

STORMWATER

2010 Report Card for Pennsylvania's Infrastructure

D-

When looking at infrastructure, potholes and rotting bridges are easy to see—a failing stormwater system is not. Stormwater infrastructure is vital to providing and maintaining safe drinking water supplies and a healthy environment, since stormwater runoff ends up in lakes and reservoirs. Approximately 84 percent of Pennsylvania's population relies on surface water for their drinking water supply. Chemical and biological contamination from stormwater runoff can endanger both of these goals. The primary obstacles to improving the state's stormwater infrastructure are that there is no dedicated funding source for investigation, operation and maintenance of existing systems; no funding for taking the next step to improve water quality as well as manage water quantity; and little to no regulatory oversight of stormwater systems.

BACKGROUND

Determining the condition and effectiveness of stormwater systems must be done in conjunction with drinking water and wastewater systems, since the quality and efficiency of any of these three systems will affect the other two. Over the last 250 years, we have placed our streams and sewage into pipes, manipulated our topography, filled historic floodplains and wetlands, and rendered our ground surfaces impermeable. This was all done under “accepted engineering practices” at the time. But while we have gained cleaner drinking water and control of our sewage, we have often failed to see how our actions have affected stormwater quality. With many channels transferred to underground pipes and more and more surface area given over to cement and asphalt, the lack of stormwater management has now begun to affect the quality of drinking water and our ability to control our sewage.

The Clean Water Act of 1972 (CWA) was the primary step toward clean surface water in the United States. The Environmental Protection Agency (EPA) describes this act as the “cornerstone of surface water quality protection in the United States” and it uses regulatory and non-regulatory tools to “achieve a broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nations’ waters so that they can support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.” Initially, CWA enforcement focused on point-source pollution from sources such as industry and wastewater treatment plants. In the late 1980s, the EPA started to focus on the more significant non-point pollutant sources such as construction sites, farms, street runoff and urban storm sewer systems. The National Pollutant Discharge Elimination System (NPDES) was implemented under CWA to control source point discharges. The NPDES permit process has been a standard permit for the last decade. The EPA has changed its approach from looking at individual pollutants or sources to considering watersheds as a whole, with a focus on maintaining or improving the water quality of entire watersheds.

While the watershed approach seems to make the most sense when considering the health of large pieces of our water supply, our municipal boundaries are not based on watersheds. To try to assist with the combination of municipal and watershed borders, Pennsylvania created the Stormwater Management Act in October 1978 (Act 167) with the purpose of establishing comprehensive, watershed-based stormwater management plans to “preserve and restore the

flood carrying capacity of commonwealth streams; to preserve to the maximum extent practicable natural storm water runoff regimes and natural course, current and cross-section of water of the commonwealth; and to protect and conserve ground waters and ground-water recharge areas." The Stormwater Management Act included provisions for the contents of the plans, multi-county cooperation, enforcement for non-completion, enforcement for municipal non-compliance, public participation, required five-year updates and 75 percent cost reimbursement. While this was promising and forward-thinking for 1978, these Act 167 plans never were fully funded or enforced by the Pennsylvania Department of Environmental Protection (PADEP). There are 357 designated watersheds in Pennsylvania⁴ and for many of them, Act 167 plans were prepared; however, many have not been updated since their original execution. The municipalities that did incorporate Act 167 plans into their municipal regulations experienced uneven regulatory enforcement.

Pennsylvania enacted the Water Resources Planning Act in December 2002 (Act 220), which required PADEP to update the state's water plan for the first time in 25 years. Pennsylvania updated the state water plan in January 2009. This was another attempt to take an integrated approach to stormwater management in the state. The plan established three priorities: 1) initiate a plan to collect, interpret and disseminate water resources information; 2) encourage an integrated approach to managing water resources; and 3) adopt policies that encourage technological advances designed to conserve and enhance water resources. The plan also provided regional watershed needs and succinct recommendations of legislative priorities necessary to implement the state water plan.

In December 2006, Pennsylvania published the Stormwater Best Management Practices (BMP) Manual. The purpose of the BMP Manual was to provide suggested options and tools to be used when developing site stormwater management plans. Though not law, the BMP Manual is being enforced by some PADEP regions as law.

The regulatory footprint for stormwater management in Pennsylvania exists. Enforcement and funding availability continue to stand in the way of any type of comprehensive stormwater implementation. In addition, a good education program for contractors or developers on the importance of stormwater management does not exist, so the burden of education is left to the engineering consultants who have to obtain permits for new construction.

There are some funding mechanisms in place for stormwater improvements, but there is no dedicated funding source for stormwater. Pennsylvania created the Pennsylvania Infrastructure Investment Authority (PENNVEST) in 1988 to help communities finance infrastructure investments. The PENNVEST Clean Water State Revolving Fund (CWSRF) program provides funding to projects in Pennsylvania for the construction and maintenance of wastewater treatment facilities, stormwater management projects, non-point source pollution controls and watershed and estuary management. The majority of PENNVEST funding has historically gone to sanitary sewage projects. Other funding mechanisms, such as cofunding with combined utility projects and charging municipal users, exist.

CONDITIONS

Local, state and federal governments, which are already on tight budgets, tend to push funding toward more visible infrastructure problems, such as roads and bridges. Consent orders and decrees with federal, state and local agencies brought to light by the Clean Water Act now have turned some of the focus on sanitary sewers. This has forced municipalities to look under their roadways to find their sanitary sewer lines, determine their conditions, start to implement repairs on the most serious defects, and implement operation and maintenance programs.

Historically, stormwater treatment consisted of looking at design storms, determining the amount of runoff and directing the water to a pipe off-site or into a large detention basin. Years of these practices has resulted in increased downstream flooding, redirection of water away from natural/historical drainage ways, redirection of point-source discharges to streams resulting in stream scour, undercutting of stream banks, increased sediment load in streams, and a multitude of unmaintained, dysfunctional stormwater management ponds. The redirection of stormwater quantity has had obvious detrimental impacts to our waterways. The alternatives to this conventional stormwater management practices are on-lot management of stormwater and many of the green solutions that are presented in the state's BMP Manual.

The quality of the stormwater that is entering our waterways had not been considered until recently. Current regulatory programs provide for the characterization of stormwater pipes that have continuous discharges, but there is nothing in place that is looking at the first flush of our storm sewers that are directly discharging into the waters of our state. Studies have shown that this first flush of stormwater through the system can contain animal wastes, garbage, lawn debris, oil and grease, nutrients (phosphorus and nitrogen), pesticides, herbicides, fertilizers and sediment.

State water quality standards have been established for some of the waterways of Pennsylvania, but they are not complete. PADEP has not worked as closely with watershed associations, who are intimately familiar with their watersheds, when establishing the water quality criteria. Once there are established limits for a stream, there is no mechanism to stop stream pollution from existing stormwater runoff. Post-construction stormwater management plans will improve water quality and quantity with new construction, but they will not help water quality within existing stormwater systems.

Currently municipalities, or in some cases homeowners associations, are responsible for the planning, operation and maintenance of stormwater systems. This presents a problem for the municipalities. As with sanitary sewers, some stormwater systems have been in place for many years. To begin to understand the existing systems and how they operate within the traditional watershed boundary, municipalities need to:

- Map their storm sewer systems;
- Determine where all of their stormwater pipes are discharging to (local streams, combined sewer, unmaintained pond, etc.);
- Determine the condition of their stormwater system; and
- Evaluate and maintain existing stormwater structures (outfalls to streams, detention basins, etc.).

The largest obstacle for the municipalities is the lack of funds for their own systems.

POLICY OPTIONS

Municipalities and watershed units need to work together to model and plan for the improvement of existing and future stormwater infrastructure. They also need to determine realistic costs to implement comprehensive, watershed-based stormwater management.

Roadways and aviation have long-term federal grant programs, but water infrastructure does not. Clean and safe water should have the same level of importance as acceptable roadways and safe and efficient aviation.

RECOMMENDATIONS

The Pennsylvania sections of the American Society of Civil Engineers encourage the commonwealth to support the following recommendations:

- Fully fund and enforce Act 167
- Comply with the recommended legislative priorities of the state water plan, including: “Clearly authorize by legislation, regulation, or policy the creation and operation of local Authorities, Utilities, or Management Districts and/or other sustainable funding sources that enable entities to collect fees and generate revenues dedicated to planning, constructing, monitoring, maintaining, improving, expanding, operating, inspecting and repairing public and private stormwater management infrastructure.”
- Manage the level of effort allotted for preparing and updating stormwater management plans. Target critical watersheds with serious quality or quantity problems, based on a set of criteria (e.g., percent impervious cover, population density, federal requirements, special protection watersheds, impaired waters, rate of development, chronic flooding history and critical water planning area designation) for detailed planning efforts. Remaining areas could be covered using a standard planning outline.
- Use stormwater management planning as a tool to achieve compliance with the total maximum daily load (TMDL) implementation where a water body is impaired by stormwater and a TMDL has been prepared or adopted.
- Improve enforcement provisions to provide meaningful economic incentives to adopt, amend and implement stormwater management plans and ordinances.
- Include provisions to address long-term operation and maintenance of stormwater management facilities.
- Adequately fund regular updates to the Pennsylvania Stormwater Best Management Practices Manual to reflect innovation and change and continue to maintain and update the Stormwater Management Model Ordinance to reflect Manual revisions and statutory amendments.
- To the maximum extent practicable and cost effective, vegetated buffers should be preserved and restored along all waterways.

- Through legislative, regulatory and administrative provisions, seek to manage stormwater so as to reduce excess runoff and pollutants.
- Fund, promote and encourage water resource restoration projects.
- With the decreasing federal funding for the State Revolving Loan Fund (SRF) program, Pennsylvania should leverage the available federal funds that remain, using them as collateral for the issuance of state bonds, effectively doubling the amount of funds available for infrastructure investments.
- Establish a statewide infrastructure inventory to increase public awareness of the problems and needs facing the state's physical infrastructure and help the state legislature to focus on programs devoted to long-term growth and productivity.
- Promote sustainable infrastructure initiatives to close the funding gap by promoting better asset management techniques for reducing long-term costs and improving performance and supporting reduction of non-point source pollution of water sources.
- Continue to fund low-interest loans to farmers to implement best management practices for manure handling and storage and land management to protect water sources.

SOURCES

American Society for Civil Engineers (ASCE) Central PA, Lehigh Valley, Philadelphia, Pittsburgh, *2006 Report Card for Pennsylvania's Infrastructure*: May 2006. Available at: <http://www.pareportcard.org/>

American Society of Civil Engineers (ASCE), *2009 Report Card for American's Infrastructure*: March 25, 2009. Available at: <http://www.infrastructurereportcard.org/>

National Association of Flood and Stormwater Management Agencies, *Guidance for Municipal Stormwater Funding*: 2006. Available at: <http://www.nafsma.org/Guidance%20Manual%20Version%202X.pdf>

Pennsylvania Department of Environmental Protection (PADEP), *Pennsylvania State Water Plan (Act 220)*. Available at: <http://www.pawaterplan.dep.state.pa.us/statewaterplan/docroot/default.aspx>

Pennsylvania Department of Environmental Protection (PADEP), *Pennsylvania Stormwater Best Management Practices Manual*: 2006. Available at: <http://www.elibrary.dep.state.pa.us/dsweb/View/Collection-830>

Pennsylvania Department of Environmental Protection (PADEP), *Pennsylvania Stormwater Management Act*. 1978. Available at: <http://www.stormwaterpa.org/act-167.html>

Pennsylvania Department of Environmental Protection (PADEP), *Pennsylvania Water Resources Planning Act*. 2002. Available at:

http://www.portal.state.pa.us/portal/server.pt/community/background_status/10619/water_resources_planning_act_by_section/554285

United States Department of Environmental Protection (DEP), *Clean and Safe Water: 2003-2008 EPA Strategic Plan*. Available at:

<http://www.epa.gov/water/waterplan/documents/Goal2.pdf>

United States Environmental Protection Agency (EPA), *Clean Water Act*. 1972. Available at:

http://cfpub.epa.gov/npdes/cwa.cfm?program_id=45

United States Environmental Protection Agency (EPA), *Clean Water Act Module, State Revolving Load Funds*. Available at: <http://www.epa.gov/watertrain/cwa/cwa59.htm>

United States Environmental Protection Agency (EPA), *EPA Clean Watersheds Needs Survey, 2000*. Available at: <http://www.epa.gov/cwns/>

United States Environmental Protection Agency (EPA), *Summary of Water Infrastructure Forum from Closing the Gap: Innovative Solutions for America's Water Infrastructure Forum, 2003*.

Available at: http://www.epa.gov/waterinfrastructure/pdfs/summary_si_waterinfrastructureforum-2003.pdf

Water Science and Technology Board (WSTB) and Earth and Life Studies (DELS), *National Research Council Report on Regional Cooperation for Water Quality Improvement in Southwest Pennsylvania, 2005*. Available at: http://www.nap.edu/catalog.php?record_id=11196#orgs

- ASCE Policy Statement 131: [Growth and Development \(PS 131\)](#)
- ASCE Policy Statement 302: [Cost Sharing in Water Resources Infrastructure Programs \(PS 302\)](#)
- ASCE Policy Statement 420: [Clean Water Act Reauthorization \(PS 420\)](#)
- ASCE Policy Statement 422: [Watershed Management \(PS 422\)](#)
- ASCE Policy Statement 441: [Storm Water Management \(PS 441\)](#)
- ASCE Policy Statement 447: [Hydrologic Data Collection \(PS 447\)](#)
- ASCE Policy Statement 453: [Federal Capital Budgeting \(PS 453\)](#)
- ASCE Policy Statement 461: [Non-Point Water Source Quality \(PS 461\)](#)
- ASCE Policy Statement 480: [Waste-, Storm-, and Drinking Water Infrastructure Funding \(PS 480\)](#)
- ASCE Policy Statement 522: [Regional Sediment Management \(PS 522\)](#)