



The Research Bureau

# EPA Stormwater Regulations in Worcester: Will Ratepayers be Drained?

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## EXECUTIVE SUMMARY

Worcester faces a new stormwater discharge permit requirement from the EPA, one that is expected to impose stricter water quality standards on the city's stormwater management operations. Compliance costs have been estimated at over a billion dollars, all of which must be borne by local ratepayers, as there is no other source of funds available to fund the cost of compliance. The EPA disputes this estimate, claiming that the permit's cost will be below \$20 million. But the EPA does maintain that stricter stormwater discharge standards will be necessary in order to fulfill the Federal Clean Water Act's mandate.

The purpose of this report is to explain the stormwater regulations controversy in Worcester and to suggest policy improvements at the Federal, state and local level.

Key findings include:

- City officials argue that the EPA should explicitly limit Worcester's liability to reduce stormwater pollution to the "maximum extent practicable." This phrase is included in the Clean Water Act as the statutory standard for pollution removal by municipal stormwater systems and was the governing standard of Worcester's prior stormwater discharge permit. It is included in the draft permit from the EPA, but city officials believe that its force is ambiguous.
- Worcester's sewer bills have increased about 200% over the last decade. During the same time, property tax bills have increased 50%.
- The main cause of this increase in sewer fees is EPA regulations on local wastewater management operations. Stormwater and wastewater discharge permits are unfunded mandates, meaning there is no significant Federal or state source of funding for the cost of compliance. Hence local officials' concern about the potential impact on ratepayers' sewer fees of impending discharge permits.
- Much uncertainty clouds the future of stormwater regulation in Worcester. The costs of EPA stormwater regulations are disputed, the effectiveness of various techniques in measurably reducing stormwater pollution are unknown, and it is unclear if the community has the will and/or ability to pay for stricter Federal environmental mandates.

How to improve stormwater management policy in Worcester? The Research Bureau makes the following recommendations:

- *The EPA should make "maximum extent practicable" the governing standard of Worcester's stormwater discharge permit.* (p. 13-14)
- *The EPA should enhance its efforts at civic education.* (p. 14-16)

- *The DEP should consider tiered designated uses for bodies of water.* (p. 16)
  - *The City should continue to explore green infrastructure approaches to stormwater management and implement them where appropriate.* (p. 16-18)
  - *Worcester should consider establishing a utility district.* (p. 18)
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## INTRODUCTION

The EPA is expected to issue Worcester a new stormwater discharge permit requirement some time within the next several months. Local officials have protested strenuously against the draft permit, claiming that it will require expensive upgrades to produce marginal improvements in water quality. Stormwater discharge regulations are unfunded mandates, meaning that no significant source of Federal or state funding is available to fund the cost of complying with them. The City's environmental consultant estimated that the cost of fully complying with the new permit's requirements could be over \$1 billion, bringing annual residential sewer bills to over \$1,000. This estimate was based on the need to construct so-called end-of-pipe treatment facilities, which city officials believe is the only certain way to conform to the new permit's water quality standards. The EPA disputes the City's cost estimates, claiming that the permit will cost around \$18 million. But the EPA does maintain that stricter stormwater discharge standards will be necessary in order to fulfill the Federal Clean Water Act's mandate.

Over the past decade, Worcester sewer bills have increased by about 200%, while property tax bills have gone up 50%. This increase has been largely due to costs associated with other, recent EPA regulations. At present, in addition to the impending stormwater permit, Worcester ratepayers face the costs of an estimated \$180-200 million in upgrades to the Upper Blackstone Water Pollution Abatement District wastewater treatment plant, where Worcester and eight other neighboring communities treat all their sewage and wastewater.

Stormwater management is an arcane and complicated public policy issue, many aspects of which can be understood only by environmental engineers. But non-engineers should develop at least a partial understanding of it, because of the costs involved and its potential implications for other issues such as economic development and public finance. Ultimately, of course, all questions of environmental policy are political decisions. Citizens and their duly elected political officials, not scientists and engineers, hold the final responsibility for deciding how to reconcile the goods of disciplined public spending, economic development, and environmental health. Underlying the debate about stormwater regulations are

several basic questions common to any debate about environmental policy, such as: How can political authorities reconcile conflicting claims about scientific evidence? How clean do we want our environment to be, and at what cost?

## THE BASICS OF STORMWATER MANAGEMENT POLICY

Urban stormwater runoff is caused by precipitation that falls on impervious surfaces such as streets, sidewalks, parking lots, and roofs. Traditionally understood, stormwater management is flood and drainage control, a basic service provided by municipal government. Unlike wastewater, most stormwater is not treated. It is simply diverted as quickly and unobtrusively as possible into storm drains, through underground pipes, and then into the nearest body of water. In the process, the runoff picks up oil, sediment, pathogens, and other contaminants, all of which it transmits into receiving waters. In 1987, Congress authorized the EPA (and state environmental agencies delegated with authority to administer the Federal program) to regulate local stormwater management efforts.<sup>1</sup> Environmental authorities' main concern in regulating stormwater management is with the quality of the rivers, lakes, and streams into which cities drain their stormwater. Both the Massachusetts Department of

Environmental Protection (DEP) and the EPA consider stormwater runoff to be one of the major sources of water pollution in America. EPA regulations are meant to ensure that local flood and drainage control efforts are combined with efforts to decouple the otherwise close association between watercourse degradation and increasingly intensive land use.

Worcester empties its stormwater runoff into every body of water within City borders, including Indian Lake, Lake Quinsigamond, and the Blackstone River. The state Department of Environmental Protection (DEP) classifies virtually all of Worcester's waters as "impaired." Some of Worcester's waters contain high levels of phosphorus in particular. Algae feed on phosphorus, and thus increased phosphorus loading may produce excessive algae growth, which in turn produces waters poor for swimming and other forms of recreation.<sup>2</sup> Excessive algae growth may also lead to depleted or fluctuating levels of oxygen, which make waters less hospitable to fish and other forms of aquatic life.

Cities tend to be located on rivers not only because of their obvious commercial advantages, but also because cities have traditionally relied on rivers to transfer away their waste and refuse.<sup>3</sup> Worcester is situated at the head of the Blackstone River and the very top of the Blackstone River

Watershed. A watershed is, in the words of the EPA, “the area of land where all of the water that is under it or drains off of it goes into the same place.” There are 28 watersheds in Massachusetts. Since water flows down, the level of contamination in Worcester’s rivers and streams may affect downstream waters of all other communities in the Blackstone River Watershed as well. The EPA claims that the Blackstone River is “one of the most impaired rivers in Massachusetts.”<sup>4</sup> During and after rainstorms, “significant toxicity” has been measured in the first two miles of the river (in the greater Worcester area), drawing increased scrutiny to Worcester’s stormwater operations.<sup>5</sup>

The Clean Water Act prohibited all waterborne discharges unless specifically authorized by a permit. The EPA regulates Worcester’s stormwater discharges through its National Pollution Discharge Elimination System (NPDES) program. When first established in the early 1970s, the NPDES program was intended to regulate wastewater and industrial discharge. In 1987, Congress expanded it to cover stormwater discharges. Worcester was the first community in New England to receive a NPDES stormwater permit from the EPA, in September 1998.<sup>6</sup> This permit by its terms expired in October 2003. However, the EPA administratively continued the permit, as allowed by regulation, and the City continues to

operate under its terms. The next permit, issued as a draft on June 20, 2008, is the source of the current controversy between the City and the EPA.

Part I.C.1 of the draft permit indicated that Worcester must “ensure that discharges...do not cause or contribute to exceedances of water quality standards.” Worcester’s previous stormwater permit required the City only to “consider” the water quality impact of its stormwater management operations. Equally important, from the perspective of local officials, is the fact that the 1998 permit limited Worcester’s liability to reduce stormwater pollution to the “maximum extent practicable.”<sup>7</sup> While the draft permit does include language about reducing stormwater pollution to the “maximum extent practicable,” the force of this phrase is more ambiguous, as it does not seem to extend to the language about meeting water quality standards.<sup>8</sup> City officials believe that the draft permit’s language is inconsistent and that “maximum extent practicable” should be made the governing standard of the entire permit.

In short, the entire controversy between the City and the EPA involves whether Worcester’s stormwater pollution control efforts should be limited to the “maximum extent practicable,” or whether the City should be required to meet “water quality standards.” More generally, the City believes that this

inclusion of water quality standards in its stormwater discharge permit constitutes illegal EPA overreach beyond its legislative mandate. The EPA believes that it not only has the right to incorporate water quality standards into discharge permits, but also the obligation to do so, in order to fulfill the Clean Water Act’s fundamental mandate, to “restore and maintain the chemical, physical and biological integrity of the Nation’s waters.” The long-term goal of the Clean Water Act is the complete elimination of polluted discharges to surface waters (cf. “National Pollutant Discharge Elimination System”). This goal was originally supposed to be met by 1985; now, efforts are focused on meeting the interim goals of attaining swimmable and fishable waters.<sup>9</sup>

The City and the EPA also disagree about the cost of the new permit for Worcester’s ratepayers. The City’s environmental consultant has estimated that the cost of compliance with the draft permit would reach about \$1.2 billion, leading to an increase in annual sewer bills of hundreds of dollars. The EPA claims that the new permit would cost less than \$20 million and would require only an additional \$1.3 million in annual costs and an additional \$1.50 per month in household sewer bills.<sup>10</sup>

However much the permit costs to Worcester and its ratepayers, it’s important to emphasize that these

expenditures will be all *in addition to* hundreds of millions in other recent or planned investment in the City’s water infrastructure (**Table 1**).

	<b>Cost</b>
1998-2003 Stormwater Discharge Permit	\$15.6 million
Upper Blackstone, current permit	\$180 million
Upper Blackstone, cost estimate for impending permit	\$180-200 million
Upgrades to Worcester’s Combined Sewer System	\$5 million in one time costs
Sanitary Sewer Overflow Upgrades, mandated by a 2005 EPA Administrative Order	\$7 million in one time costs; \$5 million annually

The EPA has mandated additional phosphorus and nitrogen removal requirements from the Upper Blackstone Water Pollution Abatement District wastewater treatment plant, where Worcester and eight other neighboring communities treat all their sewage and wastewater. Permit compliance will require upgrades estimated to cost \$180-\$200 million. The Upper Blackstone is currently undergoing a \$200 million upgrade mandated under a 2001 permit from the EPA. This new wastewater permit is also a source of controversy, as local officials argue that the water quality improvements will be marginal at best, and that the net environmental benefit

of these upgrades will be offset by the higher energy usage the upgrades will require. The District intends to challenge the new requirements in the First Circuit Court of Appeals.

Cost estimates for stormwater regulations have varied widely in other areas as well. The EPA recently targeted three communities in the Upper Charles River watershed-Bellingham, Milford, and Franklin-under an unusual program known as the Residual Designation Authority rule for stormwater. Although these communities already have their own discharge permits, the EPA intends to impose discharge requirements directly on all property owners with two or more acres of impervious surface (universities, multifamily residential areas). Property owners will have to retrofit their facilities to reduce their total phosphorus runoff by 65%.<sup>11</sup> According to official EPA estimates, compliance costs could range from \$28,000-\$150,000 per impervious acre.

## STORMWATER REGULATION IN CONTEXT

Within environmental circles, stormwater regulation is viewed as the next frontier in clean water policy.<sup>12</sup> Since the landmark Federal Water Pollution Act of 1972, pollution from wastewater and industrial waste has been significantly reduced.<sup>13</sup> Such

spectacular examples of water pollution as the Cuyahoga river in Ohio (which caught on fire several times during the 1960s), and Chicago's notorious "Bubbly Creek,"<sup>14</sup> are unheard of in contemporary America. The EPA, and its National Pollutant Discharge Elimination System (NPDES) program, may claim some credit in this marked improvement in water quality in America.<sup>15</sup> The EPA regulates all the nation's wastewater, industrial waste, and stormwater discharges through NPDES. Initially, the EPA exempted stormwater from its NPDES program, focusing exclusively on industrial waste and raw sewage.<sup>16</sup> Stormwater was of less concern because it is less threatening to the environment and more burdensome to regulate. Regulating stormwater involves developing pollution standards for the millions of small pipes and ditches through which runoff is conveyed. Wastewater, by contrast, is managed through large centralized facilities, such as the Upper Blackstone.<sup>17</sup> Wastewater's flow is fairly constant and of even quality. Stormwater comes from storms, sporadic events that lead to extreme fluctuations in water volume, velocity and pollutant loading.

Almost immediately after the passage of the Clean Water Act, environmental groups began urging authorities to regulate stormwater as strictly as wastewater. The National Resource Defense Council initiated and won a

lawsuit (*NRDC v. Costle* (D.C. Circuit court, 1977)) that denied the EPA the right to exempt stormwater from the NPDES program. In 1987, Congress expanded the NPDES discharge permitting program to stormwater, and the EPA established a new application process for stormwater discharge permits. Phase I (1990) dealt with the largest private and public entities: industrial activities such as waste disposal and manufacturing, construction sites five acres or larger, and municipalities with populations above 100,000. Phase II (1995) dealt with smaller entities.

The NPDES discharge permit program is not the only federal program relating to stormwater pollution. There is also the Federal Total Maximum Daily Load (TMDL) program. Under TMDL, states must “zone” their waters to define what the “beneficial use” is of each of its lakes, streams and rivers. Massachusetts and most other states group their waters into one of two categories: class A for drinking water and class B for all other uses such as a habitat for fish and other aquatic life, wildlife, and recreation. Based on these designated beneficial uses, states then derive formal water quality standards for each body of water. In the case of waters that meet their water quality standards, these function as anti-degradation provisions. For the 20,000<sup>18</sup> bodies of water in America that fall short of their specified water quality standards (virtually all of

Worcester’s waters), states must develop Total Maximum Daily Load plans. TMDL plans are budgeting exercises that specify the maximum amount of a pollutant that a body of water may absorb and still achieve its designated beneficial use.

Much of the legal dispute between Worcester and the EPA stems from the fact that Congress has mandated two separate programs, the NPDES discharge permit program, and the TMDL budgeting exercise and water quality standards program, without precisely defining their relation to each other. The City views the issue of water quality standards as separate from the stormwater discharge permits. The EPA does not. Everything hinges on this. Must stormwater effluent meet water quality standards? Or must stormwater pollution simply be reduced to the maximum extent practicable?

## THE COST OF CLEAN WATER

EPA stormwater regulations are “unfunded mandates,” meaning that the Federal government provides no significant assistance in funding the cost of compliance.<sup>19</sup> Shortly after the Clean Water Act was passed, the Federal government did provide significant assistance to local governments to improve their wastewater treatment operations. When the Upper Blackstone was built in 1977, Worcester was

responsible for only 10% of the cost. But since 1987, the cost of upgrades to either stormwater or wastewater operations has been the responsibility of the City and its ratepayers.

Worcester funds its stormwater management operations through the City's Sewer Enterprise Fund. Sewer fees pay for both wastewater and stormwater operations. As **Table 2** shows, these fees have risen steadily over the past decade.

**Table 2: Worcester Sewer Fees and Property Taxes, FY01-FY11**

	Rate per hundred cubic feet (748 gallons)	Average Annual Sewer Bill (based on 62 CCFs)	Increase over previous year	Average Single Family Property Tax Bill	Increase over previous year
FY01	\$1.70	\$105	N/A	\$2,175	N/A
FY02	\$1.78	\$110	4.7%	\$2,401	10.4%
FY03	\$1.90	\$118	6.7%	\$2,528	5.3%
FY04	\$1.90	\$118	0.0%	\$2,658	5.1%
FY05	\$2.61	\$162	37.4%	\$2,781	4.6%
FY06	\$3.11	\$193	19.2%	\$2,879	3.5%
FY07	\$3.52	\$218	13.2%	\$2,995	4.0%
FY08	\$3.97	\$246	12.8%	\$3,112	3.9%
FY09	\$4.27	\$265	7.6%	\$3,162	1.6%
FY10	\$4.61	\$286	8.0%	\$3,129	-1.0%
FY11	\$5.06	\$314	9.8%	\$3,307	5.7%
<b>Change, FY01-FY11</b>			<b>199%</b>	<b>Change, FY01-FY11</b>	<b>52.0%</b>

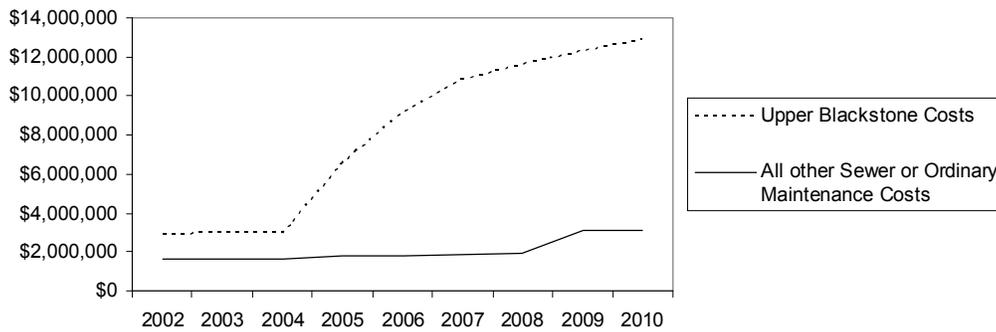
*Source: City of Worcester Department of Public Works and Parks, Massachusetts Department of Revenue*

All told, Worcester's sewer bills have increased about 200% since FY01, whereas property tax bills have gone up about 50%.<sup>20</sup>

As **Chart 1** shows, EPA mandates have been a driving factor in these rate increases. The main mandate Worcester

faced during the last decade was the \$200 million in upgrade costs associated with the Upper Blackstone's 2001 NPDES permit. **Chart 1** breaks down how the overall spending for this mandate has diverged from ordinary sewer maintenance.

**Chart 1: Upper Blackstone Costs vs. All Other Sewer and Ordinary Maintenance Costs in Worcester, FY02-10**



This is how much wastewater treatment charges paid by Worcester have increased as a result of the \$200 million upgrade required by the EPA's 2001 NPDES permit for the Upper Blackstone. Unlike the Upper Blackstone's impending wastewater permit and the City's impending stormwater permit, local officials did not object to the Upper Blackstone's 2001 permit. At the time, Worcester's sewer rates were quite low compared with other communities. Environmental groups claim that this indicated an under-investment in local water infrastructure. However, it's also worth noting that Worcester is one of the poorest communities in the Commonwealth.<sup>21</sup> Supporting investment in water infrastructure will always be more challenging for Worcester than most other Massachusetts municipalities. This is a problem for Worcester and most old, formerly industrial cities: they are more contaminated than newer "greenfield" communities, but they are also poor,

and thus less able to fund clean up costs out of their own revenues.

## THE DISPUTE OVER COSTS: WORCESTER VS. THE EPA

Based on a 2007 analysis, the City believes that the cost of compliance with the draft stormwater permit could exceed \$1 billion, causing the sewer rate to increase by over 300%, and bringing annual residential sewer costs to over \$1,000. Annual debt service could be around \$91 million, a sum 3.5 times higher than the City's current annual budget for Sewer Operations. The EPA believes the new permit will cost a much more modest \$18 million. What accounts for this drastic variation in cost estimates?

City officials believe that, in order to ensure that Worcester meets water quality standards, it will need to employ sophisticated but expensive "end-of-pipe" treatment technology. Only by, essentially, treating Worcester's

stormwater effluent using end-of-pipe technology are local officials confident that Worcester would completely fulfill the terms of its discharge permit.<sup>22</sup> The EPA claims that it is not its intention to require end-of-pipe treatment, and notes further that the draft permit did not mandate many major changes to Worcester's existing stormwater management program. According to the EPA, Worcester can meet the new permit requirements solely through enhanced best management practices, such as street sweeping, catch basin cleaning, and public education. In total, EPA believes that the new permit will cost only \$770,000 more over the five-year length of the permit than what Worcester is already spending.

Despite the EPA's denials about its intentions, local officials maintain that the permit explicitly leaves open the possibility that EPA could require additional pollution controlling measures if stormwater discharges are found to contain pollutant loadings in excess of water quality standards. Even if the EPA did not enforce water quality standards to the strictest degree, Worcester would be exposed to the very real possibility of a lawsuit initiated by a third party environmental group, as happened in 2010 to the Boston Water and Sewer Commission.<sup>23</sup> "Bounty hunting," the enforcement of Federal law and regulations through private litigation, has shaped all aspects of environmental policy in America.<sup>24</sup> This

is not simply because of America's famously litigious culture. In section 505 of the Clean Water Act, Congress specifically intended that Clean Water Act regulations be enforced by litigation. Thus it is understandable why local officials have tended to cite the higher-range end-of-pipe cost estimates as the true cost for complying with the EPA's new water quality standards. While less expensive stormwater management techniques *may* fulfill the terms of the permit, city officials can only be certain of the effectiveness of end-of-pipe technology.<sup>25</sup>

## CRITICISMS OF STRICTER STORMWATER REGULATION

Leaving aside the question of EPA's legal right to mandate water quality standards in stormwater permits, does it make for sound policy? City officials believe that there are three main arguments against stricter stormwater regulations.

**Science:** All parties agree that urban stormwater runoff is polluted and degrades receiving waters. But a gap exists between that *general* proposition and precise, scientific knowledge about the link between *specific* sources of stormwater pollution and receiving waters. Permits that require hundreds of millions of dollars in upgrade costs are

sometimes based on the most meagerly-funded DEP and EPA studies.

Worcester's TMDL studies are a case in point. The Curtis Pond TMDL, issued in 2002, relies on land use data from 1985 and modeling to predict (not measure) phosphorus concentration. The 2002 Indian Lake TMDL is based on earlier environmental studies, none of which were completed more recently than 1989. The Lake Quinsigamond/Flint Pond TMDL is based on data from the early 80s. This reliance on decades-old data, data that might not have even been collected for the purpose of the actual TMDL report, and theoretical models, provide the basis for the water quality standards that the EPA intends to make Worcester legally required to meet.

In order to be sure that precise reductions in certain contaminants in stormwater effluent are necessary to improve conditions in a given watershed, an exhaustive audit of the *entire watershed*, and all its uses, pollution sources, etc., would be necessary. The EPA's current approach is to focus on individual sources of individual contaminants within individual communities. A holistic, watershed-based approach would look more closely into the question of how much factors outside local authorities' control contribute to the watershed's overall impairment. Some examples of these include legacy pollution sources (contaminated sediment), pollution

from non-point source runoff (i.e. that flows directly into a body of water instead of through a pipe), and dams.<sup>26</sup> Coordinating permits among different communities could allow for pollutant trading between them. The EPA is actively exploring the possibility of watershed-based permitting, but has thus far found it too complicated to coordinate permits for different communities within the same watershed.

**Economic Development:** It is not obvious that the goals of economic development and reducing stormwater pollution can be easily reconciled. To the extent that stormwater pollution is a problem in America, the root of the problem is "increasingly intensive land use."<sup>27</sup> Economic development produces impervious surfaces, which produce stormwater pollution. If an area's economy is going to continue to grow, so too will urbanization and the amount of impervious surface.<sup>28</sup> While Worcester's draft permit does require city government to mandate that all new development and redevelopments employ onsite stormwater management techniques, the EPA has no authority to regulate economic development in any strict sense. Land use policies (zoning, code, and ordinances) are state and local matters. There is a strong legal case to be made that only state and local governments have the authority to decide how much stormwater impact should factor into their land-use

planning and management. Thus far, most state and local governments have declined to do so to any significant degree. And this for obvious reasons: stricter stormwater standards raise taxes and/or fees, anger businesses, place added burdens on already-strained regulatory staff, come with no Federal financial support, and their benefits are ambiguous.

The impact of stricter stormwater standards on economic development is therefore uncertain. Worcester faces a range of challenges in its efforts to encourage more development in the city, including a high commercial and industrial tax rate, soft housing market, brownfield issues, and underperforming public schools. It is therefore understandable that local officials would be wary of the effect of stricter stormwater regulations.

### **Balancing Spending Priorities:**

Water infrastructure-related expenditures are even more controversial in an era of limited revenues and tight competition among policy priorities. In FY12, Massachusetts faces a \$2 billion budget deficit and Worcester a cumulative (including the Worcester Public Schools) deficit of over \$13 million. Worcester currently has an unfunded pension liability of over \$300 million, an unfunded retiree health care liability of \$765 million, and over \$100 million in long-deferred street and sidewalk improvements. The American

Society for Civil Engineers estimates that, in Massachusetts, infrastructure upgrades related solely to wastewater and drinking water will amount to \$11.72 billion over the next 20 years. The figure for America is over \$400 billion over the next 20 years (again-these figures do not include stormwater-related expenditures).<sup>29</sup> The Commonwealth has its own unfunded pension liability for state employees of \$5 billion and an unfunded retiree health care liability of \$22 billion. According to the 2007 Massachusetts Transportation Finance Commission, the state faces a gap of \$15-19 billion between what it currently plans to spend on transportation infrastructure and what it needs to spend in order to bring its existing assets into good repair.<sup>30</sup>

Of course, the Federal government's long term fiscal challenges dwarf those of state and local government. It is not necessary to discuss these challenges in detail. The point is the same: in light of these various commitments, the nation will have to reassess and balance its priorities. Paying for water infrastructure upgrades are worth it when it is a question of an immediate and certain public health danger. Around 1900, American municipalities were spending as much on water infrastructure as the Federal government was spending on *everything*, save the Army and the Post Office.<sup>31</sup> As a consequence, urban populations

experienced remarkable decreases in diseases and increases in life expectancies. But no one has contracted cholera from stormwater pollution.

The EPA's efforts at regulating wastewater and industrial waste have led to measurable improvements in water quality. But America now faces the problem of the law of diminishing returns with regard to stormwater. Burdensome expenditures may be required in order to achieve marginal improvements in water quality. The wider the gap becomes between appreciable improvements in Worcester's rivers and lakes and the burden on city ratepayers, the greater the pressure will become on government officials to reconsider the goals of the Clean Water Act. Choices may have to be made.

## CONCLUSION AND RECOMMENDATIONS

Stormwater is more of a quality of life than public health issue. The main potential dangers of polluted urban stormwater runoff include impaired shellfish beds, beach closings and swimming advisories, fishkills and depleted fish stocks. Classifying stormwater in this manner does not make it frivolous or unworthy of public concern and public expenditures. Many legitimate environmental issues fall short of a strict public health standard, such as litter, pet waste, and protecting

certain endangered species. The question is not should there be a stormwater regulation policy, but how to improve it.<sup>32</sup>

The current policy arrangement has been criticized by many different groups for many different reasons. An improved stormwater policy would have the following characteristics: local flexibility to experiment with different techniques, a focus on total stormwater flow instead of particular pollutants, and enhanced public education efforts on the part of the EPA.

Towards this end, The Research Bureau makes the following recommendations:

*The EPA should make "maximum extent practicable" the governing standard of Worcester's stormwater discharge permit.* Requiring local authorities to limit stormwater pollution to the maximum extent practicable provides crucial flexibility to experiment with cheaper but untested management techniques. For the first decades of its stormwater discharge permit program, the EPA recognized this statutory standard in its regulations. In abruptly abandoning "maximum extent practicable" as the governing standard for the entire permit, the EPA has given the impression that it does not believe that local officials can be trusted when they assert that they *are* endeavoring to reduce stormwater pollution to the maximum extent practicable.

The state DEP has adhered to “maximum extent practicable” in its own stormwater regulations. Regulating stormwater is primarily a Federal issue, especially in Massachusetts, where the EPA authorizes discharge permits. However, the DEP does have its own official stormwater policy, which it first promulgated in 1996 and revised in 2008.<sup>33</sup> Massachusetts’ Stormwater Management Standards attempt to minimize stormwater pollution caused by new development. The regulations require developers to manage as much of their runoff onsite as possible, imposing specific amounts of stormwater “recharge” volume per unit of impervious surface for developments (depending on the quality of soil).

But in contrast to Worcester’s stormwater discharge permit, these state regulations *are* governed entirely by the principle of “maximum extent practicable.” Developers must apply responsible stormwater management practices, but their liability in remediating stormwater pollution is limited in a way that Worcester’s is not.

The problems of uncertain science and imprecise statutory mandates have always vexed environmental regulators and surely will continue to in the future. Even if the science were perfect, it is impossible to put an exact price on clean air and water. This uncertainty should be reflected in stormwater regulations.

Maintaining “maximum extent practicable” would be one way to do so.

*The EPA should enhance its efforts at civic education.* NPDES permits always include a public education component. The EPA requires local officials to educate their community about stormwater pollution through measures such as publishing newsletters and brochures and participating in forums and community events. But there is no equivalent requirement for the EPA itself in its administration of the NPDES program. The “public” aspect of the NPDES permitting process is defined primarily by public comment periods, in which citizens, businesses, and officials are given the opportunity to comment on proposed regulations. What would be more helpful would be a more serious effort at explaining this complicated issue to local officials and the public. Throughout Worcester’s sustained controversy over its new stormwater permit, Department of Public Works and Parks (DPWP) staff have vocally communicated their views on the draft permit’s shortcomings through a variety of mediums such as newspaper Op-Eds and public forums. In Worcester, local environmental groups have taken the lead in disputing the DPWP’s claims. The EPA, aside from a couple press releases, has made little effort to respond. According to the EPA, the formal nature of the regulatory process restricts the agency from discussing stormwater regulation policy

in any but the most circumspect, legalistic fashion. (For this reason, EPA officials were only willing to comment about a few small factual matters on a draft of this report.)

Civic education is not often viewed as a core responsibility of a government agency such as EPA, but it should be. As scholars Marc Landy, Marc Roberts and Stephen Thomas write:

As the Preamble to the Constitution announces, the purpose of the American government is to “form a more perfect union...and to secure the blessings of liberty...”

Government functions both to protect freedom and to promote it. Doing so requires that those qualities of citizens that enable them to act as free persons must be nourished and enhanced.

Government must accept some responsibility for the public’s capacity to understand both the technical and the moral significance of the decisions that have to be made.

Hence, public servants have a major educational responsibility. They cannot, and ought not try, to tell citizens what to think. But, they must make use of their considerable stature and expertise to frame questions so that public debate can be made

coherent and intelligible. They must tease out the essential social and ethical issues from the welter of scientific data and legal formalisms in which those issues are enveloped.<sup>34</sup>

Enhanced efforts at public education about stormwater regulations would provide answers to a range of questions about Worcester’s impending stormwater permit, such as: Why has the language about “water quality standards” been adopted in the new draft permit? Does this indicate stricter discharge standards? If so, how can stormwater management costs *not* become much more expensive? How can ratepayers know that their increased expenditures will make a difference in improving the quality of local bodies of water? Is the ultimate goal of stricter stormwater regulations to regulate stormwater discharges as strictly as wastewater? Is it even feasible to clean stormwater to the level that it meets water quality standards and removes impairments in receiving waters? Is there any evidence of this having taken place in a heavily urbanized area?

The formal, legalistic character of the permitting process makes it unsuited for genuine public debate and education, especially for issues as complicated as environmental issues. Whether regarding stormwater, smog, or cleaning up brownfields, if the EPA does not provide the public with a clear

and complete account of the issue, citizens on both sides of the issue will be encouraged to believe that it is much simpler than it is. The point is less that the EPA needs to do a better job listening to the public. That would presume that the public already possess a full grasp of the facts and the arguments, which is rarely the case about complicated environmental issues. Rather, the EPA needs to do a better job trying to educate and engage the public.<sup>35</sup>

*The DEP should consider tiered designated uses for bodies of water.* One policy change that the state could consider is providing more flexibility in designating “beneficial uses” for water quality standards. Years ago, brownfields restrictions posed a major hindrance to redevelopment of older industrial cities like Worcester. If a parcel was found to be contaminated, all contamination had to be remediated before any redevelopment could occur and the developer was liable for the entire cost of the remediation. A breakthrough was achieved (which led directly to the development of St. Vincent’s Hospital in downtown Worcester) when the state allowed a more flexible method of classifying properties’ level of contamination.<sup>36</sup> Different levels of environmental cleanliness can now be required (for instance) for a highway and a day care center.

A similar approach should be applied to the stormwater issue. When setting standards for contamination levels, current regulations give little to no consideration for receiving waters’ history and setting. The same standards are applied equally to old, developed communities and newer, less-developed communities. The difference, in terms of public expenditures, between sustaining some degree of aquatic life and supporting cold water trout and salmon could be tremendous. The distinction need not be so rigid, as the EPA does allow for “tiered aquatic life uses” in TMDL designations, at least on a temporary basis. Ohio has tiered uses.<sup>37</sup> The *degradation* of any river beyond its current condition should still be strictly prohibited, but there needs to be more flexibility as to at least the intermediate goal of clean water regulations.

*The City should continue to explore green infrastructure approaches to stormwater management and implement them where appropriate.* “Green infrastructure” refers to a variety of stormwater management approaches such as rain gardens, rain barrels, roof gardens, permeable pavement, and retention ponds.<sup>38</sup> Two features characterize them: they try to replicate the natural, pre-development hydrology of an area, and they address overall stormwater flow, not particular contaminants. Successful green infrastructure techniques restore the natural, hydrological process through

which precipitation is absorbed and filtered by the soil. Impervious surfaces disrupt this process, which leads to more extreme fluctuations in receiving bodies of water, and pollution, because runoff saturated with contaminants is channeled directly into local rivers, streams and lakes instead of being first filtered by the soil. The idea behind green infrastructure is to capture precipitation before it becomes runoff, and then either put it to some use (in a garden or for landscaping) or allow it to be absorbed into the ground. Green infrastructure is distinguished from “gray” infrastructure, the standard system of drains, catch basins and outfalls with which cities manage their stormwater. Green infrastructure is a much newer approach, formally endorsed by the EPA only within the past decade. While it is doubtful that green infrastructure could ever completely replace gray infrastructure, however much these techniques can reduce flow and reduce pressure on traditional stormwater management systems will lead to reductions in stormwater pollution.

Some advocates of stricter stormwater standards claim that green infrastructure will even obviate the need for expensive end-of-pipe treatment in Worcester’s next permit. This is speculative. Applying green infrastructure to an old and dense area such as Worcester poses special challenges, since space is at a premium.

Also, whereas gray infrastructure is maintained by the City, most green infrastructure techniques require maintenance by individual property owners. A serious commitment to green infrastructure could not simply rely on the voluntary initiative of private citizens, but would require some element of carrots and sticks. It would require a comprehensive and integrated strategy, developed and led by a public authority. Lack of definition about this strategy, and what form these carrots and sticks would take, compounds the uncertainty of green infrastructure’s overall effectiveness.

More time will be required, to experiment with approaches and develop strategies. For this reason, although the EPA has officially endorsed green infrastructure, the terms of the NDPES permit program favors gray end-of-pipe stormwater management approaches. When the EPA issues Worcester its next stormwater discharge permit, the City will have only five years to comply with water quality standards. Such a limited timeframe creates a strong bias for end-of-pipe techniques. A gray infrastructure plan to reduce stormwater pollution would perhaps be more expensive, but also more expeditious to implement, and, most importantly, more assured in its effects. Green infrastructure is promising but uncertain, especially in the short term.

But despite these obstacles, the basic logic behind green infrastructure is sound, that of reducing flow rather than trying to isolate particular sources and pollutants. Thus, regardless of the consequences of the impending discharge permit, the City should continue to pursue green infrastructure.

*Worcester should consider establishing a utility district.* Unfunded environmental mandates are anathema to local officials, but they at least have the advantage of forcing citizens to assess their priorities. Were EPA-mandated upgrades still paid for by Federal revenues (other people's taxes), Worcester ratepayers would likely have little idea of the true price of a perfectly swimmable Blackstone River. The obvious disadvantage of unfunded mandates is that they are *mandates*: however much ratepayers and local officials may object to stormwater system upgrades, they have no realistic alternative but to fund them.

Establishing a "utility district" would enhance transparency about the true cost of stormwater management. Currently, stormwater and wastewater operations in Worcester are both funded entirely by sewer fees (neither receive general fund tax subsidies). Not all communities do so. Most smaller municipalities fund stormwater operations out of general fund tax revenues. More than 400 communities nationwide, including Chicopee,

Newton, and Reading, fund their stormwater operations through "utility districts."<sup>39</sup> Creating a stormwater utility district would entail charging property owners a separate stormwater management fee based on the amount of impervious surface they own. In addition to promoting transparency, a utility district would in some ways be a fairer way to fund stormwater operations than the current system, in which Worcester charges all property owners the same rate regardless of how much they contribute to the problem. However, a utility district is no panacea, and it could have disadvantages. Most notably, it could increase the cost of doing business in Worcester. Commercial and industrial property owners have much more impervious surface per acre than residential property owners. Much would depend on the design of the program and how impervious surfaces would be "assessed." Abatements could also be offered in exchange for implementing green infrastructure techniques.

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<sup>1</sup> In most states, primary authority to regulate stormwater management has been delegated to state agencies. In Massachusetts and four other states, the EPA is the lead agency for administering the program and determining the content of permits issued to Massachusetts dischargers.

<sup>2</sup> The environmental movement's campaign against phosphorus recently resulted in its abolition from all dish detergents in America. See Jonathan Last, "Another Triumph for the Greens," *Weekly Standard*, January 31, 2011.

<sup>3</sup> Edward C. Banfield and James Q. Wilson, *City Politics*, Harvard University Press, 1963, 8.

<sup>4</sup> "Worcester's Water Pollution Challenge," EPA press release, January 2008.

<sup>5</sup> *Ibid.*

<sup>6</sup> Worcester is an "MS4" community, meaning it owns and operates a municipal separate storm sewer system. A "separate" system is distinguished from a "combined sewer operation," or CSO. Worcester also operates a CSO, for which it has to apply for yet another NPDES permit. In a CSO, stormwater is sent into the wastewater system to be treated and then discharged. The problem with these systems is that they can be overwhelmed in the event of a flood, and wastewater can flow directly into bodies of water. This is a bigger issue in other communities, as Worcester upgraded its CSO facilities in the early 1980s, with the Federal government paying for most of the cost. Other older industrial communities such as Springfield and Providence have recently faced extremely expensive CSO upgrades.

<sup>7</sup> The 1987 Federal legislation that originally authorized the EPA to regulate stormwater management also employs "maximum extent practicable" (Clean Water Act §402(p)(3)(B)(iii)).

<sup>8</sup> Specifically, the draft permit reads: "Pursuant to Clean Water Act § 402(p)(3)(B)(iii), this permit includes provisions to ensure that discharges from the Permittee's MS4 do not cause or contribute to exceedances of water quality standards, in addition to requirements to reduce the discharge of pollutants to the maximum extent practicable ("MEP") set forth in Part I.E [emphasis added]."

<sup>9</sup> "Urban Stormwater Management in the United States," National Research Council, October 2008, 39.

<sup>10</sup> "Draft Stormwater Permit Provides Protections for Worcester's Environment," EPA press release, January 20, 2008.

<sup>11</sup> "A River Runs Through It," Taryn Plumb, *MetroWest 495 Biz*, February 2011.

<sup>12</sup> "Urban Stormwater Management in the United States," 83.

<sup>13</sup> "Urban Stormwater Management in the United States," 17; Bjørn Lomborg, *The Skeptical Environmentalist*, Cambridge University Press, 2005, 203-5.

<sup>14</sup> "'Bubbly Creek' is an arm of the Chicago River, and forms the southern boundary of the Union Stock Yards; all the drainage of the square mile of packing-houses empties into it, so that it is really a great open sewer a hundred or two feet wide. One long arm of it is blind, and the filth stays there forever and a day. The grease and chemicals that are poured into it undergo all sorts of strange transformations, which are the cause of its name; it is constantly in motion, as if huge fish were feeding in it, or great leviathans disporting themselves in its depths. Bubbles of carbonic gas will rise to the surface and

burst, and make rings two or three feet wide. Here and there the grease and filth have caked solid, and the creek looks like a bed of lava; chickens walk about on it, feeding, and many times an unwary stranger has started to stroll across, and vanished temporarily. The packers used to leave the creek that way, till every now and then the surface would catch on fire and burn furiously, and the fire department would have to come and put it out. Once, however, an ingenious stranger came and started to gather this filth in scows, to make lard out of; then the packers took the cue, and got out an injunction to stop him, and afterwards gathered it themselves. The banks of 'Bubbly Creek' are plastered thick with hairs, and this also the packers gather and clean." Upton Sinclair, *The Jungle*, 1906, Chapter Nine.

<sup>15</sup> "Urban Stormwater in America," 18.

<sup>16</sup> A few states made efforts to regulate stormwater on their own before the EPA began issuing regulations ("Urban Stormwater Management in the United States," 55).

<sup>17</sup> Technically, the EPA issues "individual" NPDES permits to single point source dischargers such as the Upper Blackstone and "general" permits to whole communities that cover multiple point source dischargers in a given area. Still, stormwater permittees account for approximately 80% of NPDES-regulated entities ("Urban Stormwater Management in the United States," 29).

<sup>18</sup> "Urban Stormwater Management in the United States," 49. For more detailed information on water quality impairment across the nation, see the EPA's most recent (2004) National Water Quality Inventory.

<sup>19</sup> The only form of financial assistance for stormwater and wastewater upgrades that exists is access to low (2%) interest loans from the state revolving fund program.

<sup>20</sup> Note: Sewer and Water are separate operations with different rates, but their costs are closely linked because Worcester calculates sewer bills based on metered water use. The City charges single family homes (the majority of users) a sewer fee based upon 80% of their water usage. The City essentially assumes that 80% of users' water is ultimately sent back into back into the sewer system, with the remainder used for activities such as car washing or lawn watering. Thus, the average single family water bill is based on 77 hundred cubic feet and the average sewer bill on 62 hundred cubic feet. Water usage in Worcester has declined over the decades. Water use in Worcester peaked in 1988 at 27.5 million gallons per day and then decreased to 23.5. In FY10, the figure was 21.2 million gallons per day, the lowest since at least 1983. Usage has declined for several reasons including low-flow plumbing fixtures, better water system management and a more informed

public. But because of the high fixed costs associated with maintaining the City's water operations, water rates have had to increase as usage has gone down. And sewer rates have had to increase for the same reason, since sewer operations also have high fixed costs and sewer usage is calculated based on water usage. However, rate increases associated with decline in usage have not been as significant as rate increases caused by EPA regulations.

<sup>21</sup> According to data used by the Department of Revenue to calculate local aid in FY11, Worcester's per capita income is **\$18,336** (31<sup>st</sup> lowest; state average is \$35,852) and equalized value per capita (the measure of a community's relative property wealth) is **\$75,726** (12<sup>th</sup> lowest; state average is \$165,919).

<sup>22</sup> Worcester already utilizes some end of pipe technology, in the form of 14 hydrodynamic separators, large structures which eliminate solids in effluent through centrifugal force.

<sup>23</sup> The Conservation Law Foundation filed suit against the Boston Water and Sewer Commission in US District Court in February 2010, alleging that the Commission is in violation of the terms of its NPDES stormwater permits and the Clean Water Act. In December 2010, the EPA joined this case as an intervener.

<sup>24</sup> Robert Kagan, "Adversarial Legalism and American Government," in *The New Politics of Public Policy*, Ed. Marc Landy and Martin Levin, Johns Hopkins University Press, 1995, 88-118; Michael Greve, "Environmentalism and Bounty Hunting," *The Public Interest*, Fall 1989, 15-29.

<sup>25</sup> The uncertain effectiveness of various stormwater pollution reduction techniques, and therefore the EPA's ability accurately to predict permit costs, is a nation-wide problem. Both the National Research Council ("*Urban Stormwater Management in the United States*") and the Government Accountability Office ("*Clean Water Act: Further Implementation and Better Cost Data Needed to Determine Impact of EPA's Storm Water Program on Communities*," May 2007") have cited this uncertainty as one of the main problems with the NPDES discharge permit program.

<sup>26</sup> For more on how obsolete dams contribute to water quality problems, see Elizabeth Grossman, *Watershed*, Counterpoint, 2002.

<sup>27</sup> "*Urban Stormwater Management in the United States*," 83.

<sup>28</sup> On the future of economic development and land use in central Massachusetts, see "*Worcester Regional Mobility Study*," Vanasse Hangen Brustlin, Inc. (prepared for the Central Massachusetts Regional Planning Commission), February 2011.

<sup>29</sup> "2009 Report Card for America's Infrastructure," American Society of Civil Engineers, March 29, 2009, 55-61.

<sup>30</sup> "*Transportation Finance in Massachusetts: An Unsustainable System*," Massachusetts Transportation Finance Commission," March 28, 2007; See also Barry LePatner, *Too Big to Fall*, Foster Publishing, 2010.

<sup>31</sup> Edward Glaeser, *Triumph of the City*, The Penguin Press, 2011, 87.

<sup>32</sup> For an argument that quality of life, not public health, should be the EPA's "proper strategic focus" more generally, see Marc K. Landy, Marc J. Roberts and Stephen R. Thomas, *The Environmental Protection Agency: Asking the Wrong Questions*, Oxford University Press, 1990, Chapter 10.

<sup>33</sup> Massachusetts' Stormwater Management Standards are applied through the Wetlands Protection Act. Some municipalities, including Worcester, have applied the same standards to "upland areas" as well.

<sup>34</sup> *The Environmental Protection Agency: Asking the Wrong Questions*, 3.

<sup>35</sup> For EPA's shortcomings in civic education throughout its history, see *The Environmental Protection Agency: Asking the Wrong Questions*, especially Chapters Nine and Ten.

<sup>36</sup> See "*Facilitating the Cleanup and Development of Worcester's Brownfields*," Worcester Municipal Research Bureau, Report No. 97-6, November 19, 1997.

<sup>37</sup> "*Urban Stormwater Management in the United States*," 44-6.

<sup>38</sup> On the use communities throughout the nation have made of green infrastructure in their stormwater management operations, see "*New Strategies for Controlling Stormwater Overflows*," Linda Baker, *Governing*, February 2011 and "*Efforts to Address Urban Stormwater Runoff*," transcript from a hearing before the Subcommittee on Water Resources and Environment of the Transportation and Infrastructure, US House of Representatives, One Hundred Eleventh Congress, First Session, March 19, 2009.

<sup>39</sup> Source: American Public Works Association ("*Storm water utilities can meet funding needs*," June 2, 2008, Massachusetts Municipal Association).

*Mission Statement:*

*The Research Bureau serves the public interest of the Greater Worcester region by conducting independent, non-partisan research and analysis of public policy issues to promote informed public debate and decision-making.*



## The Research Bureau

Worcester Regional Research Bureau  
319 Main Street, Worcester, Massachusetts  
Telephone: 508 799 7169 Facsimile: 508 799 4720  
[www.wrrb.org](http://www.wrrb.org)