SOLVING THE CSO CONUNDRUM: GREEN INFRASTRUCTURE AND THE UNFULFILLED PROMISE OF FEDERAL-MUNICIPAL COOPERATION

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Faced with mounting infrastructure construction costs and more frequent and severe weather events due to climate change, cities across the country are managing the water pollution challenges of stormwater runoff and combined sewer overflows through new and innovative "green infrastructure" mechanisms that mimic, maintain, or restore natural hydrological features in the urban landscape. When utilized properly, such mechanisms can obviate the need for more expensive pipes, storage facilities, and other traditional "grey infrastructure" features, so named to acknowledge the vast amounts of concrete and other materials with high embedded energy necessary in their construction. Green infrastructure can also provide substantial co-benefits to city dwellers, such as cleaner air, reduced urban temperatures, and quality of life improvements associated with recreation areas and wildlife habitats.

This Article examines the opportunities and challenges presented by municipal green infrastructure programs in the context of Clean Water Act ("CWA") enforcement by the U.S. Environmental Protection Agency ("EPA"). First, it explores new thinking in urban sustainability and identifies opportunities for greater federal-municipal cooperation in the management of environmental problems, including stormwater runoff. Second, it unpacks the challenges presented by the relative inflexibility of federal environmental enforcement in the context of urban stormwater management under the CWA, and compares the differences between traditional federal approaches and newer local initiatives in terms of adaptability, responsiveness to community needs, preferences and trade-offs, cost effectiveness, and innovation. Third, it describes a recent consent agreement between New York State and New York City, identifying key features and best practices that can be readily replicated in other jurisdictions. In recent years, EPA has taken big steps forward to encourage and support municipal green infrastructure initiatives, including the release of its Integrated Municipal Stormwater and Wastewater Planning Approach Framework. The Article concludes with a specific proposal for further regulatory and policy reform that would build upon this framework to develop truly comprehensive, municipally-led plans to prioritize infrastructure investments that improve public health and the environment.

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Introduction

This Article examines the evolving interface between federal environmental laws and municipal regulation of land use, as seen through the lens of green infrastructure. Federal-municipal interactions in this area raise a host of difficult and pressing questions concerning the allocation of scarce resources to improve public health, minimize the urban environmental footprint, attract talented individuals, and foster economic development across cities worldwide. Traditionally, these disparate goals have been only loosely affiliated under the rubric of "quality of life," but today they are increasingly understood as elements of integrated, coherent, and synergistic urban sustainability programs that are built upon a common cost/benefit foundation.

Perhaps the best example of how sustainability planning can integrate apparently dissimilar environmental and quality of life mandates is the use of green infrastructure to meet federal Clean Water Act ("CWA") obligations. The need for a new conceptual framework in this arena is the result of an inherent, and as yet unresolved, conflict in environmental policy: Dense settlement in urban centers is relatively energy efficient on a per capita basis, yet can generate significant amounts of localized air and water pollution. Among other things, if pollution is regulated in a manner that significantly drives up the cost of living in cities, then overall settlement will be less dense, driving up aggregate energy use and pollution levels.

One important effect of the conversion of landscapes to closely spaced residential and commercial buildings and roadways is that a large proportion of the overall urban land surface sheds water, or is impermeable to rain. Cities with a relatively high proportion of impermeable surfaces such as streets, sidewalks, and rooftops must cope with significant volumes of stormwater runoff

during wet weather. Indeed, stormwater is now a leading cause of water pollution in most U.S. cities.

In many older American cities, particularly in the Northeast and Midwest, stormwater runoff, whether from streets, rooftops or other impermeable surfaces, is handled together with residential and commercial wastewater by relatively old single-pipe combined sewer systems ("CSS"). A typical CSS receives both domestic sewage and stormwater, and drains to a publicly owned treatment works ("POTW") where wastewater is treated. Such systems also typically include a number of outfalls that discharge a mixture of untreated sewage and stormwater runoff when peak storm flows overwhelm the system's capacity. For many older U.S. cities that rely on CSS rather than municipal separate stormwater systems, the dominant water quality issue is not stormwater *per se* but rather combined sewer overflows ("CSOs"), the consequence of heavy rains and the limitations of existing infrastructure.

The U.S. Environmental Protection Agency's ("EPA") regulation of stormwater discharges under the CWA is unusual among environmental laws in that the major regulated entities are municipalities (rather than private corporations) and, as a consequence, a wide base of taxpayers or ratepayers are required to spend significant amounts of money on infrastructure projects for stormwater management and the control of CSOs. Unlike other core municipal services such as solid waste handling, snow removal, policing, traffic safety, and the like, the CWA involves the federal government directly in wastewater management services provided by local government. More commonly than other federal environmental laws, the CWA imposes significant fiscal and budgetary obligations directly upon municipalities (as opposed to the costs borne by state governments or private entities related to regulatory capacity or industrial activities, respectively). Consequently, important questions arise about the interaction and boundaries between federal and municipal authorities.

The Article proceeds in three parts. Part I introduces the broad concept of urban sustainability. This Part focuses on key questions such as how goals are defined and set, who decides which goals to pursue, how to prioritize between competing objectives, and who ultimately pays to achieve sustainability goals. It also outlines a theoretical framework that can be applied more generally in the context of federal-municipal coordination on flexible approaches to environmental regulation. Part II examines the CWA in the context of cities, paying particular attention to stormwater regulation and the mitigation of CSOs. It goes on to introduce the concept of green infrastructure, compare the costs and benefits of green and so-called "grey" infrastructure, and explore the interaction between federal standards and local stormwater management programs. Part III provides a case study drawing together the green infrastructure concepts discussed in Part II and the key urban sustainability principles discussed in Part I. The Article concludes with a specific proposal for further regulatory and policy reform that would significantly extend EPA's Integrated Municipal Stormwater and Wastewater Planning Approach Framework ("Integrated Framework"), released in June 2012, to develop truly comprehensive, munici-

pally-led plans to prioritize infrastructure investments that improve public health and the environment.

By better aligning accountability for investment decisions with regulatory planning at the municipal level, this proposal would lead to more efficient allocation of resources, and more "ownership" by and engagement of the local ratepayers who pay for CWA compliance. It would also lead to investments that are better tailored to local conditions, innovative ideas that seek to maximize positive externalities (as opposed to mere compliance with pollution minimization targets), and less resentment towards one-size-fits-all regulations made in the context of a sometimes distant national perspective. A strong, ongoing federal role in such policymaking would ensure that municipal plans have a solid scientific foundation. EPA would also oversee progress towards milestones and guarantee transparency and accountability through regular reporting, all within an adaptive management framework.

I. Urban Sustainability in the 21st Century

A. Key Questions

In 2008, for the first time in human history, more people worldwide were living in cities than in rural areas.[1] Recognizing the growing importance of municipal-scale initiatives on any number of environmental, public health, and economic concerns, city governments in recent years have become increasingly active and innovative players in sustainability policy making and implementation.[2] In the United States—especially in the absence of comprehensive federal policy on climate change—cities are taking the lead on a wide range of initiatives, from energy efficiency and green infrastructure to transportation planning and urban agriculture.[3]

Of course, cities are not the only actors in the sustainability space; many of the initiatives undertaken by municipalities are subject to overlapping regu-

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[1] *Urbanization: A Majority in Cities*, United Nations Population Fund (May 2007), http://perma.cc/4B8W-Q83C ("In 2008, for the first time in history, more than half of the world's population will be living in towns and cities.").

[2] *See, e.g.*, Asian Dev. Bank, Green Urbanization in Asia: Key Indicators for Asia and the Pacific 2012: Special Chapter (2012), http://perma.cc/6ZEX-XPBH; C40 Cities Climate Leadership Group, *Global Leadership on Climate Change*, http://perma.cc/A7YA-32BS; ICLEI Local Governments for Sustainability, http://perma.cc/6DS6-YW73. More fundamentally, cities are motivated by regional and, in some cases, global competition to attract citizens, cutting edge industries, etc. They recognize that environmental health—sometimes synonymous with livable cities—is necessary for economic health.

[3] *See, e.g.*, PlaNYC 2030: A Greener, Greater New York (2007), http://perma.cc/K9DK-SAB4; Richard B. Stewart, *States and Cities as Actors in Global Climate Regulation: Unitary vs. Plural Architectures*, 50 Ariz. L. Rev. 681 (2008) (exploring the benefits of sub-national climate change policy in the absence of federal leadership and international agreement). *But see* Jonathan B. Wiener, *Think Globally, Act Globally: The Limits of Local Climate Policies*, 155 U. Pa. L. Rev. 1961 (2007).

latory mandates at the federal, state, and local levels.[4] For instance, the installation of neighborhood-scale green infrastructure to manage stormwater runoff, prevent CSOs, and provide valuable co-benefits may be required to meet federal CWA and state water pollution statutes.[5] Nevertheless, in almost every realm, the cityscape remains a primary locus for contemporary sustainability initiatives, making municipal "green" governance—and the interaction among municipal, federal, and state regulatory authorities—a subject worthy of careful consideration.[6]

In examining these interactions, several initial questions can help us properly frame the scope of our inquiry and provide some structure for further discussion of particular programs such as municipal stormwater management and CSO mitigation. First, what are the goals of urban sustainability initiatives and, relatedly, how do we identify and delineate boundaries between such goals? Second, who decides which goals are important, and who sets priorities among multiple, often competing, objectives? Third, who pays to achieve such goals? As we shall see in the context of stormwater management, each of these questions raises serious theoretical and practical considerations that have impacts on communities and watersheds across the nation.

1. Goals?

a. Defining Goals

It is usually at the local level where the policy making rubber hits the proverbial road of real world implementation, with the immediate effects felt, for better or worse, in the daily lives of identifiable individuals and their local communities.[7] As demonstrated by public demands after major winter snowstorms and, most recently, Superstorm Sandy, city officials face a much higher degree of accountability for services than do their state or federal counterparts.

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[4] This Article refers to "cities" and "municipalities" interchangeably, even though there are significant differences between sustainability initiatives in a major city such as New York and at a smaller municipal scale. *See* Hari M. Osofsky, *Scaling "Local": The Implications of Greenhouse Gas Regulation in San Bernardino County*, 30 MICH. J. INT'L L. 689, 692 (2009) ("U.S. cities and counties differ substantially in their sizes, the quantity and physical characteristics of their land, the size and density of their populations, and the needs of their citizens.").

[5] *See, e.g.*, Press Release, EPA, EPA Administrator Jackson & Philadelphia Mayor Nutter Sign Landmark Green City, Clean Waters Partnership Agreement (Apr. 10, 2012), *available at* http://perma.cc/C7JF-6SC3.

[6] *See* Keith H. Hirokawa, *Sustaining Ecosystem Services Through Local Environmental Law*, 28 PACE ENVTL. L. REV. 760, 776 (2011) ("[T]he local nature of sustainability is essential, as the battle for sustainable development will almost certainly be decided in cities . . . .") (internal quotation marks omitted); Patricia E. Salkin, *Can You Hear Me Up There? Giving Voice to Local Communities Imperative for Achieving Sustainability*, 4 ENVTL. & ENERGY L. & POL'Y J. 256, 258 (2009) ("While the United States as a whole speaks through the federal government, the voices and actions of local governments are critical to achieving truly sustainable communities . . . ."); Peter H. Lehner, *Act Locally: Municipal Enforcement of Environmental Law*, 12 STAN. ENVTL. L.J. 50 (1993).

[7] Hirokawa, *supra* note 6, at 778 ("Local governments are *always* environmentally situated, and ecosystems are always locally felt . . . . [L]and, by its nature, is inherently local.") (internal quotation marks omitted).

New York City Mayor John Lindsay's failure to have snow removed quickly enough from parts of Queens after a 1969 snowstorm, and the consequent public scorn, is perhaps the most famous of many similar incidents.[8] By necessity, municipal governments must be adept at balancing competing interests and priorities and setting and achieving multiple goals that may cut across conceptually distinct issue areas or be subject to wholly separate regulatory regimes. For instance, cities seeking to implement a broad mandate to improve the quality of life must regularly weigh both the tradeoffs and co-benefits among various public health, environmental quality, and economic development programs.

With comprehensive urban sustainability initiatives such as New York City's PlaNYC, municipalities are experimenting with new methods to achieve these goals, often in ways that expressly create and capitalize on positive spillover effects between hitherto distinct programmatic activities.[9] For instance, PlaNYC expressly designed its open space plan in such a way that it would help to achieve New York City's overall policy goals in several different areas, including housing, water quality, energy conservation, and climate change.[10] Although by no means a comprehensive accounting, such goals can be characterized in terms of one of four broad categories: public health and safety, environmental quality, quality of life, and economic development.

i. Public Health and Safety

Many municipal regulatory initiatives throughout history have been designed first and foremost to improve public health, up to and including new programs being piloted today.[11] The world's earliest septic systems, for exam-

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[8] *See* VINCENT J. CANNATO, THE UNGOVERNABLE CITY: JOHN LINDSAY AND HIS STRUGGLE TO SAVE NEW YORK (2001) (recounting the 1969 snowstorm and the mayor's response); Sewell Chan, *Remembering a Snowstorm that Paralyzed the City*, N.Y. TIMES, Feb. 10, 2009, http://perma.cc/6PB7-GNPT.

[9] "Sustainability" can mean many things to many people. A rough working definition of urban sustainability, for the purposes of this Article, is "the state a metropolitan community reaches once it is able to meet the needs of the present generation without compromising the ability of future generations to meet their own needs." This definition was adopted by the authors of a 2004 report on urban sustainability prepared for the Oak Ridge National Laboratory. *See* UNA MCGEOUGH ET AL., MODEL FOR SUSTAINABLE URBAN DESIGN 1 (2004), *available at* http://perma.cc/56A4-3ZMH. Although this definition is quite broad, it properly encompasses many of the key features of sustainability initiatives being adopted by cities around the world, from waste management practices to energy conservation to open space preservation and public health campaigns. Particularly in a time of tight budgets, the cross-cutting approach to sustainability being taken by many municipalities, including New York City, is helping urban residents achieve multiple sustainability objectives at once.

[10] *See* ICLEI–LOCAL GOVERNMENTS FOR SUSTAINABILITY, THE PROCESS BEHIND PLANYC: HOW THE CITY OF NEW YORK DEVELOPED PLANYC, ITS GROUNDBREAKING SUSTAINABILITY PLAN 28–29 (2010), http://perma.cc/YKP3-LNPB; *see also* Hirokawa, *supra* note 6, at 762 ("Local environmental law generally involves a complex system of legislative and administrative procedures, parochial values, overlapping jurisdictions, and often conflicting priorities.").

[11] New York City has pioneered several high profile public health initiatives in recent years, including a 2003 ban on smoking in restaurants and bars, a 2006 phase out of artificial trans-fat in all restaurants and other food establishments, and a 2012 proposal to prohibit the sale of large sodas and other sugary drinks in similar locations. *See* Michael Howard Saul, *City Plans to Restrict Big-Size Soda Sales*, WALL STREET JOURNAL, May 31, 2012, at A19.

ple, were constructed to minimize human contact with wastewater and thereby prevent the spread of disease. New York City's pioneering Zoning Resolution of 1916—which paved the way for modern land use regulation as we have come to know it—was compelled at least in part by residents' desire to mitigate the adverse public health and safety impacts of burgeoning urban development, including concerns over access to adequate light and air.[12] Innovative urban sustainability initiatives as varied as bicycle-friendly transportation infrastructure and green roofs are also meant to improve public health by encouraging healthy behaviors such as bike-riding and by making it easier for city residents to access locally grown fruits and vegetables.[13]

ii. Environmental Quality

Of course, today's urban sustainability initiatives are not only concerned with public health and safety, but also broader environmental issues such as water quality, open space preservation, wildlife conservation, and climate change.[14] New York City's Green Infrastructure Plan, for example, is designed to control stormwater runoff from impervious surfaces, limiting the volume and frequency of CSOs and thereby improving water quality in New York Harbor in accordance with the CWA's mandate, which is geared as much toward environmental protection as it is toward human health.[15] Similarly, the MillionTrees-NYC initiative was designed to improve open space while reducing energy use and concomitant greenhouse gas emissions, both worthy environmental and economic goals that can stand on their own quite apart from any public health or quality of life objectives.[16]

iii. Quality of Life

Unlike federal environmental regulators who can concern themselves primarily with imposing scientific and technical pollution standards to protect human health and environmental quality, local governments are the organs through which citizens most directly engage in a "process of visioning the community [and] identifying those physical and intangible characteristics that are locally cherished as contributing to the quality of life."[17] Quality of life is

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[12] *About Zoning*, N.Y.C. Dept. of City Planning, http://perma.cc/TE74-QE9C.
[13] *See, e.g.*, Citibike, http://perma.cc/LM5M-WGET (New York City's new bike sharing program); Henry Goldman, *Brooklyn Yields Cucumbers as NYC Expands Industrial Roof Farms*, Bloomberg, Aug. 2, 2012, http://perma.cc/W6JM-TRKH.
[14] With more than half of humanity living in cities, "initiatives at the state and local government level, even standing alone, have the potential to dramatically contribute to the international effort to slow the pace of global warming." Salkin, *supra* note 6, at 258 (citation omitted).
[15] NYC Dep't of Envtl. Prot., NYC Green Infrastructure Plan: A Sustainable Strategy for Clean Waterways 15 (2010) [hereinafter Green Infrastructure Plan], *available at* http://perma.cc/56SA-6XMT.
[16] *Id.* at 17.
[17] Hirokawa, *supra* note 6, at 770.

something of a catchall category. With its roots in Euclidean zoning,[18] municipal park development, and even nuisance law, the contemporary conception of "quality of life" incorporates public health and environmental goals alongside education, housing, transportation, public safety, recreation, aesthetics, and other values.[19] In each locality, citizens may hold distinct values that yield particular priorities—whether economic, environmental, or social—for shaping the character of their community. When planning for future infrastructure improvements, city governments must therefore "wrestle[ ] not only with . . . physical constraints . . . but also with the fundamental values implicit in those policy choices,"[20] balancing competing objectives such as environmental protection and economic development, both of which may contribute to citizens' conceptions of quality of life.

iv. Economic Development

Urban sustainability goals, particularly in developing countries but also here in the United States, typically include a significant sustainable economic development component. For instance, the Partnership for Sustainable Communities, a federal interagency collaboration among the Department of Housing and Urban Development, the Department of Transportation, and EPA,[21] aims to "help communities around the country better meet their housing, transportation, and environmental goals—laying the groundwork for an economy that provides good jobs now and creates a strong foundation for long-term prosperity."[22] This vision of integrating economic development and environmental protection is at the core of many urban sustainability programs, whether acknowledged explicitly or simply implicit in their design.

New York City's PlaNYC, which is "focused on the physical city, and its possibilities to unleash opportunity," makes the link between sustainability and economic growth quite clear.[23] A major impetus for the plan was the demographic projection of a million more City residents by 2030, the equivalent of

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[18] *See* Village of Euclid v. Ambler Realty Co., 272 U.S. 365 (1926) (upholding local zoning ordinance and establishing the modern legal framework for "Euclidean" zoning regulation nationwide).

[19] An interesting and relatively novel catchall metric for quality of life is the "Google Walkability Index," which has been used by researchers to examine the correlation between walkable neighborhoods and public health outcomes. *See* Karen Glanz et al., *Google Walkability: A New Tool for Local Planning and Public Health Research?*, 9 J. PHYSICAL ACTIVITY & HEALTH 689, 689 (2012). In New York City, Nate Silver, the former proprietor of the Five Thirty Eight polling analysis blog at *The New York Times*, authored a popular cover story in *New York Magazine*, along with an associated interactive website, utilizing a comprehensive quality of life matrix to rank the city's neighborhoods using factors such as access to public transportation, amount of green space, crime rates, and the quality of local schools. *See* Nate Silver, *The Most Livable Neighborhoods in New York*, N. Y. MAGAZINE, April 11, 2010, http://perma.cc/4QWD-VB2K.

[20] PLANYC, *supra* note 3, at 10.

[21] PARTNERSHIP FOR SUSTAINABLE COMMUNITIES, http://perma.cc/JJK5-AGUB.

[22] PARTNERSHIP FOR SUSTAINABLE COMMUNITIES, THREE YEARS OF HELPING COMMUNITIES ACHIEVE THEIR VISIONS FOR GROWTH AND PROSPERITY 1 (2012), *available at* http://perma.cc/9S88-ABLN.

[23] PLANYC, *supra* note 3, at 3.

accommodating the populations of both Miami and Boston with existing infrastructure over a twenty-year period. As the plan demonstrates, protecting public health and the environment while ensuring other quality of life improvements is necessary for New York City to compete effectively against national and international rivals for jobs and residents, and has the potential to create real economic opportunities at the neighborhood, borough, city, or regional scale. However, to make such decisions, policy makers must set boundaries and establish priorities.

b. Setting Boundaries

Today's major policy challenges, from financial stimulus to terrorism, cannot be readily contained within easily discernible geographic boundaries. As Professor Ashira Ostrow explains, "[i]n a world where capital and information flow freely across national and subnational boundaries, few regulatory matters can be cabined within the jurisdictional lines of a single state, let alone a single locality."[24] What is true for economic and social problems is even more obvious for environmental issues; it is seldom the case that political and administrative lines on a map are coextensive with the natural boundaries of an ecosystem, airshed, or watershed.[25] Indeed, regulators at EPA and state environmental protection agencies have begun to recognize this reality, taking an ecosystem- or watershed-wide approach to thorny problems such as toxic contamination that for economic, political, and practical reasons had previously been dealt with in a much more piecemeal fashion.[26]

Furthermore, none of the conceptually distinct objectives identified above can be achieved in a vacuum as the deployment of regulations and resources to achieve solutions in one area will have measurable impacts on related objectives, particularly in a densely settled urban milieu. In many cases, there will be positive spillover effects, as in the case of the obvious relationship among green infrastructure, quality of life improvements, and reductions in CSO volume and frequency.[27] Sometimes, there are clear tradeoffs between competing land uses and public policy goals, as in the case of conflicts between open space preservation and new residential or commercial construction. Often, one

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[24] Ashira P. Ostrow, *Land Law Federalism*, 61 EMORY L.J. 1397, 1397 (2012); *see* Robert B. Ahdieh, *From Federalism to Intersystemic Governance: The Changing Nature of Modern Jurisdiction*, 57 EMORY L.J. 1, 17 (2007).

[25] Indeed, New York City's Department of Environmental Protection ("DEP") has authority to protect and manage the city's drinking water supply even though most of the reservoir system is located upstate in the Catskill/Delaware and Croton watersheds, both of which are far outside city limits. *See* N.Y.C. R. & Regs. §18-11–§18-91 (2010); *see also* Jon Paul Rodríguez et al., *Interactions among Ecosystem Services*, *in* ECOSYSTEMS AND HUMAN WELL-BEING: SCENARIOS, Vol. 2, 431 (2005) (exploring the complex interactions between various ecosystem services and human activities).

[26] *See, e.g.*, Anthony DePalma, *Superfund Cleanup Stirs Troubled Waters*, N.Y. TIMES, Aug. 13, 2012, http://perma.cc/WF7A-623W ("Environmental officials say they have learned through trial and error that it can be far more effective to take an entire river system into account, rather than proceeding piecemeal.").

[27] *See infra* Part II.C.2.c.

program will impose both costs *and* benefits on another programmatic area.[28] In most matters the municipal government, and ultimately citizens themselves, must set boundaries between multiple objectives and priorities with regard to municipal investments. This default would apply to investments in wastewater systems in the absence of federal and state oversight.

2. Who Decides?

Regulatory authority over environmental quality is "widely distributed across many levels and types of governmental entities,"[29] but in the United States such authority has been ordered hierarchically since the 1970s, with the federal government holding ultimate power. In the context of the CWA, the authority to implement federal water quality standards and issue National Pollutant Discharge Elimination System ("NPDES") permits may be delegated to states, which in turn impose stringent requirements on municipalities, typically treating them—except in certain narrow circumstances—as *subjects of* regulation rather than *regulators* in their own right.[30] By contrast, municipal authority to regulate land use and zoning is traditionally quite extensive and a presumptive part of the residual "police power,"[31] meaning that it is almost always local government officials who are responsible for planning the layout of neighborhoods, building and maintaining grey and green infrastructure, and providing a range of essential public services. Difficult theoretical and practical questions arise where these "top down" and "bottom up" regulatory domains intersect. This Article examines these issues in the context of stormwater management and CSO control policy.

On the one hand, there are good reasons for the now customary federal preeminence in environmental protection and enforcement. The rise of federal environmental regulation in the 1960s and 1970s was a direct attempt to mitigate the negative externalities of parochial decision making by state and local officials, including (but by no means limited to) decision making about land use, such as the siting and operation of factories. As Dean Patricia Salkin explains, "in many instances, issues of larger geographic significance [such as air and water quality] may not be addressed by local officials due to the lack of perspective, funding, or support."[32] By federalizing environmental protection,

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[28] For example, an increase in the number of trees and planted areas in a New York City neighborhood may help reduce CSO volumes while providing shade in the summer, thus reducing energy use for air conditioning and at the same time imposing additional costs associated with the risk of downed trees and fallen limbs during severe storms or heavy snows. *See, e.g.*, Lisa Foderaro, *Storm Inflicted a Beating on Trees*, N.Y. TIMES, Nov. 12, 2012, at A22.

[29] Hirokawa, *supra* note 6, at 783.

[30] *See infra* note 61 and accompanying text.

[31] *See, e.g.*, Richard Briffault, *Our Localism: Part I — The Structure of Local Government Law*, 90 COLUM. L. REV. 1, 3 (1990) ("Land use control is the most important local regulatory power.").

[32] Patricia E. Salkin, *The Quiet Revolution and Federalism: Into the Future*, 45 J. MARSHALL L. REV. 253, 254 n.5 (2012) (citing U.S. GEN. ACCOUNTING OFFICE, ENVIRONMENTAL PROTECTION: FEDERAL INCENTIVES COULD HELP PROMOTE LAND USE THAT PROTECTS AIR AND WATER QUALITY 63 (2001), *available at* http://perma.cc/9JFX-EPHW).

modern environmental law imposes uniform standards across the country, preserving natural resources and protecting public health by preventing the "race to the bottom" that might otherwise occur in the absence of a federal regulatory "floor," as polluting activities migrate from jurisdictions with strong environmental controls to those with weaker ones.[33] The inherent parochialism of local politics and the desire to avoid short-term costs, even in those cases where cleaner cities might provide longer-term benefits, provides one set of arguments in favor of federal authority to determine environmental goals.[34]

On the other hand, federal regulators generally do not face the financial and operational needs to balance competing or even contradictory programs that are specific to individual media. If cities do not have an incentive to think about other cities, it is equally true that the federal government is not held directly accountable for the costs of obligations it can impose on cities and citizens under federal environmental laws and associated regulatory programs. The disconnect in accountability at the federal level was masked for the first two decades of CWA enforcement, when substantial federal grants helped municipalities pay for federal mandates, but that support has since disappeared.[35]

Moreover, regulation at the federal level can often fail to take into consideration local conditions that, particularly when environmental objectives intersect with the vagaries of land use control, may make all the difference for the success or failure of a given regulatory program.[36] For example, "federal mandates that municipalities treat stormwater like industrial pollution discharges . . . may make sense in the northeast, but such requirements are ill-suited to arid regions with little rainfall or clay-based soils."[37]

The local nature of most environmental problems, then, militates in the other direction, in favor of decentralized decision making. One reason is that it is easier for citizens to participate and make their preferences known at the local level,[38] where governments must respond to community needs and preferences,[39] while federal agencies "are remote from average citizens and lack effective, low-cost channels through which citizens can communicate and

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[33] Ostrow, *supra* note 24, at 1402 ("The body of federal law is bound by a common objective—to counterbalance the harm that would result from unfettered local control over land use.").

[34] But the federal government does not necessarily focus its attention on those environmental issues where its involvement would make the biggest difference. *See* Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 160 (2005) ("While the federal government is hyperactive in its focus on local environmental concerns, it is less active in those areas where the case for federal involvement is strongest.").

[35] *See infra* note 58 and accompanying text.

[36] Adler, *supra* note 34, at 136 ("The failure to take into account local environmental conditions—let alone local tastes, preferences, and economic conditions—leads to 'one size fits all' policies that fit few areas well, if at all.").

[37] *Id.* (citing PIETRO S. NIVOLA & JON A. SHIELDS, MANAGING GREEN MANDATES: LOCAL RIGORS OF U.S. ENVIRONMENTAL REGULATION 36 (2001)).

[38] *See* Gerald E. Frug, *The City as a Legal Concept*, 93 HARV. L. REV. 1057 (1980) (arguing that smaller jurisdictions allow for greater public participation in political processes).

[39] *See* Erwin Chemerinsky, *The Values of Federalism*, 47 FLA. L. REV. 499, 536 (1995) ("Safeguarding community decision making enhances diversity, as groups are allowed to decide their own nature and composition. Communities can define themselves to best serve the needs of their members.").

implement their views."[40] Moreover, from a purely political perspective, federal elections are not and cannot be about primarily local issues and concerns. And without that general political feedback, decision making at the federal level resides in administrative bodies with less direct accountability to affected parties. Aware of how these dynamics play out in the democratic process, some scholars have argued for a "rebuttable presumption" for local- or state-level regulatory authority, acknowledging that the presumption should be overcome when centralized (i.e., federal) action will yield better results.[41] Such a default rule would help prevent the unintended consequence of federal regulatory standards serving as a "ceiling" rather than a "floor," that is, discouraging state and local authorities from adopting measures that are more protective than the federal rules rather than preventing a regulatory race to the bottom.[42]

3. Who Pays?

Federal water quality mandates can create a significant mismatch between municipal capital budgeting resources and the priorities of citizens and taxpayers on whose behalf municipal expenditures are ostensibly made. Between 2002 and 2009, for instance, New York City "invested more capital funds in environmental protection than on other critical municipal functions, including education, transportation, and housing."[43] While New Yorkers certainly value water quality, they also value safety, affordable housing, and other public goods, and should have the ability to allocate scarce resources according to their priorities. With limited funds available and a long and growing list of overlapping urban sustainability (and other) priorities,[44] however, the question of *who* pays for *what* takes on added importance.

The majority of federal environmental mandates—including those imposed by the Clean Air Act ("CAA"),[45] the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA," or Superfund Act),[46] the Endangered Species Act,[47] the National Environmental Policy Act,[48] the Resource Conservation and Recovery Act ("RCRA")[49] and parts of the CWA—do not typically create "unfunded mandates."[50] To be sure, compliance with these

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[40] Ashira P. Ostrow, *Process Preemption in Federal Siting Regimes*, 48 HARV. J. ON LEGIS. 289, 304 (2011) (quotations omitted).
[41] Adler, *supra* note 34, at 139 (citing Richard L. Revesz, *The Race to the Bottom and Federal Environmental Regulation: A Response to Critics*, 82 MINN. L. REV. 535, 536–38 (1997) (arguing for a "rebuttable presumption in favor of decentralization" in environmental policy).
[42] *Id.* at 170–71.
[43] GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 15 (citing NYC Office of the Comptroller, *Comprehensive Annual Financial Report, Fiscal Years 2002–2009*).
[44] *See supra* Part I.A.1.
[45] 42 U.S.C. §§ 7401–7700 (2012).
[46] 42 U.S.C. §§ 9601–9675 (2012).
[47] 16 U.S.C. §§ 1531–1544 (2012).
[48] 42 U.S.C. §§ 4321–4370h (2012).
[49] 42 U.S.C. §§ 6901–6992k (2012).
[50] Some obligations imposed by CERCLA and RCRA are a notable exception in this regard, as municipalities may incur significant costs under both statutes to the extent that municipal landfills currently or formerly received hazardous wastes for disposal.

statutes can be costly, with some obligations running into the hundreds of millions or even billions of dollars,[51] but such costs are supposed to be outweighed by benefits at least at the general level, if not determined with specificity in particular cases.[52] At a theoretical level and in the private context, the "polluter pays" principle can be understood as a mechanism to simply recoup externalities that would otherwise unfairly subsidize firm profits.[53]

This rationale breaks down in the public, municipal context, where costs do not come from profits that would otherwise go to investors, but rather are passed on to local ratepayers and taxpayers.[54] Taking the analogy a step further, the practical effect of such unfunded mandates is to shift the costs of federal programs from the federal government to local governments and their tax bases. Since it is generally the case that federal taxes are progressive while local water rates are regressive (i.e., are the same per unit of water regardless of household income), such cost shifting to municipalities raises important issues with regard to affordability.[55] That is one reason a significant element of the 1972 CWA was the sixteen billion dollar initial authorization for the POTW Construction Grant program between 1972 and 1976,[56] with federal expenditures on POTWs growing from half a billion dollars per year in 1970 to a peak of six billion dollars per year in 1977.[57] And that is why the shift in the late 1980s to the Clean Water State Revolving Fund ("CWSRF") program, which provides low interest loans that nonetheless have to be repaid and add to municipal utility debt, contributed to a financial crisis with bankruptcies or near collapses related to wastewater mandates in Jefferson County, Alabama; Stockton, California; Detroit, Michigan; and other locations.[58] Reflecting this trend,

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[51] *See, e.g.*, DePalma, *supra* note 26 ("According to the E.P.A., more than 70 businesses will have to pay for the Passaic [River] cleanup [in northern New Jersey], which could cost more than $3 billion.").

[52] Title II of the Unfunded Mandates Reform Act of 1995, Pub. L. No. 104-4, 109 Stat. 49 (1995) (codified as amended at 2 U.S.C. §§ 1501–1571) requires that each federal agency conduct a cost-benefit analysis and select the least costly, most cost-effective, or least burdensome alternative before promulgating any proposed or final rule that may result in expenditures of more than $100 million (adjusted for inflation) in any one year by state, local, and tribal governments, or by the private sector. Each agency must also seek input from state, local, and tribal governments. The White House Office of Management and Budget reports on agency compliance in an annual report to Congress. *See* Office of Mgmt. & Budget, Office of Info. & Regulatory Affairs, Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities (2011), *available at* http://perma.cc/39-D9FW.

[53] *See* Jonathan R. Nash, *Too Much Market? Conflict between Tradable Pollution Allowances and the "Polluter Pays" Principle*, 24 Harv. Envtl. L. Rev. 465, 472–78 (2000) (discussing a range of "strong" and "weak" interpretations of the polluter pays principle).

[54] *See* Press Release, U.S. Conference of Mayors, Mayors Discuss Urgent Need for New Strategies as Clean Water Act Turns 40, (May 31, 2012), *available at* http://perma.cc/NX5-KKW2.

[55] *See* Nat'l Ass'n of Clean Water Agencies, Financial Capability and Affordability in Wet Weather Negotiations (2005), *available at* http://perma.cc/E8L8-9DUT.

[56] Winston Harrington & Peter Nelson, Resources for the Future, Public Treatment of Private Waste: Industrial Use of Municipal Wastewater Treatment 4 (2006), *available at* http://perma.cc/QA3Z-A97K.

[57] *Id.*

[58] *See, e.g.*, Mary W. Walsh, *In Alabama, a County that Fell Off the Financial Cliff*, N.Y. Times, Feb. 19, 2012, at B1 ("The county . . . is drowning under $4 billion in debt, the legacy of a big

the expansion of the NPDES program to include stormwater was not accompanied by a federal grants program to help municipalities defray the costs associated with required infrastructure improvements such as capital intensive CSO storage facilities.[59] This leaves local governments liable for the full cost of federally mandated infrastructure improvements, often with little or no flexibility in deciding how, where, and when to make needed investments. Unlike in other regulatory contexts, where environmental objectives are achieved within a cooperative federalism framework that emphasizes partnerships at least between federal and state authorities,[60] and sometimes, local authorities, EPA's stormwater program arguably treats municipal governments as polluters, not partners.[61]

B. New Thinking in Urban Sustainability

Robust theories of federalism in environmental law have proliferated for decades, with sophisticated arguments and counterarguments in favor of state or federal preeminence articulated by some of the nation's leading scholars.[62] Notably, there has not yet been a similar flowering of scholarship on federal-municipal governance, particularly when it comes to the regulation, environmental or otherwise, of urban landscapes.[63] Because in most states there are relatively few state regulatory authorities in the field of land use law, the direct interaction between federal regulatory agencies and local governments is thrown into starkest relief where federal environmental law bumps up against

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sewer project and corrupt[ion] . . . ."). Significantly, while the federal government gives grants to states, the State Revolving Funds principally make loans to municipalities; these loans have to be repaid and thus add to outstanding debt.

[59] *See* GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 37.

[60] For example, Title I, Part A, of the CAA requires EPA to establish National Ambient Air Quality Standards ("NAAQS") that set the maximum permissible levels of pollutants for which air quality criteria have been issued. 42 U.S.C. § 7409. States, in turn, are required to develop State Implementation Plans ("SIPs") to determine, based on local conditions and needs, how to implement the NAAQS and related requirements. 42 U.S.C. § 7410. Section 110 of the CAA provides the framework for SIP development and submission by States to EPA "within 3 years (or such shorter period as the [EPA] Administrator may prescribe)" of promulgation of a NAAQS. 42 U.S.C. § 7410(a)(1).

[61] Written Testimony, David Berger, United States Conference of Mayors Before the Water Resources Subcommittee — House Transportation and Infrastructure Committee, at 17–18 (July 25, 2012) ("The U.S. Conference of Mayors urges U.S. EPA to cease treating local governments as polluters, and instead work with local governments as partners in environmental and public health stewardship . . . .").

[62] *See, e.g.*, William W. Buzbee, *Contextual Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 108, 109–13 (2005) (examining common arguments in scholarly debates about environmental federalism); Daniel C. Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570, 599–605 (1996) (discussing the origins and state of the environmental federalism debate).

[63] Ostrow, *supra* note 24, at 1401–02 ("[T]he legal literature has yet to develop a robust theory of federalism to tie together the disparate strands of federal land-use law."). Notably, a significant body of scholarship has emerged around the Religious Land Use and Institutionalized Persons Act of 2000 ("RLUIPA"), which "scholars have repeatedly denounced . . . [as] a tool that religious individuals and organizations may use to thwart municipal zoning plans and to undermine local communities' land use needs." Bram Alden, *Reconsidering RLUIPA: Do Religious Land Use Protections Really Benefit Religious Land Users?*, 57 UCLA L. REV. 1779, 1779 (2010).

local land use controls.[64] These issues have come to a head in the context of municipal stormwater regulation because of the significant expenses involved, and because stormwater remedies can involve traditionally local regulation of land use. This Section discusses new approaches to federalism in light of urban sustainability initiatives.

1. Modular Environmental Regulation, Local Environmental Law

Environmental problems and natural resource management at the ecosystem or watershed scale tend not to lend themselves to neat jurisdictional divisions, whether among federal, state, and local agencies or the separate statutory mandates of, say, the CWA and the Safe Drinking Water Act ("SDWA").[65] Rather, complex regulatory challenges such as those presented by municipal stormwater management call for flexible multi-stakeholder approaches that prioritize creative problem solving at the local level over command-and-control permitting and penalties imposed from the top down.[66]

These ideas are not new. In 1993, Peter Lehner, then the Deputy Chief of the Environmental Law Division of the New York City Law Department, penned an influential article that called for greater emphasis on the municipal enforcement of federal environmental laws, pointing out that local governments often have greater incentives to act, better knowledge and flexibility to tackle the most pressing problems first, and the ability to respond more quickly than federal or state regulators.[67]

A few years later, the Yale Center for Environmental Law and Policy launched its "Next Generation Project," engaging students, regulators, business leaders, and a range of policy experts in a wide-ranging review of national environmental laws, which at the time were deemed to need an injection of new and different thinking.[68] Among its findings and recommendations, the Yale study concluded that "next-generation [environmental] strategies should be cooperative, not confrontational; comprehensive, not fragmented; and flexibly tailored to local contexts, rather than constrained by a 'one-size-fits-all' approach."[69]

In a 2005 article, Professors Jody Freeman and Daniel Farber dubbed this sort of approach a "modular" conception of environmental regulation, which in

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[64] Ostrow, *supra* note 24, at 1403 (citing Nestor M. Davidson, *Cooperative Localism: Federal-Local Collaboration in an Era of State Sovereignty*, 93 VA. L. REV. 959 (2007)).
[65] 42 U.S.C. §§ 300f–300j.
[66] *See, e.g.*, John R. Nolon, *In Praise of Parochialism: The Advent of Local Environmental Law*, 26 HARV. ENVTL. L. REV. 365, 371–72 (2002) ("Perhaps the recent advent of local environmental law . . . suggests a strategic solution to the problem of imposing federal environmental solutions on local and state land use decision-making."). *But see* Salkin, *supra* note 32 (examining the ongoing importance of a federal role in local land use planning).
[67] Lehner, *supra* note 6. Since 2006, Lehner has served as the Executive Director of the Natural Resources Defense Council, and previously served as Chief of the Environmental Protection Bureau of the New York State Attorney General's Office, among other positions.
[68] *See* THINKING ECOLOGICALLY: THE NEXT GENERATION OF ENVIRONMENTAL POLICY (Marian R. Chertow & Daniel C. Esty eds., 1997) (reporting the results of the Next Generation Project).
[69] Nolon, *supra* note 66, at 411.

their view should allow for a wide ranging, collaborative approach to problem solving, involving multiple levels of government as well as private actors.[70] This view stands in stark contrast to what has become the conventional wisdom on cooperative federalism and the environment, where the focus is on specific federal or state (rarely local) agencies that have specific statutory authority to regulate or otherwise manage specific environmental resources like air, water, or wildlife habitat. This specificity leads, in some cases, to "regulatory fracture," as "the diffusion of authority across agencies at all levels of government can result in a vacuum of leadership for larger, system wide problems" such as pollution or conservation at the level of a watershed, which may extend beyond the jurisdiction of a particular agency, or indeed, a single state or even country.[71]

The insights behind the theory of modular environmental regulation and the championing of "local" environmental law are, today, finding their greatest real-world expression in urban sustainability programs. The unique link between stormwater regulation and land use controls is particularly well suited to the sort of coordinated, flexible approach contemplated by these theoretical frameworks. Indeed, programs using green infrastructure for stormwater management provide a practical model for the integration of urban sustainability initiatives and federal environmental regulation.

2. *Agreement-Based Regulation at the Municipal-Federal Interface*

Closer coordination between city governments and federal regulators may in some cases be unnecessarily stymied because many regulatory regimes empower state officials with delegated federal authority and task them with direct implementation of federal programs, circumventing city officials. In certain instances this sub-delegation works well for municipalities, as state regulators can often be more attuned to local needs, especially since state-level officials are subject to some degree of political accountability from many of the same stakeholders and citizens, as are their municipal counterparts. The role for municipal actors is or should be especially large in those areas where federal environmental controls disproportionately affect local land use planning, since municipalities historically have had near-plenary authority to regulate land use.[72] The federal regulation of municipal stormwater management and CSO mitigation is one clear instance of such an area.

At the municipal-federal interface, where federal environmental standards bump up against local planning and zoning authority, coordination between cities and federal regulators may sometimes be difficult but can nonetheless, in certain circumstances, be catalyzed by the transformation of a "conflict into a set of questions about a problem."[73] In our current era of fiscal constraint, for

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[70] Jody Freeman & Daniel A. Farber, *Modular Environmental Regulation*, 54 DUKE L.J. 795, 798 (2005).
[71] *Id.* at 877.
[72] *See supra* note 31 and accompanying text.
[73] Freeman & Farber, *supra* note 70, at 878.

instance, the ongoing conflict between federal stormwater management mandates and local preferences and priorities has the potential to be transformed into new cooperative arrangements. Tight budgets, citizen engagement at the neighborhood and citywide levels, and a budding awareness of and interest in urban sustainability programs are all factors which are helping policy makers think about old problems in terms of new and different questions. EPA's Integrated Framework is only the most recent and visible manifestation of this changing dynamic.[74] In exploring cooperative arrangements between federal and municipal authorities, the Integrated Framework emphasizes several principles: a functional approach to problems; an agreement-based framework as opposed to an enforcement-oriented strategy; an emphasis on adaptive management and learning; and the involvement and participation of community stakeholders.

a. Agreements, Not Enforcement

Complex urban problems require government and regulatory structures in which "form follows function, such that institutional design can be consciously tailored to policy goals."[75] New York City's Green Infrastructure Plan takes a functional approach to CSOs, situating mitigation activities within PlaNYC's "holistic framework for meeting the City's . . . infrastructure needs over the next 20 years" with initiatives that "typically make progress toward several [sustainability] goals at the same time," creating an interagency partnership (the Green Infrastructure Task Force) to implement projects, authorizing a Green Infrastructure Fund, and launching a set of community partnerships to develop programs for the construction and maintenance of green infrastructure across the cityscape.[76]

The success of newer forms of environmental regulation involving cooperative arrangements between federal and municipal actors thus often depends in large part on the willing participation of a wide range of regulators, regulated entities, and other stakeholders whose agreement forms the basis for the coordination that must take place in order to achieve broad-based sustainability objectives. As Freeman and Farber point out in the context of the CalFed Bay Delta Program in Northern California:

> [A]greements, both formal and informal, appear more prevalent than rules, limits and prohibitions. Not that rules are unimportant. As agencies turn to implementation, they rely on their traditional regula-

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[74] Memorandum from Nancy Stoner, EPA Acting Asst. Admin. for Water, to EPA Reg'l Admin., Integrated Municipal Stormwater and Wastewater Planning Approach Framework 2 (June 5, 2012), *available at* http://perma.cc/5QGH-DUY4.

[75] Freeman & Farber, *supra* note 70, at 798. This functional approach to problem solving is necessary because extant institutions and rules are all too often "siloed" and inflexible, incapable of adapting to the more integrated planning paradigm necessary to achieve twenty-first century sustainability objectives such as those included in PlaNYC and other comparable planning frameworks.

[76] GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 11, 17.

> tory authority and will of course employ the conventional tools of regulation. But these are not the focus of discussion initially. Because modularity amounts to a movement toward agreement-based regulation and management, it shifts the regulatory spotlight to a host of instruments that do not generally attract much attention in either administrative or environmental law.[77]

These sorts of instruments and other more informal kinds of agreements operate in ways that are quite different from the rigid, judicially sanctioned consent decrees typically utilized in CWA enforcement proceedings; many such consent decrees have compelled city governments to take certain actions and spend specified sums according to a detailed timeline, leaving little room for adaptation, flexibility, or collaborative learning.[78]

Notably, the use of federal consent decrees is by no means limited to water quality enforcement, or even to environmental regulation more broadly. The U.S. Department of Justice ("DOJ"), for instance, makes extensive use of consent decrees to investigate and enforce certain mandates against local police departments found to have violated federal civil rights laws.[79] As in the case of CSO consent decrees, local law enforcement authorities have increasingly raised concerns about what they see as exorbitant costs, unreasonably high standards, unnecessarily adversarial rather than collaborative federal-municipal interactions, and inadequate measures to tell whether federal intervention is effective.[80] According to *The New York Times*, "federal intervention has become far more common and much broader in scope under the Obama adminis-

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[77] Freeman & Farber, *supra* note 70, at 881.

[78] To take just one example, a 2010 federal consent decree in Kansas City, Missouri mandated that the municipality conduct preventative maintenance on 283 miles of sewer per year regardless of need or cost. Consent Decree at 8, United States v. Kansas City, Missouri (W.D. Mo., May 18, 2010), *available at* http://perma.cc/4567-AK27. It should be noted here, however, that this consent decree also contains adaptive management and green infrastructure elements, and thus represents something of a transitional moment in EPA's approach to CSOs. As of this writing, it remains to be seen whether the new Integrated Framework will be fully operationalized at the regional and municipal level in a meaningful way.

[79] Civil rights violations by municipal law enforcement agencies are subject to oversight by DOJ pursuant to the Violent Crime Control and Law Enforcement Act of 1994 ("VCCLEA"), Pub. L. No. 103-322, 108 Stat. 1796 (codified as amended at 42 U.S.C. § 14141), the anti-discrimination provisions of the Omnibus Crime Control and Safe Streets Act of 1968, Pub. L. No. 90-351, 82 Stat. 197 (codified as amended at 42 U.S.C. § 3789d), and Title VI of the Civil Rights Act of 1964, Pub. L. No. 88-352, 78 Stat. 241 (codified as amended at 42 U.S.C. § 2000d). Under Section 14141 of VCCLEA, DOJ has the authority to file civil suits against local law enforcement agencies that engage in a pattern or practice of misconduct. DOJ is authorized under the Safe Streets Act and Title VI to sue law enforcement agencies that engage in discrimination if they receive federal funds. DOJ relied on all three of these statutes in a recent, high profile consent decree entered into with the New Orleans Police Department. *See* Press Release, U.S. Department of Justice, Justice Department Announces Consent Decree with City of New Orleans to Resolve Allegations of Unlawful Misconduct by New Orleans Police Department (July 24, 2012), *available at* http://perma.cc/5KJS-ZJEQ.

[80] Erica Goode, *Some Chiefs Chafing as Justice Department Keeps Closer Eye on Policing*, N.Y. Times, July 27, 2013, http://perma.cc/4CP4-F46C.

tration,"[81] a development that in some ways mirrors the increased reliance on consent decrees in the water quality context.

Crucially, agreement-based regulation ought not to serve as a smokescreen for wholesale deregulation or the piecemeal loosening of pollution standards, as some would prefer. Incorporating some much needed flexibility into environmental regulation and emphasizing coordination over conflict does not mean that polluters should be given free rein to self-police. Indeed, state and federal permitting authorities have an ongoing and important role to play in integrating new green infrastructure approaches to stormwater management into a variety of regulatory instruments used to ensure compliance with the CWA, including permits, consent decrees and Long-Term Control Plans ("LTCPs"),[82] which are mechanisms designed to facilitate and ensure municipalities' compliance with EPA's CSO Control Policy.[83] These authorities must also track and verify the extensive post-construction monitoring obligations that are built into those permits, consent decrees and LTCPs incorporating relatively novel green infrastructure components.[84]

b. Adaptive Management and Learning

Adaptive management has been defined as an approach in which "policy measures are understood as provisional and subject to modification in light of scientific advances and the results of rigorous monitoring."[85] Especially where complex urban planning and design considerations interact with ever-changing natural and biological processes, an adaptive management framework will likely yield better outcomes, at lower cost, than a traditionally rigid regulatory regime. Rather than "codifying existing knowledge in rules that are hard to change,"[86] adaptive management approaches to environmental regulation make use of learning, including social and community-based learning, to achieve desired results. The challenge of course is ensuring that regulatory structures are both responsive enough to learn and adapt while retaining the integrity necessary to function effectively.[87]

i. Community-Scale Participation

Broad, multi-stakeholder participation and accountability mechanisms, whether formal or informal, are hallmarks of the sort of agreement-based regulation being put into place at the municipal-federal interface to deal with complex contemporary challenges such as CSOs. Particularly in the case of green infrastructure systems, which involve distributed networks of green roofs, rain

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[81] *Id.*
[82] *See, e.g.*, *Green City, Clean Waters*, PHILADELPHIA WATER DEP'T, http://perma.cc/3463-ASRQ.
[83] *See infra* notes 120–26 and accompanying text.
[84] *See* EPA, CSO POST CONSTRUCTION COMPLIANCE MONITORING GUIDANCE (May 2012), *available at* http://perma.cc/9BE5-7XH3
[85] Bradley C. Karkkainen, *Collaborative Ecosystem Governance: Scale, Complexity and Dynamism*, 21 VA. ENVTL. L.J. 189, 202 (2002).
[86] *Id.* at 203.
[87] Freeman & Farber, *supra* note 70, at 888.

gardens, and cisterns that will be built near homes and businesses and are likely to be maintained in part by volunteers, local residents, or businesses, community participation is vital to the success of many new regulatory initiatives.[88] Moreover, community participation can help to inform the policy making process, often leading to shifts in strategy as new ideas and local knowledge "trickle up" to policy makers and regulators.[89]

II. The Clean Water Act, Stormwater Regulation, and Cities

A. Statutory Framework

Throughout most of U.S. history, water pollution control and associated land use regulation largely occurred at the local level.[90] This began to change in the early 1970s, as Congress enacted sweeping environmental statutes, including the Federal Water Pollution Control Act of 1972,[91] as amended by the Clean Water Act of 1977[92] and the Water Quality Act of 1987[93] (collectively, the Clean Water Act or "CWA"), designed to "restore and maintain the chemical, physical and biological integrity of the Nation's waters."[94] At the most basic level, the CWA is composed of two broad elements.

First, it provides a comprehensive statutory framework for regulating the discharge of pollutants into "navigable waters," which are defined broadly by statute and regulation to include a wide swath of tributaries and wetlands that may not fit within the normal English language meaning of the word "navigable."[95] For discharges from point sources such as pipes and sewers,[96] the

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[88] By no means does green infrastructure depend wholly on volunteerism. Many features of New York City's Green Infrastructure Plan, for instance, involve the installation of green swales and other streetscape modifications that are undertaken wholly by municipal agencies such as DEP. Green Infrastructure Plan, *supra* note 15. Nevertheless, especially as compared with traditional grey infrastructure, green infrastructure components do depend on a greater degree of private sector and community involvement. This dependency makes strong oversight, monitoring, and enforcement, if only as a backstop, particularly important.

[89] For a thoughtful discussion of these and other related issues, see generally Alexandra Dunn & Nancy Stoner, *From Rooftops to Rivers: Green Infrastructure Yields Economic and Environmental Benefits*, Am. Pub. Works Ass'n Rep. Online, Feb. 2008, http://perma.cc/HQQ9-HMDT; Alexandra Dunn, *Siting Green Infrastructure: Legal and Policy Solutions to Alleviate Urban Poverty and Promote Healthy Communities*, 37 Env. Aff. 41 (2010).

[90] *See* Jonathan H. Adler, *Fables of the Cuyahoga: Reconstructing a History of Environmental Protection*, 14 Fordham Envtl. L.J. 89 (2002); William L. Andreen, *The Evolution of Water Pollution Control in the United States—State, Local and Federal Efforts, 1789-1972: Part I*, 22 Stan. Envtl. L.J. 145 (2003); William L. Andreen, *The Evolution of Water Pollution Control in the United States—State, Local and Federal Efforts, 1789-1972: Part II*, 22 Stan. Envtl. L.J. 215 (2003).

[91] Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251–1387).

[92] Pub. L. No. 95-217, 91 Stat. 1566 (codified as amended at 33 U.S.C. §§ 1251–1387).

[93] Pub. L. No. 100-4, 101 Stat. 7 (codified as amended at 33 U.S.C. §§ 1251–1387).

[94] 33 U.S.C. § 1251(a) (2012).

[95] The CWA itself defines "navigable waters" as "the waters of the United States, including territorial seas." 33 U.S.C. § 1362(7). The Army Corps of Engineers has given the term more specificity, including tributaries and wetlands adjacent to navigable waters. 33 C.F.R. § 328.3 (1993); 40 C.F.R. § 230.3(s) (1993). In *Rapanos v. United States*, the Supreme Court addressed the constitu-

NPDES program requires facilities to obtain permits, issued either by EPA or state/tribal authorities, prior to discharge.[97] Such permits typically include a combination of technology-based and water quality-based pollution limits, as well as a set of monitoring and reporting requirements tailored to the specific facility and industry in question.[98] Second, and critically, the law initially provided funding to municipalities through a construction grant program to encourage them to build sewage treatment plants, also known as publicly owned treatment works ("POTWs").[99]

In addition to the NPDES program—which in 1987 was expanded to cover stormwater discharges—the CWA contains specialized provisions for the protection of wetlands,[100] estuaries,[101] and nationally significant bodies of water—such as the Chesapeake Bay, the Great Lakes, and Long Island Sound;[102] the prevention of oil spills from aboveground and underground storage tanks;[103] the pretreatment of indirect discharges of pollutants to POTWs;[104] the regulation of non-point source pollution;[105] and the establishment of total maximum daily loads ("TMDLs") of specified pollutants for impaired waters that do not meet the national goal of "fishable/swimmable" waters after the implementation of mandated pollution controls.[106]

Within the CWA's overall statutory framework, different programs and initiatives focus on different water quality problems, many of which affect munic-

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tional limits of the CWA's jurisdiction under the Commerce Clause by determining (in five separate opinions) whether a wetland or tributary is indeed a "water of the United States" and therefore subject to the CWA's Section 404 permitting requirements (governing the disposal of dredge or fill material). 547 U.S. 715 (2006); *see also* Memorandum on Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States* to the EPA & U.S. Army Corps of Eng'rs (June 5, 2007), *available at* http://perma.cc/US2L-D38G.

[96] EPA defines a point source as "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, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged." 40 C.F.R. § 122.2.

[97] The NPDES program is administered by EPA until a state, tribe, or territory successfully applies to administer the program according to federal standards. Where the administration has been delegated to the state, a permittee must obtain a State Pollutant Discharge Elimination System ("SPDES") permit in lieu of a federal (NPDES) permit. 33 U.S.C. § 1342(b). In this way, the structure of the CWA is one of "cooperative federalism." *See* ROBIN K. CRAIG, ENVIRONMENTAL LAW IN CONTEXT 677 (2d ed. 2008).

[98] *See* EPA OFFICE OF WASTEWATER MGMT., WATER PERMITTING 101 2–3, *available at* http://perma.cc/ZXV3-JT5V.

[99] Title II of the CWA (1972) provided for the original POTW construction grant program. 33 U.S.C. §§ 1281–1301. The Water Quality Act of 1987 replaced this program with the Clean Water State Revolving Fund ("CWSRF") program. 33 U.S.C. §§ 1381–87. For a discussion of the POTW construction grant program's funding levels over time, see Harrington & Nelson, *supra* note 56 and accompanying text.

[100] 33 U.S.C. § 1344.

[101] § 1330.

[102] § 1267; §1268; § 1269.

[103] § 1321.

[104] § 1317(b).

[105] § 1329.

[106] §1313(d). The "fishable/swimmable" goal is identified in Section 101 of the Clean Water Act. §1251(a)(2).

ipalities in particular ways. The non-stormwater NPDES program, for instance, covers both industrial and municipal facilities, but through the POTW construction grant program,[107] substantial federal assistance was initially made available to municipalities to help meet pollutant discharge standards. The stormwater program, however, stands out. The NPDES-related stormwater permit requirements distinctively "treat communities as polluters"[108] and impose huge costs directly on municipalities by requiring often-significant capital investments. Additionally, the stormwater program does not provide federal money to help defray municipal government expenditures associated with mandated infrastructure improvements. This combination—imposing high costs without providing financial aid—makes the federal regulation of stormwater under the CWA unusual.

B. Stormwater Regulation

Urban stormwater runoff has the potential to contain "suspended metals, sediments, algae-promoting nutrients (nitrogen and phosphorus), floatable trash, used motor oil, raw sewage, pesticides, and other toxic contaminants" into America's waters, particularly during the "first flush" from rain after a long dry period during which pollutants build up.[109] According to one recent estimate by EPA, such runoff contributes to pollution in approximately thirteen percent of all impaired rivers and streams, eighteen percent of all impaired lakes, and thirty-two percent of all impaired estuaries nationwide.[110] Yet EPA initially exempted stormwater discharges from NPDES permitting requirements,[111] treating stormwater as a form of non-point source pollution and thus (largely) not subject to regulation.[112]

This exemption was held unlawful by the U.S. Court of Appeals for the District of Columbia Circuit in 1977,[113] but EPA took only limited steps to regulate stormwater discharges. By the mid-1980s it was clear that stormwater (defined under current EPA regulations to include stormwater runoff, snow melt runoff, and surface runoff and drainage)[114] remained one of the leading causes of water pollution.[115] Responding to heightened public concern and ongoing litigation on the issue, Congress passed the Water Quality Act of 1987, amending the CWA to require NPDES permitting of stormwater discharges

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[107] *See* Harrington & Nelson, *supra* note 56.
[108] Salkin, *supra* note 32, at 281.
[109] Envtl. Def. Ctr., Inc. v. EPA, 344 F.3d 832, 840–41 (9th Cir. 2003).
[110] NRDC, ROOFTOPS TO RIVERS II 7 (2013) (citing EPA, REPORT TO CONGRESS ON THE PHASE I STORMWATER REGULATIONS 17 (2000)).
[111] *See* 40 C.F.R. §125.4 (1975).
[112] *See generally Envtl. Def. Ctr.*, 344 F.3d at 841, n.8 (citing Or. Natural Desert Ass'n v. Dombeck, 172 F.3d 1092, 1095 (9th Cir. 1998)). However, some types of stormwater, including agricultural runoff and discharges from small municipal separate storwater systems ("MS4s") outside urbanized areas, continue to be exempt from CWA regulation.
[113] Natural Res. Def. Council v. Costle, 568 F.2d 1369, 1379 (D.C. Cir. 1977).
[114] 40 C.F.R. § 122.26(b)(13).
[115] Envtl. Def. Ctr., Inc. v. EPA, 344 F.3d 832, 841 (9th Cir. 2003) ("In 1985, three-quarters of the States cited urban stormwater runoff as a major cause of waterbody impairment.").

from industrial facilities, municipalities, and other sources necessary "to protect water quality,"[116] as determined by EPA.

The 1987 CWA amendments set rigid timelines for EPA to promulgate new stormwater rules and to issue permits to dischargers. In a series of Ninth Circuit cases, environmental groups challenged EPA's rulemakings on a number of grounds, winning partial relief and compelling the agency to finalize and strengthen the rules in certain key respects.[117] EPA's Stormwater Phase I and Phase II Rules now require municipal separate stormwater systems ("MS4s")—serving large/medium and smaller municipalities, respectively—to obtain NPDES permits and achieve a set of stormwater management objectives using a range of best management practices.[118] The rules also apply to a wide variety of industrial and construction activities.[119]

In an acknowledgement of the unique stormwater management challenges confronting municipalities with CSS rather than MS4 infrastructure, in the early 1990s EPA launched an effort with a diverse set of stakeholders representing the utility industry and environmental groups (including the Association of Metropolitan Sewerage Agencies — subsequently renamed the National Association of Clean Water Agencies) to develop a consensus policy. The culmination of this effort was EPA's 1994 CSO Control Policy,[120] which set out broad parameters for both short- and long-term municipal regulatory and other activities to control CSOs. The 1994 CSO Control Policy defines a CSO as "the discharge from a CSS at a point prior to the POTW Treatment Plant," and specifies that CSOs "are point sources subject to NPDES permit requirements including both technology-based and water quality-based requirements of the CWA."[121]

However, rather than creating a single standard for CSO control to apply uniformly to municipalities across the nation, EPA "recognize[d] the site-specific nature of CSOs and their impacts and provide[d] the necessary flexibility to tailor controls to local situations."[122] The CSO Control Policy required municipalities to begin implementing "nine minimum controls" comprised of best management practices such as regular maintenance of CSS and public notification of CSO occurrences and impacts, which were understood to be low-cost

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[116] 33 U.S.C. § 1342(p)(3).
[117] Natural Res. Def. Council v. EPA, 966 F.2d 1292 (9th Cir. 1992); Defenders of Wildlife v. Browner, 191 F.3d 1159 (9th Cir. 1999); *Envtl. Def. Ctr.*, 344 F. 3d 832.
[118] EPA, National Pollutant Discharge Elimination System Permit Application Regulations for Stormwater Discharges (Phase I Rule), *available at* http://perma.cc/9V7J-AVBN; EPA, National Pollutant Discharge Elimination System—Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges (Phase II Rule), *available at* http://perma.cc/7MMQ-TNCC.
[119] *Id.*
[120] 59 Fed. Reg. 18688 (April 19, 1994). Congress amended the CWA in 2000 to require municipalities to comply with EPA's CSO Control Policy. *See* 33 U.S.C. § 1342(q). Notably, an appropriations bill directly translated EPA's CSO Control Policy into statute with very little discussion and limited input from stakeholders, including the municipal governments that would be most directly affected by the policy's new requirements. The policy would have benefited from a more thorough vetting through the rulemaking process.
[121] 59 Fed. Reg. 18688, 18689 (1994).
[122] *Id.* at 18688.

tasks that could begin immediately.[123] Separately, the CSO Control Policy required utilities to assess more costly capital projects in LTCPs, which were to phase any recommended construction over many years.[124]

By its terms, the CSO Control Policy grants municipalities latitude to work with NPDES permitting authorities and state regulators in both implementing the nine minimum controls and developing LTCPs, including by granting them the option of choosing between either a "presumption" or "demonstration" approach to compliance in any given LTCP.[125] EPA has expanded on this principle of flexibility by promulgating the Integrated Framework, which expressly acknowledges that the complex challenges facing municipalities today are ill-suited to an approach focused on "each CWA requirement individually without full consideration of all CWA obligations," leading to "the unintended consequence of constraining a municipality from addressing its most serious water quality issues first."[126] Recently, EPA took another step forward when it released a comprehensive planning resource to provide municipalities with tools to help quantify and better integrate green infrastructure elements into their CSO control plans.[127]

In theory, the Integrated Framework encourages a municipality's integrated plan to include NPDES requirements for separate sanitary sewer systems, CSS, MS4s, and POTWs, where appropriate,[128] and allows all or part of a plan to be incorporated into a single NPDES permit.[129] The Integrated Framework defines six overarching elements that should be addressed in every plan: (i) a description of issues to be addressed; (ii) a description of existing wastewater and stormwater systems; (iii) a stakeholder engagement and communication process; (iv) a process for identifying, evaluating, and selecting alternatives; (v) a monitoring and measurement plan; and (vi) a process for making modifications and improvements over time. It also provides for the incorporation of integrated plans into permits and enforcement actions by EPA and States.[130] EPA's Integrated Framework represents an important step in the direction of truly integrated planning and adaptive management to achieve long-term urban sustainability goals. In practice, however, EPA's approach to regulation under the CWA often involves forgoing or bypassing the permit process altogether, and regulating by inflexible consent orders. This is a severe limitation on the potential of the new Integrated Framework to catalyze meaningful changes in municipal stormwater and CSO management, including the

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[123] *Id.* at 18691.
[124] *Id.* at 18694.
[125] *Id.* at 18692–93.
[126] *See Integrated Municipal Stormwater and Wastewater Plans*, EPA.GOV (July 17, 2013), http://perma.cc/U9QZ-R7SH.
[127] EPA, GREENING CSO PLANS: PLANNING AND MODELING GREEN INFRASTRUCTURE FOR COMBINED SEWER OVERFLOW (CSO) CONTROL (March 2014), *available at* http://perma.cc/N8JM-6S6Z.
[128] Memorandum from Nancy Stoner & Cynthia Giles to EPA Reg'l Admin. (June 5, 2012), *available at* http://perma.cc/EFF2-KQWN.
[129] *Id.* at 6.
[130] *Id.* at 4–7. The Integrated Framework also contemplates the use of memoranda of understanding ("MOUs") for this purpose, but the approach remains untested as of this writing.

adoption of green infrastructure.[131] Moreover, because the Integrated Framework merely provides guidance and does not modify or replace any existing regulatory or permitting standards, some city officials may question whether EPA will simply reshuffle mandates for the installation of costly new infrastructure without adopting a holistic, flexible approach of alternative, cost-effective solutions.[132]

C. "Grey" Versus "Green" Infrastructure

1. What is Grey Infrastructure?

a. Basics

Until very recently, urban stormwater and sewer infrastructure has meant pipes and treatment facilities. For millennia, sanitation technology consisted of the collection, transportation, treatment, and disposal of wastewater to limit human contact with unsanitary conditions and prevent the spread of disease. Pipes, storage facilities, and POTWs are single-purpose stormwater infrastructure known by the shorthand of "grey infrastructure" to acknowledge the vast amounts of concrete and other materials with high embedded energy necessary in their construction. A wide range of grey infrastructure improvements are available to mitigate CSOs. Grey modifications to a CSS may include such items as new sewer systems designed to divert rainfall directly into waterways through permitted outlets; CSO storage facilities (tanks, tunnels, and retention basins); expanded wet weather capacity at POTWs; floatables control; and aeration and dredging.[133]

b. Costs and Benefits

The water quality benefits of traditional grey infrastructure can be enormous in areas and jurisdictions where wastewater would otherwise go untreated. Indeed, initial investments in such systems had high incremental gains, as measured by avoided health care and mortality costs, improved recreation and fisheries, or other benefits.[134] Yet much of the low-hanging fruit of health and welfare benefits has already been harvested and, in many localities, additional grey infrastructure improvements have diminishing marginal benefits. In

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[131] *See, e.g.*, Consent Decree, United States v. City of Youngstown, Ohio (N.D. Ohio, March 5, 2002), *available at* http://perma.cc/5JAJ-6K6B. A complete list of CWA consent decrees and settlements dating back to 1999 is available on the EPA website at http://perma.cc/44W3-LDCW.
[132] *See* Jeff Kray, *Cities Split on Whether EPA's New "Flexible" Stormwater Management Policy Will Save Money*, MARTEN L. NEWSLETTER, http://perma.cc/5MZC-L9S5.
[133] GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 37.
[134] *See* Richard Carson & Robert Mitchell, *The Value of Clean Water: The Public's Willingness to Pay for Boatable, Fishable, and Swimmable Quality Water*, 29 WATER RESOURCES RES. 2445, 2453 (1993) (finding that "the potential annual benefits of swimmable quality water in the nation's freshwater lakes, rivers, and streams are large and in excess of [the 1988] costs of the water quality improvement program," but that "total costs are projected to escalate well beyond total potential benefits owing to the higher marginal costs" of water quality improvements).

other words, additional separated sewers or CSO storage facilities are often far less cost-effective than the first generation of grey infrastructure.

2. What is Green Infrastructure?

a. Basics

"Green infrastructure" is a network of approaches and technologies that, taken together, mimic, maintain, or restore natural hydrological features to allow for the infiltration, evapotranspiration, capture, and reuse of stormwater that would otherwise be dealt with via traditional forms of grey infrastructure.[135] Green infrastructure "uses vegetation and soil to manage rainwater where it falls."[136] Green infrastructure approaches and technologies make use of "soils and vegetation rather than traditional hardscape collection, conveyance, and storage structures,"[137] and can include items such as "green roofs, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, vegetated median strips[,] . . . permeable pavement, and rain barrels and cisterns."[138] When implemented at sufficient density, green infrastructure can prevent or delay the entry of stormwater runoff into the sewers, thereby reducing CSOs and creating a range of other benefits.

b. Water Quality Benefits

Green infrastructure reduces peak flows of stormwater runoff during and after wet weather events by filtering water through vegetation, soils, and other natural or artificial media. By recharging groundwater or slowing the release of runoff to surface waters, this filtration effect has been shown to significantly reduce both the numbers and volumes of CSOs and their associated water pollution effects.[139] Because green infrastructure has the potential to achieve some of the same water quality results as more traditional grey infrastructure approaches, the implementation of certain green infrastructure approaches and technologies may enable city governments to downsize or eliminate grey infrastructure components that would otherwise be mandated under their LTCPs and consent orders.[140]

c. Other Co-Benefits

In 2007 EPA's Assistant Administrator for Water enumerated many of the most widely acknowledged co-benefits of green infrastructure. These include:

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[135] *See* Michael Sullivan et al., *Green Infrastructure and NPDES Permits: One Step at a Time*, 101 WATER ENV'T FEDERATION PROC. 7801 (2010).
[136] *Green Infrastructure*, EPA.GOV, http://perma.cc/B5SH-YHAU.
[137] Memorandum from Benjamin Grumbles, EPA Asst. Admin. for Water, to EPA Reg'l Admins., Using Green Infrastructure to Protect Water Quality in Stormwater, CSO, Nonpoint Source and other Water Programs 1 (Mar. 5, 2007), *available at* http://perma.cc/3CMX-2AHX.
[138] *Id.*
[139] EPA, COMBINED SEWER OVERFLOWS 2–3, *available at* http://perma.cc/55VY-RBAA.
[140] *See id.* at 2.

- Enhanced water supplies via groundwater recharge;
- Cleaner air via the filtration of airborne pollutants by trees and vegetation;
- Reduced urban temperatures via increasing shade and reducing the amount of heat absorbing materials;
- Increased energy efficiency by shading and insulating buildings, reducing the energy needed for heating and cooling; and
- Community benefits such as improved urban aesthetics and the availability of recreation and wildlife areas, which can improve quality of life and raise property values.[141]

Notably, two important co-benefits of green infrastructure not included in the 2007 EPA memo are climate change mitigation and adaptation, where the federal government has struggled to gain traction. In contrast, adapting to and mitigating climate change are specifically adopted as goals in New York City's PlaNYC as well as its Green Infrastructure Plan.[142]

d. Costs

The costs of green infrastructure installation and maintenance vary widely, depending in large part on the features utilized, the labor and materials costs, and whether projects are implemented on public streets and rights-of-way or at buildings and other facilities.[143] Although the co-benefits of green infrastructure are harder to quantify than the immediate costs associated with the construction and installation of grey or green infrastructure features, they have been estimated with increasing rigor and precision by municipal governments.[144]

In addition to its co-benefits, green infrastructure "may save capital costs" as compared to construction, operation, and maintenance expenses associated with grey infrastructure, including but not limited to "digging big tunnels and stormwater ponds, . . . energy costs for pumping water; and costs of wet weather treatment and of repairing stormwater and sewage pollution impacts, such as streambank restoration."[145] As with grey infrastructure, however, green infrastructure's costs are likely to be both program- and site-specific, and to fluctuate to greater and lesser degrees depending on local conditions.

D. Comparing Federal and Local Approaches

1. Federal "Silos," Local Flexibility

The U.S. Conference of Mayors has characterized EPA's approach to stormwater in terms of a "rule-by-silo/command-and-control" regulatory strat-

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[141] Memorandum from Benjamin Grumbles, *supra* note 137, at 2.
[142] *See* GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 26.
[143] *See id.* at 22–23 (discussing green infrastructure cost estimates and modeling assumptions).
[144] *See infra* note 164 and accompanying text.
[145] Memorandum from Benjamin Grumbles, *supra* note 138.

egy.[146] Historically, this approach has meant that EPA tended to impose its environmental compliance mandates in a rigid, time-bound manner and on a narrow, statute-by-statute basis, for instance with little regard to the often significant spillover effects between overlapping CWA and SDWA compliance activities.[147] There is a growing disconnect between the federal government's enforcement-oriented approach to stormwater management and the more integrated approach being championed by a number of American cities which focuses on long term investments in both green and grey infrastructure.

With scarce public resources available for infrastructure investment at all levels of government, federal regulators can and should prioritize partnerships with municipalities that have already put in place comprehensive plans to prioritize investments and address the most critical needs identified at a local level. Indeed, EPA's Integrated Framework takes some meaningful steps to operationalize and facilitate such municipal-federal cooperation.[148] Unfortunately, however, the message seems not to have gotten through to many of those on the front lines of federal enforcement efforts.

There is a clear gap, for instance, between the approach taken in many of EPA's recent wet-weather consent decrees and the agency's widely touted reform efforts, including the Integrated Framework. "Siloed" laws, regulations, and programs that eschew comprehensive planning perpetuate this gap. For example, EPA's Office of Compliance and Enforcement has focused on reducing CSOs and other sources of sewage remaining after utilities have complied with the secondary treatment standard without reference to public health impacts or costs, let alone whether such reductions are necessary to meet existing water quality standards.

Bypassing the normal CWA permitting process (which is largely implemented by the States and may be better able to integrate adaptive management approaches to green infrastructure), EPA and the Department of Justice have pushed municipalities into a series of consent decrees with rigid compliance schedules that micro-manage local budgeting and usurp local authority to regulate land use.[149] While consent decrees are, by their nature, legal agreements entered into with the consent of *both* parties, they remain a formal and relatively rigid judicial remedy that precludes some of the flexibility that municipalities need to effectively manage and maintain green infrastructure over the medium- to long-term.[150]

In contrast to this still dominant approach to municipal stormwater regulation, many elements of a recent agreement between New York City and New York State follow flexible, adaptive management principles and incorporate

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[146] Berger, *supra* note 61, at 2.
[147] *See id.* at 17.
[148] *See Integrated Municipal Stormwater and Wastewater Plans*, *supra* note 126.
[149] *See, e.g.*, Consent Decree, *supra* note 78.
[150] *But see* EPA, *supra* note 127 and accompanying text (discussing EPA's recent "Greening CSO Plans" guidance document as an indication of the agency's increasing commitment to helping municipalities—including those against which enforcement actions are brought—meet CWA and CSO Control Policy requirements with green infrastructure).

green infrastructure goals as cost-effective methods to reduce wet weather pollution while providing many other important benefits to the City.[151] These principles and goals are also emphasized in the Integrated Framework, which acknowledges the fact that municipal governments are by their very nature more flexible and responsive than federal regulators can be to local needs and preferences and, in some cases, more attuned to environmental conditions on the ground.[152]

2. Goal Setting and Trade-Offs

Under the traditional federal approach to stormwater regulation, goals are rigid and trade-offs between "siloed" programs and initiatives are difficult to consider in any meaningful way. Constrained by the statutory text passed by Congress, in some cases more than four decades ago, EPA has only limited flexibility to balance competing objectives or set priorities within or among programs. The CWA's overarching goal of "restor[ing] and maintain[ing] the chemical, physical and biological integrity of the Nation's waters"[153] has been operationalized over the years through a wide variety of regulatory initiatives including, as of 1987, the incorporation of stormwater discharges in the NPDES program and, after 1994, the application of EPA's CSO Control Policy to CSO discharges.

Recently, EPA has moved away from its traditional approach, expressly encouraging a more integrated approach to goal-setting in its 2012 Integrated Framework. While stopping short of allowing municipalities complete discretion in picking and choosing among goals that extend beyond the statutory mandate of the CWA itself, EPA did indicate that its new framework should "allow a municipality to balance CWA requirements in a manner that addresses the most pressing public health and environmental protection issues first."[154] This represents a real shift in both tone and substance for EPA. While it is too soon to tell, as of this writing, whether the Integrated Framework will make a meaningful difference in EPA's regional and enforcement offices, the mere promulgation of such a directive indicates a new openness to more flexible goal-setting in the context of wastewater and stormwater management.

Perhaps by virtue of the fact that city governments are less constrained by narrow statutory mandates than is EPA, municipal sustainability initiatives such as PlaNYC and New York City's Green Infrastructure Plan are able to expressly contemplate complex trade-offs among disparate goals and to establish priorities on the basis of local preferences and needs.

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[151] *See infra* Part III.

[152] *See supra* notes 125–30 and accompanying text. It remains to be seen, of course, whether EPA's new Integrated Framework will lead to real and meaningful changes in federal enforcement of the CWA vis-à-vis municipal stormwater management and CSO mitigation.

[153] 33 U.S.C. § 1251(a).

[154] *See* Memorandum from Nancy Stoner, *supra* note 74.

3. Cost-Effectiveness

Not only can municipal sustainability plans set goals that are more responsive to local concerns than federally mandated compliance actions, but they may also be able to achieve equivalent or even identical results in a more cost-effective manner than plans developed pursuant to federal enforcement. Of course, EPA's CSO Control Policy contemplates thoughtful cost-benefit analysis of grey infrastructure improvements such as new CSO detention facilities, but all too often this analysis is not undertaken in practice.

At the front line of the federal/municipal interface, EPA compliance and enforcement staff often pushes for the greatest reduction in CSO frequency and volume without regard for costs or relative benefits compared to mitigation of other point and non-point sources of water pollution. Even if municipalities achieve state water quality standards, there is often added pressure to achieve "swimmable" water quality in every water body, including industrial and urban waters where such recreation is unlikely to occur. Unfortunately, this approach has often resulted in consent decrees that ignore the high costs imposed on cities and do not assess or quantify the value of marginal benefits expected to accrue to city residents and ratepayers. Additionally, EPA or States require LTCPs to enumerate specific compliance benchmarks that may only be modified by subsequent written agreement and judicial approval.[155] These benchmarks are tied to the achievement of specific water quality objectives, and are typically established with little or no regard for cost.

A handful of LTCPs promulgated by municipalities pursuant to more recent federal consent decrees do incorporate flexible compliance schedules and green infrastructure features that help mitigate costs.[156] Notwithstanding these new developments and the encouraging language on cost containment in EPA's Integrated Framework, the federal approach to stormwater is relatively agnostic on cost.[157] By comparison, integrated urban sustainability plans adopted at the municipal level go much further to expressly tackle the cost issue.[158] For example, New York City's 2010 Green Infrastructure Plan includes a careful accounting of the costs and benefits of several different future investment scenarios, including the construction of new CSO containment tanks and tunnels and a more limited roster of cost-effective grey infrastructure investments.[159]

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[155] *See, e.g.*, N.Y. Dep't of Envtl. Conservation, Order on Consent (March 8, 2012), *available at* http://perma.cc/JHX6-WKHN.
[156] One of the most notable examples is Philadelphia's "Green City, Clean Waters" program. *See Green City, Clean Waters*, *supra* note 82.
[157] *See* 33 U.S.C. § 1342(q).
[158] *See, e.g.*, GREEN INFRASTRUCTURE PLAN, *supra* note 15.
[159] *Id.* at 19–33.

4. Innovation

Constrained by rigid statutory mandates, top-down management structures, and decades of accumulated rules, regulations, interpretations, and practices, the federal enforcement of environmental laws may be less amenable to innovation than analogous programs at the state or municipal levels. For good reasons, federal regulators must implement programs that have been carefully designed to comply with the authority granted to them by Congress in enumerated statutes. Moreover, some scholars have argued that "contemporary environmental regulation and natural resource management have been shaped by a legal regime that too often promotes the careful hoarding of information [by "siloed" federal and state regulators] and fails to build in mechanisms for environmental agencies to learn from their actions," further stymieing innovative thinking.[160]

These limitations are much less severe at the municipal level, where officials can experiment with initiatives—sometimes on a trial or pilot-program basis—that respond to community preferences and solve local, site-specific problems but would be impractical if introduced first by federal regulators on a nationwide or even regional basis. PlaNYC is a good example of how cities can pioneer innovative solutions to complex environmental, economic, and urban planning problems such as CSOs.[161] By creating a policy framework and institutional architecture to support a comprehensive long-term sustainability plan, including broad goals, frequent reporting, and accountability to voters, New York City was able to create a "sweeping plan [across a range of different agencies and programs] that [will guide] the city's growth over the next 25 years."[162] This plan situates its CSO mitigation plans within the context of a broader set of urban sustainability objectives and uses innovative green infrastructure management tools to achieve results. Not coincidentally, many of the green infrastructure innovations pioneered by cities are now making their way into federal programs and initiatives such as the Integrated Framework.

III. Case Study: New York's March 2012 CSO Consent Order

On March 13, 2012, the New York State Department of Environmental Conservation ("DEC") and the New York City Department of Environmental Protection ("DEP") reached an historic agreement to reduce CSOs through a cost-effective combination of grey and green infrastructure. After negotiating for more than a year, the two parties were able to reach agreement on a revised consent order that will reduce CSOs by approximately twelve billion gallons annually by 2030, approximately two billion gallons more than a prior plan that

[160] Freeman & Farber, *supra* note 70, at 883.
[161] PlaNYC, *supra* note 3.
[162] ICLEI, *supra* note 10, at 46.

relied completely on traditional grey infrastructure.[163] The NYC Green Infrastructure Plan is projected to cost ratepayers approximately $2.4 billion less than the grey infrastructure plan it replaced.

The agreement includes a commitment to build $2.9 billion in cost-effective grey infrastructure as well as $2.4 billion in green infrastructure over twenty years. DEC also agreed to defer or postpone $3.4 billion in grey infrastructure spending for additional storage tunnels and holding tanks.[164] The revised order has been celebrated by all parties because it benefits both DEC and New York City: water quality in New York City's harbor will be higher than it would have been under the traditional "grey" plan at a lower cost to New Yorkers.

The consent order is structured in a way that allows the City to use an adaptive management approach to achieve compliance. Unlike many other consent orders that require specific investments on strict timelines, this agreement sets broad performance goals and allows city officials to determine how to meet them. Regarding green infrastructure, by 2015 the City has agreed to control the stormwater generated by one inch of precipitation on 1.5 percent of the impervious surfaces in combined sewer areas.[165] The milestones established in the order require the City to increase the amount of stormwater managed at specified intervals: four percent by 2020; seven percent by 2025; and ten percent by 2030.[166] To achieve these goals, the City is pursuing a multi-pronged strategy building green infrastructure on public property, establishing new stormwater control requirements for new private and public construction, and funding the retrofitting of existing buildings with green infrastructure.

For the first milestone, if the City fails to meet the 1.5 percent goal in 2015, the State will consider whether there was a good faith effort to launch the program, including consideration of whether the City has effectively committed $187 million in public funds to build green infrastructure in specified drainage areas.[167] For later milestones, the City will work with DEC to submit contingency plans, on a rolling basis, which are to include specific green infrastructure projects "sufficient to make up the shortfall in CSO volume reduction from [each] previous 5-year implementation period," along with forward-looking

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[163] N.Y. Dep't of Envtl. Conservation, *supra* note 155, at 11. The Green Infrastructure Plan, significant elements of which are incorporated by reference directly into the consent order, states that "over 20 years . . . [it] will reduce CSO volumes from approximately 30 billion gallons a year ["bgy"] to approximately 17.9 bgy. This is nearly 2 billion gallons lower CSO volume per year than would be achieved by the Grey Strategy." GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 8.

[164] Separately from the March 2012 consent order, DEP estimated that the "accumulated sustainability benefits" of its Green Infrastructure Plan over twenty years, including the co-benefits enumerated above, would range from $139 million to $418 million (in 2010 dollars), depending in large part on the amount of vegetation used in the installed infrastructure features. GREEN INFRASTRUCTURE PLAN, *supra* note 15, at 26–29.

[165] N.Y. Dep't of Envtl. Conservation, *supra* note 155, at 9.

[166] *Id.* at 11.

[167] *Id.* at 10.

implementation schedules.[168] These milestones are also accompanied by a series of program evaluation requirements to ensure that the City stays on track over the coming decades. This flexible compliance standard is beneficial for both parties because it allows the City to try new approaches as quickly as possible, accounts for challenges that DEP may encounter installing green infrastructure in the City's ultra-urban environment, and gives DEC robust enforcement powers—but not the draconian penalty schedules that have been a hallmark of typical state and federal consent decrees.[169]

The green infrastructure consent order crafted by New York City and New York State is a critical and groundbreaking test case of adaptive management. The flexibility inherent in the adaptive management approach is a necessary component of the successful implementation of green infrastructure systems. Since many of these methods have never been tested, iterative monitoring and redesign will be required and must be encouraged. The try-and-try-again approach is particularly important in New York City, with its wide variety of development, land use, and geology, which will require many and varied types of green infrastructure systems for all parts of the combined sewer system. For example, some areas in the Bronx have high bedrock, making them less amenable to retention systems such as bioswales and better suited for green roofs and detention systems. To assess the effectiveness of green infrastructure in some of these areas, the City has agreed to test different green infrastructure systems on a large scale through two demonstration projects in the Bronx River and Newtown Creek watersheds.[170] The City has installed monitoring equipment in these demonstration areas to determine flow before rolling out green infrastructure across an entire drainage area.[171] Results from these pilot areas will drive drainage area-wide investment decisions and provide a wealth of original data for future use throughout the City and in similarly dense urban areas across the country.

These data will eventually contribute to LTCPs that define what New York City will construct to achieve full water quality compliance in ten combined sewer drainage areas and for a citywide LTCP. These LTCPs will be developed with public input between 2013 and 2017, and the City is committed to implementing the terms of this agreement in the most transparent way possible.[172] In early June 2012, the City held the first of many LTCP public participation meetings, and continues to solicit community input and involvement while

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[168] *Id.* at 12.

[169] For example, an April 2013 consent decree between EPA, the City of Seattle, and King County, Washington imposed $750,000 in penalties to be paid to the state and federal governments. *Seattle, Washington and King County, Washington Settlement*, EPA.GOV (April 16, 2013), http://perma.cc/FH63-FLDG.

[170] N.Y. Dep't of Envtl. Conservation, *supra* note 155, at 5.

[171] *See id*. at Appendix A.

[172] DEP has created a website to provide public access to information relating to the development of its LTCPs and enable public participation in the process. *See Reducing Combined Sewer Overflows in NYC – DEP's Long Term Control Plan*, DEP, http://perma.cc/U9TT-B972.

sharing information about progress on project construction.[173] In LTCP modeling workshops held in 2012 and 2013, city and state officials presented models and proposed baseline assumptions for evaluating the benefits of CSO control alternatives.[174] The LTCPs will bolster the adaptive management approach laid out in other planning frameworks such as PlaNYC and the City's Green Infrastructure Plan by obligating the City to dedicate specific resources to CSO infrastructure, but allowing the community and City to collaborate and develop the most appropriate, effective, and cost-efficient uses for those resources.

The City also agreed to maintain and expand the existing Green Infrastructure Grant Program for three years.[175] The grant program is a distinctive component of the agreement because it provides a way for the City to fund the construction of green infrastructure systems on existing private residential and commercial properties, which covers a significant portion of the urban landscape and would otherwise not be reached by regulations that govern new construction or programs for funding green infrastructure in the public right-of-way and on other public property. In addition to the sustainable benefits of green infrastructure discussed above, projects in the grant program provide many additional benefits to the city including educational opportunities, research and monitoring information, and innovative designs. The grant program also helps the City to get a better return on its investments. To date, the grant program has awarded over eleven million dollars to twenty-nine recipients such as the Natural Resources Defense Council, the Bronx Zoo, and the New School, and has leveraged over five million dollars in private funds.[176]

Moving forward, the new agreement sets a collaborative tenor in the relationship between New York City and State. Both DEP and DEC agree that it is in their mutual interest to structure agreements that hold regulated entities to high performance standards and maintain their ability to make decisions that best suit local conditions, operations, and budget constraints.[177]

Moreover, the agreement may provide significant data and a set of "best practices" that can be replicated by other municipalities, at other scales, around the country and around the world. DEP and DEC officials are keenly aware of New York City's de facto leadership position as a policy laboratory for urban regulatory innovation. Indeed, one of former Mayor Bloomberg's first acts after leaving office was the establishment of a new consulting venture, staffed in part by former City officials, to help municipal governments adopt a variety of innovative policies first pioneered in New York.[178] While certain green infrastructure features developed in the context of dense urban development in Brooklyn

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[173] *Id.*
[174] *See LTCP Citywide Meetings*, DEP, http://perma.cc/6FJF-3BCD
[175] N.Y. Dep't of Envtl. Conservation, *supra* note 155, at 8.
[176] *See Grant Program for Private Property Owners*, DEP, http://perma.cc/N3ZP-BKXF.
[177] *See* Press Release, N.Y. Dep't of Envtl. Conservation, NYSDEC & NYCDEP Announce Groundbreaking Agreement to Reduce Combined Sewer Overflows Using Green Infrastructure in New York City (March 13, 2012), *available at* http://perma.cc/938B-B8AR.
[178] *See* Ed Hammond, *Bloomberg Consultancy to Keep Spreading the Views*, FT.COM, Dec. 15, 2013 (on file with the Harvard Law School Library).

may not be appropriate for suburban Boise or Burbank, others may be suitable for adoption in a range of municipalities. New York City's Green Infrastructure Program, which includes policies and initiatives that extend beyond those mandated by the 2012 DEP-DEC agreement, provides a wealth of information that can be used by other cities to craft their own approaches to stormwater management and CSO control.[179]

Conclusion

Unlike the early days of the CWA, when nearly all communities nationwide faced similar challenges in meeting basic secondary treatment standards for sewage, today a variety of problems such as stormwater pollution, CSOs, nutrients, and emerging pollutants threaten efforts to maintain and further improve the relatively high standard of water quality that many cities have achieved. The ongoing and projected impacts of climate change will further exacerbate these threats in the coming decades. Over the same period, the replacement of treatment plant equipment dating from the 1970s and 1980s, along with sewers and conveyance systems many decades older, is projected to cost billions. Local communities can legitimately choose to prioritize their investments to address any one or combination of these threats. And since the federal government has essentially ended federal investment in water infrastructure, financing for this infrastructure is entirely the responsibility of local taxpayers and governments. This reality is increasingly at odds with the CWA enforcement approach of the federal government, which typically seeks to impose uniform, one-size-fits-all standards on disparate communities. Not only do such efforts over-simplify the complex, location-specific threats to water quality, but also they severely constrain or wholly override the choices of those who foot the bill, leading at best to inefficient resource allocation and at worst to resentment and outright resistance.

This Article has suggested how the federal government may work more effectively and collaboratively with local governments to improve water quality across the country, particularly in urban areas. One promising trend is the use of green infrastructure to reduce CSOs and other forms of stormwater pollution. Where appropriate, such water quality investments create other benefits to communities, fit well with broader sustainability initiatives, and enjoy widespread support. The example of New York City shows that green infrastructure programs can be incorporated into consent orders with reportable milestones and an adaptive management structure.

In a related development, EPA has tentatively acknowledged that its Integrated Framework could, in theory, allow municipalities to prioritize CWA investments. To successfully account for variation in local needs and legitimate choices about how to allocate scarce resources, the Integrated Framework should be expanded into a set of comprehensive, municipally-led plans to pri-

[179] *See NYC Green Infrastructure Program*, DEP, http://perma.cc/93KM-4M6A.

oritize infrastructure investments that improve public health and the environment while generating other valuable co-benefits across a range of quality of life indicia. By better aligning accountability for investment decisions with regulatory planning at the municipal level, an expanded Integrated Framework would lead to more efficient allocation of resources, more "ownership" and engagement of the local ratepayers who pay for CWA programs, investments that are better tailored to local conditions, innovative ideas that seek to maximize positive externalities rather than simply comply with pollution minimization, and less resentment towards one-size-fits-all regulations that are the product of a myopic, national perspective. As with the groundbreaking green infrastructure order developed by New York City and State, a strong federal or state role would remain in making sure that such plans have a solid scientific, data-based foundation, and that milestones (and the penalties imposed for failing to meet them) are structured in a way that encourages innovation and focuses on results.