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One of the largest environmental challenges facing municipalities across the United States today is the need to reduce—and ideally eliminate—adverse impacts on water quality from municipal separate storm sewer system (MS4) discharges. Most large urban areas have MS4s that are separate from their sanitary sewer systems and that are designed to capture and convey storm water runoff during periods of rain and other wet weather events such as snow melt. Given the ways our roads and lands are used today in urban areas, it comes as no surprise that storm water runoff can contain bacteria, pathogens, and pollutants that are found in trash, liquid spills, and other debris located on streets and other impervious surfaces.

The Clean Water Act's (CWA's) MS4 provision, § 402(p)(3)(B), 33 U.S.C. § 1342(p)(3)(B), does not, on its face, mandate that MS4 discharges receive treatment designed to meet water quality criteria or any other form of numeric effluent limitations. Rather, the statute directs MS4 operators to assure the removal of storm water pollutants to the maximum extent practicable (MEP) using best management practices (BMPs) contained in National Pollutant Discharge Elimination System (NPDES) permits. MEP is not defined in the statute and has no specific definition in the context of MS4 discharges. However, it is generally understood to involve a combination of both engineering methods and management practices that together attempt to limit pollution from storm water runoff as much as possible.

The number of waterbodies failing to achieve compliance with our nation's water quality goals is not declining. This reality means that all point sources, including MS4s, are under scrutiny given that their NPDES permits are the most tangible vehicle for enforcing point source pollutant reductions. Under this cloud of frustration, states and nongovernmental organizations (NGOs) are increasingly seeking numeric effluent limitations in MS4 permits to ensure that storm water discharges will comply with state water quality standards. These arguments are based on the residual authority contained in the last phrase of 33 U.S.C. § 1342(p)(3)(B)(iii), which states that MS4 discharges are subject to "such other provisions as the Administrator or the State determines appropriate for the control of such pollutants."

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The effort to impose numeric effluent limitations in MS4 permits presumes, unrealistically, that the pollutants flowing into MS4s can be managed and controlled in a manner so effective that compliance with a strict number at the point of discharge could be assured at all times. This article highlights how and why the use of numeric limits to regulate MS4 discharges is both technologically and economically unsound at the local level and will not result in measurable environmental improvement. This article discusses the current state of MS4 regulations and highlights a number of creative approaches, including engineering methods and management practices, currently used by cities to manage their MS4 discharges. These progressive approaches are showing themselves to be more effective than setting up cities for failure via numeric effluent limitations in MS4 permits.

The Statutory Requirements for MS4s Are Unique

When the CWA was first adopted in 1972, there was no explicit statutory language addressing storm water discharges. Nonetheless, EPA did make some effort to regulate storm water through the development and promulgation of various storm water regulations. Following a series of lawsuits that challenged EPA regulations exempting many categories of storm water from the NPDES permit program, Congress was frustrated with a general lack of progress and in 1987 amended the CWA to include specific requirements for the regulation of both industrial and municipal storm water discharges. Section 402(p)(3) lays out those permit requirements, dividing them into two parts: Subsection (p)(3)(A) applies specifically to industrial storm water discharges and requires that permits for discharges associated with industrial activity must meet all applicable provisions of § 1311 (CWA § 301), thus requiring both water-quality-based and technology-based limits on the effluent. Section 301 of the CWA requires the NPDES permitting authority to establish specific numeric limits on various kinds of pollutants that a discharger holding an NPDES permit may not exceed. These limits are developed based on the specific characteristics and properties of the waterbody receiving the effluent and are intended to limit pollutants to certain levels in an effort to raise the overall water quality of the receiving waterbody. By specifically referencing § 301, § 402(p)(3)(A) clearly requires industrial storm water permits to comply with such water-quality-based effluent limits.

On the other hand, § 402(p)(3)(B) states that permits issued to MS4 dischargers "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and systems, design and engineering methods, and such other provisions as the administrator or the state determines appropriate for the control of such pollutants." Nowhere in this language is there a requirement to set numeric, water-quality-based limits under § 301 as there is in subsection 402(p)(3)(A). Thus, Congress clearly distinguished in the text of the statute between the requirements for *industrial* storm water discharges and those for *municipal* storm water discharges.

Initially, MS4 permits were issued without great controversy. However, in 1999 *Defenders of Wildlife v. Browner*, 191 F.3d 1159 (9th Cir. 1999), made its way to the U.S. Court of Appeals for the Ninth Circuit. This case, still a leading authority on the interpretation of § 402(p)(3)(B), involved five municipalities in Arizona who received MS4 permits from EPA that did not contain any numeric limitations. The plaintiffs sued EPA, arguing that the failure to include numeric limitations meant that the permits could not ensure compliance with state water quality standards. The court held that the statutory language of § 402(p)(3)(B) unambiguously shows that MS4 discharges are *not* required to achieve strict compliance with water quality standards. The court agreed that the MEP standard is all that is required under the language of the statute, and thus EPA has the discretion to issue MS4 discharge permits that do not include water-quality-based numeric limitations. However, the court focused on the reference in the last phrase of § 402(p)(3)(B)(iii) to "such other provisions as the Administrator or the State determines appropriate for the control of such pollutants" to state in dicta that EPA or the states have the discretion to impose more stringent limitations if they so choose.

Legal uncertainty in this arena has lingered, largely because, following the *Defenders* case, EPA's Environmental Appeals Board (EAB) acknowledged, but has fallen short of fully adopting, the Ninth Circuit's analysis. Instead, the EAB has continued to maintain (as it had in its original decision leading to the *Defenders* appeal) that MS4 permits must ensure compliance with water quality standards but that they can do so through the use of BMPs rather than numeric effluent limitations. *See Storm Water Discharge Permit for the Municipal Separate Storm Sewer System of Anchorage, AK*, NPDES Permit No. AKS 05255-8, NPDES Appeal No. 99-1 (Nov. 23, 1999).

In contrast to the EAB's lukewarm reaction to the *Defenders* decision, some state courts have embraced the Ninth Circuit's holding in a more effective manner. For example, the Minnesota Supreme Court took the issue up in *Mississippi River Revival, Inc. v. Minnesota Pollution Control Agency*, 2001 WL 856275 (Minn. Ct. App. July 31, 2001). This state case involved a challenge by an environmental group to MS4 permits issued to the cities of Minneapolis and St. Paul by a state agency. Plaintiffs alleged that the permits were illegal because they did not contain any numeric limits and only required BMPs to control storm water pollutants. The Minnesota court rejected the plaintiffs' contentions and followed the holding of *Defenders*—that MS4 permits do not require strict compliance with water quality standards.

The battle over the appropriate legal standard for MS4 discharges persists, however, in various parts of the nation. Take for example, an MS4 permit first issued to the District of Columbia by EPA Region 3 in April 2000. The initial permit contained numeric limits for oil and grease at one storm water outfall. A number of NGOs appealed the permit in August 2000, alleging that numeric limits ensuring compliance with water quality standards should be imposed at *every* MS4 outfall. In February 2002, the EAB ruled, in line with its past holdings, that the permit must ensure compliance with water quality standards but that EPA could use BMPs in lieu of numeric limits to reach that goal. *In Re: Government of the District of Columbia Municipal Separate Storm Sewer System*, 10 E. A. D. 323 (Feb. 20, 2002). In August 2004, EPA reissued the permit with a prohibition against any discharge that would exceed water quality standards but found again that BMPs were sufficient to ensure that standards will be met. The NGOs appealed the reissued permit in September 2004, alleging once again that numeric limits were *necessary* to ensure compliance with the CWA. Settlement discussions ensued, and EPA released a final amendment to the permit in March 2006. The final amendment does not contain any express numeric limits and finds that BMPs will be sufficient to meet the MEP standard for MS4 permits. The amendment also contains general language prohibiting any discharge that might lower the overall existing water quality of the MS4 receiving waterbodies. Both the environmental groups and the Washington, D.C., government have appealed the amended permit, and settlement discussions are again underway. The case appears on indefinite hold, at least until spring 2007. Another example can be found on the nation's West Coast in Los Angeles. The Los Angeles Regional Water Quality Control Board has issued an MS4 permit to the county of Los Angeles that includes numeric limits on bacteria levels for storm water discharges into Santa Monica Bay during dry weather conditions.

The legal debate over whether numeric effluent limitations are required in MS4 permits to ensure that discharges meet water quality standards is now playing out in the total maximum daily load (TMDL) arena. In one of the first times that TMDL-derived, water-quality-based numeric limitations have been applied specifically to MS4 discharges, Los Angeles County now faces a wet-weather bacteria limit for MS4 discharges that is being implemented over a long time period. In contrast, and perhaps illuminating a more flexible and practical approach to implementing TMDLs through MS4 permits, the state of Oregon is issuing MS4 permits that contain "benchmark" numbers based on applicable water quality standards and existing TMDL values rather than specific TMDL-based numeric limits. These "benchmarks" do not represent numeric limits per se but instead act as action

levels or triggers for an adaptive management process by which existing BMPs must be refined and improved to see if those numeric goals can be achieved in the future.

Given the uncertainty surrounding the legal standard for MS4 discharges, some U.S. cities are struggling with failed or failing MS4 systems and, as a result, the reality of fines and other penalties for noncompliance with their existing MS4 permits. The city of Dallas entered into a consent decree with the U.S. government in May 2006 as a result of a series of violations of the city's MS4 permit. The consent decree requires the city to pay $3.5 million in a comprehensive effort to decrease the amount of pollution entering the city's storm water system. As part of the $3.5 million, the city must pay a civil penalty of $800,000 and spend $1.2 million to construct two wetlands along local tributaries to help further cleanse the city's MS4 effluent. Additionally, the Dallas consent decree requires the city to increase its staffing levels in the storm water management section by 25 percent and obligates the city to perform a required number of inspections at storm water discharge pipes, industrial facilities, and construction sites.

The city of San Diego is also looking at the possibility of fines as a result of its MS4 discharges. The state of California is threatening to fine San Diego up to $10,000 per day for violations in its storm water system. San Diego's current MS4 problems stem from the fact that the city does not have enough personnel to adequately investigate the sources of pollutants to the MS4 system, thus these pollutants are going unchecked. The city is now faced with the choice to either spend $118.6 million over the next five years to upgrade its MS4 to reduce pollutants or pay steep fines. The costs for cities like San Diego to upgrade their MS4s often fall on the shoulders of citizen rate payers, but the costs are necessary to ensure compliance with MS4 permits and avoid hefty fines.

Thus, the scale with regard to the legal standard for MS4 discharges is precariously balanced. On the one side is Congress' distinctly different standard for municipal storm water as compared to industrial storm water and the 1999 *Defenders* decision and its progeny, which hold the MEP standard to be sufficient to regulate MS4 discharges. On the other side is the last phrase of § 402(p)(3)(B)(iii), the EAB's ambivalence, and persistent NGOs. Must we push the scale to one side or the other through litigation? To the contrary, the following review of what several U.S. cities are doing to make storm water control progress reveals that further litigation of the legal standard for MS4s is only wasteful and will not lead us closer to environmental benefits.

Numeric Limits for MS4s Won't Produce the Necessary Progress

Despite claims to the contrary, numeric limits on pollutants are not the most appropriate or effective way to reduce pollutants in MS4 discharges. Given the practical realities of managing storm water, using BMPs instead of numeric limits is much more environmentally and fiscally sound. The reasons for this are many and varied. First, the nature of an MS4 discharge can vary greatly depending on a number of factors, including the amount of rainfall, the time that has elapsed since the previous rainfall, the season of the year, and the kinds of substances that are on impervious surfaces and get washed into the MS4 with the rainwater. The flow level, pollutant type, and concentrations can all vary from event to event, and this makes adhering to specific numeric limits very difficult. Discharges from MS4s and their associated water quality impacts and control techniques vastly differ from discharges of municipal and industrial wastewater treatment plants; therefore, numeric limits are simply not appropriate for MS4 discharges.

Second, investing in the various treatment technologies necessary to ensure compliance with numeric limits is costly, and many municipalities with MS4s do not have sufficient funds to invest in such technologies. There is also no guarantee that spending the money necessary to comply with numeric limits will ensure significantly better water quality in the MS4 effluent than is already established through the use of BMPs. Asking cash-strapped municipalities to pay for such technologies does not make fiscal sense when spending less money on improving BMPs can achieve substantially the same result.

Third, municipalities with MS4s make concerted efforts to control and limit what gets placed into the storm water system; however, given the public nature of MS4s and their many intake points throughout a given service area, it is impossible to fully enforce the prohibition against all unauthorized discharges into the system. While a responsible and stringent BMP program can deal with most of these unauthorized discharges, a costly numeric limits system will unfairly penalize an MS4 (and its responsible rate payers) with the economic burden of a few irresponsible dischargers. Such a result is unfair and ignores the practical reality that investing in a well-run BMP control program is much more effective at stopping unauthorized discharges long term than a numeric limits approach.

Creative Approaches to Limit Pollutants from MS4 Discharges

The good news is that many municipalities are taking their own creative approaches to limiting pollutants from MS4s. Among the first to do so was Chicago. The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) has partnered with The Wetlands Initiative in an effort to implement "nutrient farming" in the areas downstream of MWRDGC's discharge locations. Nutrient farms are constructed wetlands designed, built, and operated for the primary purpose of processing nutrients (such as nitrogen), trapping sediments, and/or storing floodwaters. As waters pass though the wetlands, they are cleaned through the natural biological processes that occur in wetlands areas. These activities produce environ-

mental products (e.g., nutrient removal "credits") that can be sold to individuals, corporations, or municipal treatment facilities that need to meet water quality standards. The general idea behind nutrient farming is that the "farmers" who construct and develop the wetlands can then sell a certain number of "credits" related to the amount of nutrients that their wetlands absorb and cleanse from the water. These credits can be sold to upstream producers of nutrients (like municipalities with MS4 discharges) who are looking for additional ways to help cleanse their discharges. EPA has endorsed nutrient farming, as have various national organizations like the National Association of Clean Water Agencies (NACWA), as an effective, cost-efficient, and environmentally sound approach to reducing the amount of nutrients in wastewater and storm water discharges. In addition to nutrient farming, MWRDGC has also implemented a network of watershed planning councils that bring together local communities in the different watersheds served by the district to discuss various storm water issues and create effective storm water management plans.

Another creative approach can be found in Milwaukee, Wisconsin, where the Milwaukee Metropolitan Sewerage District (MMSD) has come up with a unique plan to address MS4 and other floodwater/storm water discharges. In a program called "Greenseams," the MMSD identifies and purchases undeveloped, privately owned properties in areas that are expected to have major growth in the next twenty years and parcels of open space along streams, shorelines, and wetlands. The idea is that by keeping these lands undeveloped, MMSD can protect key land that contains water-absorbing soils. By storing and absorbing water into the ground naturally, these lands can help limit the overall amount of water that goes into an MS4 or other storm water system during a wet weather event. Some of the preserved space also contains existing or reconstructed wetlands that help store and cleanse even more water. Preserving the properties also saves wildlife habitat and creates recreational opportunities for people living in the region. The land purchased under the Greenseams program is owned and managed by a local community or land trust and is subject to a conservation easement held by MMSD. Additionally, MMSD has encouraged Milwaukee residents to purchase "rain barrels" and use them on their properties. Rain barrels are full-sized, wooden barrels that can be used to store rainwater runoff from roofs and other elevated surfaces. Homeowners can then use the water stored in the barrels to irrigate their lawns and gardens during dry periods, thus recycling the rainwater and preventing it from washing directly into the storm water system.

A third creative approach can be found in Independence, Missouri, where the Independence Water Pollution Control Department has constructed a new wastewater treatment facility with a "green roof" to help combat storm water runoff. A "green roof" facility has a roof planted with grasses and other vegetation to help absorb falling rainwater and prevent the water from reaching the street level where it can absorb pollutants and enter an MS4 or other storm water system. Other municipalities, including Milwaukee and Washington, D.C., are also investing in various forms of "green infrastructure" to help reduce the number of impervious surfaces found in urban areas and provide more structures that absorb water during wet weather events.

All of these creative, innovated approaches to reducing the pollutants in MS4s do not mean that cities can avoid the more traditional route of investing hundreds of millions of dollars in upgrading their MS4s. A good example of this is the city of Los Angeles, which recently unveiled a $3-billion plan to upgrade its sewer, storm water, and waste-treatment systems. The plan aims not only to improve the water quality of the discharge from the city's storm water and wastewater systems but also to reduce the overall amount of water that enters the storm water system in the first place. As part of this process, the city plans to turn vacant lots and abandoned alleys into green space where storm water and urban runoff can filter down through the soil and be cleaned naturally before replenishing the groundwater. The city also plans to use parks for the same purpose. By allocating significant financial resources to better treatment of its storm water and investing in more green space to absorb water, Los Angeles is taking proactive and positive steps to reduce the overall level of pollutants from its storm water system.

Regulating MS4 discharges through a MEP-BMP standard is both fiscally and environmentally responsible.

MS4s are a critical part of the nation's urban wastewater infrastructure and are closely monitored by EPA through the NPDES permit program. Regulating MS4 discharges through a MEP-BMP standard is both fiscally and environmentally responsible. NGOs are continuing to pressure EPA to require numeric limits for MS4 discharges; however, this approach would prove very costly for cities and municipalities holding MS4 permits and would not guarantee significant improvement to the quality of the waterbodies receiving MS4 discharges. Additionally, many cities such as Chicago, Milwaukee, and Independence have shown that they can develop progressive and alternative programs to limit the negative impacts of MS4 discharges on our nation's waterways. Cities should be encouraged to continue pursuing these innovative approaches rather than saddled with arbitrary numeric limits that will not, in the long run, help achieve the overall goal of environmental stewardship through cleaner water.