59, at 251.

350. See Appleton, *supra* note 84 ("Several working groups within the committee are examining a variety of issues and methods of city-watershed town collaboration. From these discussions a new concept, called 'Whole Community Planning,' has emerged.").

This and other similar approaches aim to involve historically recalcitrant local communities in planning for sustainable growth and protecting the local environments.³⁵¹ In addition, encouraging individuals to join with state and local officials and developers may lead to significant progress in solving problems like pollution in stormwater runoff.³⁵²

An entire intellectual movement — “bioregionalism” — advocates that an ecological consciousness must stem from an understanding of a particular locale or region, and works toward greater community-based grassroots democracy in environmentalism.³⁵³ Americans may not be ready for the bioregionalists’ revolutionary proposal to restructure our society into a band of “confederal municipalities.”³⁵⁴ However, their suggestion that the power of decisions increases as they are made closer to the local level is virtually undeniable.³⁵⁵ Local procedural experimentation with stormwater runoff control could emphasize a connectedness with place not present in the top-down federal regulatory approach.³⁵⁶ This type of approach could, for example, tailor regulatory controls to the needs of particular areas.³⁵⁷

In some cases, however, a narrow local focus may be inapt. The federal government should intervene if a local majority votes to export water pollution.³⁵⁸ If problems transcend jurisdictional boundaries, then the federal government, or a combination of states, can plan to

351. *Id.*

352. See Crawford, *supra* note 340, at 52 (“[I]f people are encouraged to derive their own solutions to problems like the transport and storage of hazardous wastes, they might opt to use fewer plastics or to read newspapers in black and white.”); cf. Lazarus, *Debunking Environmental Feudalism*, *supra* note 347, at 1774 (suggesting greater emphasis on decentralized approaches in environmental policy making).

353. See, e.g., COLEMAN, *supra* note 14, at 124-25.

354. *Id.* at 156.

355. *Id.* at 157.

356. See Schoettle & Richardson, *supra* note 63, at 528.

357. Schoettle & Richardson, *supra* note 63, at 525-28.

358. The bioregionalists recognize this as a distinct possibility. See COLEMAN, *supra* note 14, at 118 (“[A] community in and of itself is not necessarily either ecological or humane.”). Development of an ecological consciousness, the bioregionalists believe, requires careful education efforts. *Id.* In the case of stormwater, programs could be developed to educate both citizens and elected officials about the benefits of an improved stormwater quality and management program. See Schoettle & Richardson, *supra* note 63, at 528.

improve the quality of a watershed; the Chesapeake Bay³⁵⁹ and Great Lakes³⁶⁰ initiatives under the Clean Water Act are examples of this sort of cooperative effort. But the larger the regional focus, states Professor Goldfarb, "the more institutions and interest groups must be included in problem-solving, thus intensifying institutional conflicts and political rivalries."³⁶¹ These rivalries are endemic in suburban America,³⁶² as reflected in the continuing hostility of many areas to the concept of metropolitan government.³⁶³ It may well be that a region "is an area safely larger than the last one to whose problems we found no solution."³⁶⁴

One innovative local device (though certainly not the only one) for the promotion of stormwater quality is the stormwater utility,³⁶⁵ which aims to internalize the costs of new development through user fees that

359. The Water Quality Act of 1987 added § 117 to the Clean Water Act, to provide funding for coordinated federal and state efforts to improve water quality in the Chesapeake Bay. Clean Water Act § 117, 33 U.S.C. § 1267 (1988). The Bay's water resource protection program is implemented by the interstate Chesapeake Bay Commission (with Maryland, Virginia, and Pennsylvania as its members) and the EPA's Chesapeake Bay Program, established under § 117. Clean Water Act § 117(a), 33 U.S.C. § 1267(a) (1988).

For a description of the interjurisdictional efforts to improve the Bay's waters, see ADLER ET AL., *supra* note 59, at 223-24. In March 1995, the University of Richmond Law School held a symposium to review the successes and failures of the Bay cleanup effort. See 29 U. RICH L. REV. (forthcoming 1995).

360. For a description of interjurisdictional cleanup efforts in the Great Lakes, see ADLER ET AL., *supra* note 59, at 221-23. The Water Quality Act of 1987 added § 118 to the Clean Water Act, to provide funding for programs to implement the U.S.-Canada Great Lakes Water Quality Agreements, and to fund efforts to improve water quality in the Great Lakes. Clean Water Act § 118, 33 U.S.C. § 1268 (1988).

361. Goldfarb, *supra* note 7, at 498.

362. BALDASSARE, *supra* note 157, at 21-22. See generally GREGORY R. WEIHER, *THE FRACTURED METROPOLIS: POLITICAL FRAGMENTATION AND METROPOLITAN SEGREGATION* (1991) (describing the complex political relationships in metropolitan areas).

363. See, e.g., BALDASSARE, *supra* note 157, at 22; JACOBS, *supra* note 35, at 426-27.

364. JACOBS, *supra* note 35, at 410.

365. A stormwater utility is a public utility, similar to "well-established [units] for the provision of governmental services such as water and sanitary sewer," that designs and implements stormwater management programs. Schoettle & Richardson, *supra* note 63, at 521. Professor Goldfarb cites Florida and Maryland as two states with progressive state stormwater control programs. Goldfarb, *supra* note 7, at 494. Florida's program relies on local stormwater utilities. See *infra* notes 368-76 and accompanying text. See Schoettle & Richardson, *supra* note 63, for a description of the legal impediments to the establishment of stormwater utilities.

fund stormwater management programs. The stormwater utility can be user-oriented, with costs allocated according to the services received. Charges can be related to a given land parcel's current or expected stormwater runoff.³⁶⁶ In jurisdictions where they are established, stormwater utilities implement the federal stormwater control program;³⁶⁷ however, neither the federal statute nor the EPA's rules require them.

Florida's comprehensive statutory authority for stormwater utilities³⁶⁸ constitutes a progressive effort to achieve better coordination between local land use patterns and stormwater controls.³⁶⁹ Programs in Florida and Maryland³⁷⁰ "reflect two unique aspects of stormwater management:"³⁷¹ conditioning approvals and fees on stormwater drainage patterns, rather than by jurisdictional boundaries; and recogniz-

366. Priede, *supra* note 107, at 38.

367. Schoettle & Richardson, *supra* note 63, at 521.

368. Local stormwater management programs are required under FLA. STAT. ANN. §§ 403.0891(3) and 403.0893 (West Supp. 1995).

The Florida statute provides local governments the ability to create one or more separate utilities and levy fees, and authority to create, in cooperation with other governmental entities, one or more stormwater management system benefit areas; requires that fees be based on a local stormwater management program; provides for delineation of subdistricts to reflect different levels of benefit provided and establish different rates for each subdistrict; and authorizes the collection of charges. *Id.*

369. See, e.g., Patrick S. Collins *et al.*, *Consolidating Stormwater Management: An Efficient Approach*, PUB. WORKS, June, 1993, at 52 (describing the Storm Water Environmental Utility in Sarasota, Fla.).

370. In 1982, the Maryland General Assembly found that "the management of storm water runoff is necessary to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding, all of which have adverse impacts on the water and land resources of Maryland." MD. CODE ANN., ENVIR. § 4-201 (1993). The legislature enacted a stormwater protection law, MD. CODE ANN., ENVIR. §§ 4-201 to 4-215 (1993 & Supp. 1994) that requires counties and municipalities to implement "stormwater management programs." *Id.* § 4-202. Before proceeding with development activities, developers must submit stormwater management plans to the county or municipality with jurisdiction. *Id.* § 4-204. The law provides both civil and criminal penalties for violations. *Id.* § 4-215. State regulations implementing the stormwater protection law require the consideration of specific BMPs. See *Maryland's Stormwater Management Program*, reprinted in *NRDC Excerpts of Record*, *supra* note 265, at 31. New developments in Chesapeake Bay critical areas must reduce pollutant loadings by at least 10% of predevelopment levels. *Id.* at 33; Tourbier & Westmacott, *supra* note 107, at 34.

371. Schoettle & Richardson, *supra* note 63, at 533.

ing and attempting to solve unique local problems.³⁷² Two authors who have studied stormwater utilities estimate that even small fees can provide significant funding for stormwater control.³⁷³ Because fees are calibrated to uses, stormwater utility charges can be an equitable way of imposing the costs of appropriate stormwater management programs³⁷⁴ and deterring overpricing.³⁷⁵ Furthermore, citizen involvement can be more direct than in the federal stormwater control program.³⁷⁶

Significant legal hurdles may hinder development of stormwater utilities in states that do not already have stormwater utilities in place.³⁷⁷ Not all states have statutes that authorize localities to create new water management entities (including stormwater utilities).³⁷⁸ In those states that authorize the creation of water management districts, the fragmented governmental responsibility characteristic of Edge Cities may

372. For example, the Florida statute empowers stormwater management utilities to establish subdistricts and set different stormwater rates accordingly. FLA. STAT. ANN. § 403.0893(4) (West Supp. 1995). The most common basis for calculating stormwater rates is the average amount of impervious surface, such as building roofs, driveways, walkways, patios. Schoettle & Richardson, *supra* note 63, at 535.

373. Schoettle & Richardson, *supra* note 63, at 527. Schoettle and Richardson cite a study that concluded that "a \$2.00 per month charge would 'raise sufficient funds for all necessary programs and new construction for a community with a population between 100,000 and 250,000.'" *Id.* (footnote omitted).

374. *Id.*

375. *Id.* at 535. Because stormwater utilities base their charges on such factors as the average amount of impervious surface, the ratio of impervious surface to pervious surface, runoff coefficients and total lot area, rates can be calibrated closely to changes in development. *Id.*

376. See Collins et al., *supra* note 369 (describing the "watershed master planning program" for Sarasota, Fla., designed with public input); see also Appleton, *supra* note 84 ("[T]he best management of the land and water resources encompassing major drainage systems will occur not through fiat but with the active participation and cooperation of states, localities, regulated entities and citizens.").

377. Schoettle and Richardson state:

A number of issues, such as legal authority, the development of a defensible rate setting methodology, administrative requirements to establish billing and collection mechanisms, as well as education of the public and elected officials about the costs to maintain facilities and implement necessary programs, should be explored by any local government considering establishing a transportation or stormwater utility. Schoettle & Richardson, *supra* note 63, at 521-22.

378. See, e.g., Goldfarb, *supra* note 7, at 496 (describing statutory variations).

impede progress.³⁷⁹ States with histories of efforts to protect significant water resources (e.g., the Everglades in Florida; the Chesapeake Bay in Maryland) may create programs before other states do. However, viewed against the federal program's inability to coordinate development and stormwater controls, the stormwater utility, and other local experiments in stormwater control, merit further study.

V. CONCLUSION

*Abandoning the city for outlying suburbs and rural areas, without questioning the attitudes that spawned the city's problems, guarantees that a retreat to the countryside will provide only temporary respite from those problems.*³⁸⁰

Any resident of an Edge City who pauses to contemplate her surroundings must perceive that she inhabits a place in a temporary, transitional state of urban development. Edge Cities are the architectural and environmental equivalents of junk food: seemingly satisfying, yet empty at the core. They are hardly "sustainable," if that means that a connectedness with nature and a respect for nature's processes has been achieved. Most Edge Cities "merely incorporate the trappings of nature, like trees, lawns, gardens, and lakes," but like traditional cities, lack respect for nature's processes.³⁸¹ Edge Cities feature artificial land-

379. A book review of *Edge City* proclaimed confidently that existing political jurisdictions can regulate nearly every facet of life in Edge Cities. John Martinez, *Edge City: Life on the New Frontier*, 24 URB. LAW. 233, 234 (1992) (book review). Those jurisdictions often have other pressing responsibilities. Moreover, efforts to redistribute responsibility for environmental protection in Edge Cities frequently are mired in political and institutional gridlock. See CERVERO, *supra* note 165, at 222 ("The diffusion of decision making throughout suburbia has more often than not hindered efforts to engage in meaningful cooperation on problems that transcend municipal boundaries."); Goldfarb, *supra* note 7, at 501 (stating that any proposal to create local institutions "is vulnerable in its proliferation of new institutions without established constituencies or political credibility").

380. SPIRN, *supra* note 25, at 241.

381. SPIRN, *supra* note 25, at 34. Joel Garreau cites a number of "Developers' Laws" that prevail in Edge Cities — rules of thumb that operate in development after development. Many of these illustrate the developer's mindset: to obliterate the natural landscape. Garreau states, "the first thing a developer usually does is bulldoze everything flat." He introduces us to "Jake Page's Law of Severed Continuity," which holds that "You name a place for what is no longer there as a result of your actions," and the "Keith Severin Corollary": "All subdivisions are named after whatever species are first driven out by the construction. E.g., Quail Trail Estates." GARREAU, *supra* note 22, at 470-71.

In 1961, Jane Jacobs predicted that mindless repetition of the same development forms

scapes,³⁸² with virtually complete barriers between nature and the built environment. "We have," says author James Kunstler, "achieved the goal of total separation of uses in [this] man-made landscape."³⁸³ Edge Cities generate no sense of place, of existing in a community with nature.³⁸⁴

Legal innovation is necessary for successful environmental protection efforts in Edge Cities. On this "urban frontier," the prevailing environmental ethic resembles that of the Western land grab: take, develop, and protect³⁸⁵ before anyone else does. "[A]llowing the uncontrolled growth of existing suburbs," writes Peter Calthorpe, "is our most common growth strategy."³⁸⁶ Ironically, this development boom is exactly the opposite of what Edge City residents expected. Edge City residents, surveying the trees and grass planted around them, believe

would create unhealthy urban environments:

We are constantly being told simple-minded lies about order in cities, talked down to in effect, assured that duplication represents order. It is the easiest thing in the world to seize hold of a few forms, give them a regimented regularity, and try to palm them off in the name of order.

JACOBS, *supra* note 35, at 375-76.

382. Knox, *supra* note 154, at 2.

383. KUNSTLER, *supra* note 7, at 118; GEORGE STERNLIEB, PATTERNS OF DEVELOPMENT 93-94 (1986) (describing the "synthetic" nature of most suburban cities). Professor Blassingame sees the definition of the Edge City as part of the problem. See Blassingame, *supra* note 7, at 5 ("Whereas Edge Cities are defined first in terms of their size (number of square feet of office and retail space), Eco-Cities are defined by their relationship to nature.").

Even the name "Edge City" implies some sort of physical separation between the urban form and the natural environment, with the "edge" existing between the two. According to Jane Jacobs, this need not be the case:

An edge may be more than simply a dominant barrier, . . . if some visual or motion penetration is allowed through it — if it is, as it were, structured to some depth with the regions on either side. It then becomes a seam rather than a barrier, a line of exchange along which two areas are sewn together.

JACOBS, *supra* note 35, at 267 (quoting Kevin Lynch, then-associate professor of planning at the Massachusetts Institute of Technology).

384. See KUNSTLER, *supra* note 7, at 125 ("The least understood cost — although probably the most keenly felt — has been the sacrifice of a sense of place: the idea that people and things exist in some sort of continuity, that we belong to the world physically and chronologically, and that we know where we are.").

385. Jurisdictions with political responsibility for Edge Cities frequently use "managed growth" or "slow growth" strategies to prevent retrofitting of the existing landscape. See, e.g., CALTHORPE, *supra* note 7, at 31.

386. *Id.*

erroneously that they are combining the virtues of both city and country.³⁸⁷ This is nothing new: we have been trying to “mix nature with our artifacts to create extraordinary new cities”³⁸⁸ for centuries. Whether the model for new urban development was Thomas More’s Utopian city,³⁸⁹ “La Ville Radieuse” (Radiant City),³⁹⁰ the Garden

387. Garreau states that Edge City residents believe the “relationship with nature” is important to what makes theirs a “good place to live.” GARREAU, *supra* note 22, at 58. Edge City residents perceive that they have left environmental problems behind; they eventually come to recognize this as a fallacy. BALDASSARE, *supra* note 157, at 15. “[Outer cities] may at first be an ideal combination of country and city for the individual who can afford to live in them, but in the long run they are only a temporary and private solution to the problems of the metropolis.” SPIRN, *supra* note 25, at 34.

388. GARREAU, *supra* note 22, at 389.

389. See JACOBS, *supra* note 35, at 374-75; SPIRN, *supra* note 25, at 33.

390. See GARREAU, *supra* note 22, at 389; Tarlock, *City Versus Countryside*, *supra* note 7, at 478-81. Le Corbusier, says Professor Tarlock:

[A]rticulated the philosophical and aesthetic basis for urban renewal. Le Corbusier used the machine theory form to promote communitarian ends, and the machine theory reached its zenith with Le Corbusier’s Ville Radieuse. In the 1930s Le Corbusier’s architectural ideas attempted to produce a new synthesis between the city and nature; his high density, high rise cities surrounded by open space were designed to bring nature into the city.

Tarlock, *City Versus Countryside*, *supra* note 7, at 478. Le Corbusier viewed urban renewal as a societal imperative. To quote his famous words, “Architecture or revolution. Revolution can be avoided.” Knox, *supra* note 154, at 14 (quoting Le Corbusier, TOWARD A NEW ARCHITECTURE (1927)). His vision of towering skyscrapers surrounded by parks was something of an environmental vision. Tarlock, *City Versus Countryside*, *supra* note 7, at 479 (quoting KUNSTLER, *supra* note 7, at 79); see also JACOBS, *supra* note 35, at 21-22, 342. But, says Knox, Le Corbusier’s vision of the modern city “failed to deliver the goods.” Knox, *supra* note 154, at 14. That vision:

[B]ore no relationship whatsoever to the hugely greater quantities of automobiles, amounts of roadway, and extent of parking and servicing which would actually be necessary for his repetitive vertical concentrations of people, separated by vacuities. His vision of skyscrapers in the park degenerates in real life into skyscrapers in parking lots. And there never can be enough parking.

JACOBS, *supra* note 35, at 342-43. Le Corbusier “embraced the automobile as a revolutionary liberating force.” JACKSON, *supra* note 154, at 175. He failed, however, to anticipate that increased mobility would produce deconcentrated settlement patterns that would in turn spawn the Edge Cities. GARREAU, *supra* note 22, at 389. He also failed to recognize the alienation that machine-like forms for skyscrapers and other urban buildings would generate. Michael Sorkin, *See You in Disneyland*, in VARIATIONS ON A THEME PARK, *supra* note 155, at 212 (“Le Corbusier’s vision has become the icon of alienation, . . . [when] reincarnated as faceless urban renewal and bland urban downtowns.”); Tarlock, *City Versus Countryside*, *supra* note 7, at 477-81 (discussing Le Corbusier’s influence in the failed “urban renewal” movement).

City movement,³⁹¹ or Frank Lloyd Wright's "Broadacre City,"³⁹² we have failed to achieve a lasting synthesis of nature and the built environment.

The problems encountered in these developing urban areas demand simultaneous consideration at the project design stage;³⁹³ we must respond in a "bottom-up" fashion, ensuring that development takes place

391. See GARREAU, *supra* note 22, at 389; JACOBS, *supra* note 35, at 17-18; SPIRN, *supra* note 25, at 33-37; Tarlock, *City Versus Countryside*, *supra* note 7, at 475-76. The Garden City movement was started by Ebenezer Howard, an "English court reporter for whom planning was an avocation." JACOBS, *supra* note 35, at 17. In 1898, he proposed that self-sufficient settlements be built on the outskirts of existing cities, ringed by belts of greenery and agriculture. *Id.* at 17. His book, EBENEZER HOWARD, GARDEN CITIES OF TOMORROW (1902), outlined his principles for the Garden City:

Industry was to be in its planned preserves; schools, housing and greens in planned living preserves; and in the center were to be commercial, club and cultural places, held in common. The town and green belt, in their totality, were to be permanently controlled by the public authority under which the town was developed . . .

JACOBS, *supra* note 35, at 17-18.

A Garden City would be a small city, "constructed, ex novo, on the exurban perimeter of existing metropolises, to function as [an] escape valve from the tension and overcrowding of the old city." Sorkin, *supra* note 390, at 212-15. It would serve no more than thirty thousand residents. JACOBS, *supra* note 35, at 18. As such, it was designed to renaturalize the city — the "reversion to the natural," it was hoped, "would have a salutary effect on human nature." However, it would achieve exactly the opposite: in bending nature to a rigid order, the interdependence with the natural environment would be lost. Sorkin, *supra* note 390, at 212-15.

The formal structure of a Garden City guaranteed that few would ever be built. *Id.* The Garden City movement, however, continues to be a powerful intellectual model for planners of America's suburbs — and Edge Cities. See JACOBS, *supra* note 35, at 18; Tarlock, *supra* note 7, at 476.

392. Wright's "Broadacre City" was "the rival American theory to the Garden City . . . the high rise in the countryside," and a model for Edge Cities. Tarlock, *City Versus Countryside*, *supra* note 7, at 476. Wright envisioned an environmentally benign urban settlement: "The basic idea was to build slender towers surrounded by low density housing and farms. The vision was environmental: 'city building in the new city will stand there free in its own greenery or lie long, flowing lazily and low on prairie levels.'" *Id.* (quoting FRANK LLOYD WRIGHT, THE LIVING CITY 102 (1958)). Edge Cities achieved the exact opposite of what Wright intended. *Id.*

393. See CALTHORPE, *supra* note 7, at 15-26; Stern, *supra* note 153 ("These factors all need to be considered in a multi-disciplinary manner, at the same time that formal strategies of design are initiated."). This is especially true in planning for water use and reuse. See ADLER ET AL., *supra* note 59, at 197 ("[Areas] experiencing the most rapid growth rates . . . have the most urgent need for immediate establishment of water-sensitive master plans and site design practices before excavation and building ever begin.").

with sensitivity to the urban ecosystem.³⁹⁴ Each of the failed theories of urban development featured the assumption that a vision imposed from the “top down” by one or more individuals could result in an environmentally benign city.³⁹⁵ To create sustainable Edge Cities we will have to do just the opposite: develop a broad-based grassroots program for planning the future of these embryonic cities.³⁹⁶ As for those charged with decision-making authority, Jane Jacobs once stated that “[i]t is not enough for administrators in most fields to understand specific *services* and *techniques*. They must understand, and understand thoroughly, specific *places*.”³⁹⁷ That is the understanding required of those who would build new Edge Cities. In many Edge Cities, however, it is already too late to follow a “bottom-up” approach to sustainability. Those Edge Cities already in place will require retrofitting similar to that in central core cities.³⁹⁸

The transition to a sustainable urban future in these places is likely to take decades or even longer, whether we “retrofit”³⁹⁹ or develop sustainable cities still farther from the central urban core. Nothing less than a paradigm shift toward a land ethic that recognizes the “sustainability of places”⁴⁰⁰ is required to achieve better local and regional coordination of development and pollution prevention through

394. See SPIRN, *supra* note 25, at 9 (“The challenge facing [areas of rapid urban growth] is to learn from the mistakes of older cities and to design the city from the outset to exploit the opportunities of the natural environment. This challenge seems particularly acute in fast-growing cities where entire new districts are springing up seemingly overnight.”).

395. See JACOBS, *supra* note 35, at 436; Tarlock, *City Versus Countryside*, *supra* note 7, at 477.

396. CALTHORPE, *supra* note 7, at 35-36 (recognizing the need for an alliance between environmentalists, “urbanists,” and developers in addressing the “multi-faceted dimensions of the problems facing the American metropolis . . .”).

397. JACOBS, *supra* note 35, at 410.

398. Some Edge Cities are already mature. Garreau lists over 200 Edge Cities nationwide. GARREAU, *supra* note 22, at 426-38. Edge Cities on this list are not uniform in their origins (some are older, established suburbs that experienced infill growth and consolidation, and some are exurban sites of greenfield developments) or stage of development; many, says Garreau, are emerging areas that have not yet achieved full-fledged Edge City status. *Id.*

399. See Faux, *supra* note 19, at 1 (describing measures to retrofit existing Edge Cities).

400. Sagoff, *supra* note 1, at 388.

effective land use controls.⁴⁰¹ That shift will require multidisciplinary planning efforts at the local level⁴⁰² and legal innovations such as stormwater utilities.

To state that a sustainable urbanism in these places requires "bottom-up" planning, citizen involvement, and a sense of interdependence with nature is to recognize the size of the challenge involved. The democratic involvement required⁴⁰³ to establish a community with nature is antithetical to the hyperconsumerism⁴⁰⁴ and selfishness⁴⁰⁵

401. Management of watersheds, for example, should involve a locally oriented planning process:

Many commentators have agreed that unless overriding national interests dictate otherwise, watershed management should be a flexible, responsive, "bottom-up" consensus-building process rather than a universal, standardized, "top-down" product. The watershed management process should stress negotiation and consent rather than command-and-control regulation. Planning should be participatory and proceed from the "bottom up." Management should be accomplished from the "inside out" rather than from the "outside in."

Goldfarb, *supra* note 7, at 498 (endnote omitted).

402. Cities are "built by simultaneous decisions at many scales: the decision to build a single building or to move from city to suburb, the plan for a new highway or a new industrial plant." SPIRN, *supra* note 25, at 240. Spirn states that "[t]he professionals responsible for molding the actual form of the city, its buildings and space — landscape architects, architects, and engineers — seldom work at more than one scale. All too often, they . . . design specific buildings and parks without perceiving the cumulative effect upon the city and the region as a whole . . ." *Id.* If sustainability is to have any meaning, these professionals must be involved in a multidisciplinary design process to create a city more in harmony with nature. *Id.* at 244. See generally CALTHORPE, *supra* note 7 (advocating integrated regional planning to meet environmental objectives); CERVERO, *supra* note 165 (calling for coordination of transportation, environmental objectives, and development).

403. See COLEMAN, *supra* note 14, at 116 (arguing that grassroots democracy is necessary).

404. See Crawford, *supra* note 340, at 52. Crawford states:

[Q]uestion, in the context of regulating hazardous substances, the wisdom of a musing, like this: "[S]ure, we could avoid a lot of environmental problems by giving everybody 40 acres and a mule again. We can live on a level with nature alright. But we as consumers demand plastics, and newsprint with colors in the ink, and nylon stockings. We demand all sorts of things from industry and we'll pay a price for them."

Id. (quoting Dick Russell, *Passing the Buck, Burning the Evidence*, IN THESE TIMES, Mar. 16-22, 1988, at 11).

405. A question beyond the scope of this Article is the issue of distributional equity in Edge Cities. Garreau argues that Edge Cities are serving an increasingly diverse population. GARREAU, *supra* note 22, at 143-178 (analyzing the African-American community in the Edge Cities of Atlanta, Georgia). Professor Martinez disagrees

of the urban frontier's residents. In the Edge Cities, "nature" exists as a mere facade: the artificial pond of an office complex is a grandiloquent monument to unchecked economic activity. Imparting ecological wisdom and a sense of responsibility to developers preoccupied with erecting monuments to their own existence will prove to be no simple task. Institutional factors, such as the fragmentation of political authority over the affairs of Edge Cities, will further impede coordination of developmental and environmental objectives.

We may view the federal program to control stormwater runoff pollution as an attempt to overcome these obstacles to sustainability. At first, the program engaged in an almost fantastical reliance on an inappropriate form of regulation (viewing stormwater discharges as analogous to point source discharges and controllable as such). In Section 402(p), the Congress corrected its course and established what it clearly intended to be a form of coordination between land-use practices and environmental protection. The program will likely prove no more successful than previous programs to control pollution from nonpoint sources. Moreover, the federal program is limited by its very nature to addressing problems only when they have become too expensive to resolve. Continuing the seemingly endless debate over the applicable substantive standard may even preclude real improvements in water quality.⁴⁰⁶

forcefully. See Martinez, *supra* note 379, at 236-39 (stating that Garreau's analysis is anecdotal and not representative of actual inequities in America's suburbs).

Others note that exclusionist policies (such as exclusionary zoning) propelled the development of the suburbs, and hence Edge Cities. CALTHORPE, *supra* note 7, at 20; Keith Aoki, *Race, Space and Place: The Relation Between Architectural Modernism, Post-modernism, Urban Planning and Gentrification*, 20 *FORDHAM URB. L.J.* 699, 892 (1993); Tarlock, *City Versus Countryside*, *supra* note 7, at 483-84; Timothy J. Choppin, Note, *Breaking the Exclusionary Land Use Regulation Barrier: Policies to Promote Affordable Housing in the Suburbs*, 82 *GEO. L. J.* 2039, 2047 (1994) (stating that land development regulations in the suburbs have "a tendency to price out certain income groups").

Environmental justice advocates may have a role to play in the development of a relationship between connectedness with place in Edge Cities, and the achievement of increased equity in environmental protection efforts. See generally Tarlock, *City Versus Countryside*, *supra* note 7 (discussing means to bridge the gap between environmentalists and environmental justice advocates).

406. See Crawford, *supra* note 340, at 60 ("[T]he reality is that the arguments [advanced in favor of national controls] tend to forsake the possibility of actual democracy in favor of protecting the position of the federal administrative bureaucracy.").

To continue to view Washington as the ultimate arbiter of stormwater quality ignores the reality that in areas developing into Edge Cities, the process, if it is to move forward at all, will not take place within the confines of the federal program. In other areas, permit applications focusing on BMPs to control stormwater pollution to the "maximum extent practicable" represent the opening moves of an extended chess game; the planning and development process might be managed better elsewhere.

There is a "long history of the search for a sustainable urbanism."⁴⁰⁷ A sustainable urbanism would feature models for transforming existing cities.⁴⁰⁸ Eventually, even growing Edge Cities, located in areas that have been resistant to planning initiatives, may recognize the limits of growth, and engage in planning for environmental protection.⁴⁰⁹ The "design imperatives of creating the post-suburban metropolis"⁴¹⁰ are both complex and necessary. Kenneth Jackson observes that environmentally wasteful practices of suburbanites cannot continue indefinitely, stating that "the United States is not only the world's first suburban nation, but it will also be its last."⁴¹¹ Reversing the steady trend toward degeneration in the sterile backyards of many Americans' homes, is therefore, among the next major challenges of environmentalism.

407. Tarlock, *City Versus Countryside*, *supra* note 7, at 477.

408. Environmentalist Tony Dominski, for example, proposes a three-stage model of the transition to what he describes as "Eco-Cities." He warns that retrofitting today's cities is likely to face tremendous hurdles, resembling in many ways "the punch line of the joke about the Maine farmer who is asked for directions to Boston: 'You can't get there from here.'" Tony Dominski, *The Three-Stage Evolution of Eco-Cities — Reduce, Reuse, Recycle*, in SUSTAINABLE CITIES, *supra* note 7, at 16.

409. Appleton, *supra* note 84.

410. CALTHORPE, *supra* note 7, at 17.

411. JACKSON, *supra* note 154, at 304.