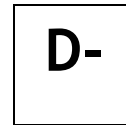


WASTEWATER



2006 Report Card for Pennsylvania's Infrastructure

Aging wastewater management systems discharge billions of gallons of untreated sewage into Pennsylvania's surface waters each year. The EPA estimates that the state must invest \$12.7 billion over the next 20 years to replace existing systems and build new ones to meet increasing demands. In 2005, the federal government cut funding for wastewater management for the first time in eight years. The Bush administration again proposed a further 33% reduction, to \$730 million, for FY06, with the majority reduction coming from a proposed cut of \$200 million to the Clean Water State Revolving Fund. Federal assistance cannot be expected to meet Pennsylvania's needs alone.

BACKGROUND

Water is life. Clean and safe water is critical for human health, ecological health, and maintaining local and national economies. Advances in wastewater treatment, which were initially made at the turn of the 20th century and greatly expanded in the 1970's, helped alleviate epidemics of typhoid, cholera and other waterborne diseases and improved environmental health — increasing fish and shellfish populations in the waters of the Commonwealth.

When sewers were first installed in Pennsylvania, combined sewage systems were used to convey sewage to the nearest waterway. These systems provided a great convenience to cities and towns. Sewage and industrial waste were commonly disposed of into waterways as a matter of course. At the time, streams and rivers were not thought of as recreational areas but instead were used for transport and waste removal. It is only relatively recently that the public perception of waterways has changed to conceptualize waterways as recreation, conservation and preservation areas.

"Without increased investment in wastewater infrastructure, in less than a generation, the U.S. could lose much of the gains it made thus far in improving water quality, and wind up with dirtier water than existed prior to the enactment of the 1972 Clean Water Act."

—House Transportation and Infrastructure Committee

The nation's current wastewater infrastructure and Pennsylvania's combined sewer systems represent nearly a century of investment, substantially funded by local taxpayers. The federal government has directly invested more than \$72 billion in the construction of publicly owned sewage treatment works (POTWs) and their related facilities since passage of the Clean Water Act in 1972. Nevertheless, the physical condition of many of the state's wastewater treatment systems is poor, due to a lack of investment in plant, equipment and other capital improvements over the years.

In 1988, Pennsylvania created the Pennsylvania Infrastructure Investment Authority (PENNVEST) to help communities finance such infrastructure investments. PENNVEST serves as the financing agency for the clean water state revolving loan funds authorized by the Clean Water Act. In May 2004, Pennsylvania voters approved a \$250 million bond issue on water and wastewater infrastructure. \$50 million was directed to PENNVEST, with another \$125 million and \$75 million issued for grants and loans respectively to fund water and sewer projects which are directly related to economic development and involve the investment of capital in Pennsylvania enterprises and communities or result in the creation or preservation of jobs in the Commonwealth.

The U.S. Environmental Protection Agency (EPA) indicates that research and development expenditures on more efficient and affordable technologies in water and wastewater treatment have decreased by half since the early 1970's.

For the past decade, federal funding under the Clean Water Act State Revolving Loan Fund (SRF) program has remained relatively flat. From 1995 to 2004, Congress appropriated between \$1.2 billion and \$1.35 billion.^[1] But in FY 2005, Congress cut wastewater SRF funding for the first time in eight years, reducing the total investment to \$1.1 billion. The Bush administration proposed further cuts for FY 2006, with a budget submittal calling for an appropriation of only \$730 million, a reduction of 33% from the FY 2005-enacted level.

Back in September 2002, the EPA released a detailed gap analysis, which assessed the difference between spending for wastewater infrastructure and total funding needs. In the study, Pennsylvania's funding gap was estimated at *\$12.7 billion*. It is important to note that the funding gap between projected wastewater investment needs and current spending levels is dependant upon the growth of user rates. The gap largely disappears if municipalities increase wastewater spending at a rate of 3% over the rate of inflation.

The EPA's gap analysis provides a starting point for the magnitude of the clean water infrastructure funding issues. While the data available represents a reasonable effort to quantify the funding gap, more detailed statewide data would further assist in more accurately defining the problem and projecting the impact of potential remedies.

The D- reflects:

- A \$12.7 billion funding gap
- Ending life spans for all aspects of infrastructure
- Existing pollution of lakes and streams
- Impending threats to public health, the environment and the economy

[1] The appropriation for state SRF programs was reduced to \$625 million in FY 1997.

CONDITIONS

The useful life of Pennsylvania's wastewater infrastructure is about to expire. Treatment plants typically have an expected useful life of 20-50 years before they have to be expanded or rehabilitated. Pipes have life cycles ranging from 15 to 100 years, with actual pipe life varying depending on soil conditions, pipe material and capacity requirements. And, in some Pennsylvania cities, a number of pipes are approaching 200 years old.

According to the 2002 Needs Survey conducted by the EPA, Pennsylvania's wastewater infrastructure will require a total of \$12.7 billion in investment over the next 20 years, including:

- \$1.7 billion for secondary and advanced treatment
- \$151 million for sewer replacement and rehabilitation
- \$967 million for new collection sewers and interceptors
- \$4.638 billion to address combined sewer overflows
- \$5.849 billion to address non-point source wastewater discharges



Failed Pipe

Without adequate spending on the state's water infrastructure, we risk reversing the public health, environmental and economic gains of the past three decades. To truly understand the urgency, we must examine how failing infrastructure has already affected Pennsylvania's waterways.

Over the past several years, the Pennsylvania Department of Environmental Protection has been studying the health of our lakes and streams. By the end of 2004, the PADEP had assessed 83,161 miles or 82% of the total stream miles in the state. 10,762 stream miles, representing 18% of the assessed and 13% of total stream miles, and 60% of lake area in Pennsylvania were classified as impacted due to on-lot sewer systems, storm water runoff, agricultural activities, acid mine drainage and wastewater discharges.

- **On-site systems failures have impaired 149 stream miles and 6,110 lake-acres.** More than one-third of Pennsylvanians use on-lot sewer disposal, which equates to 1.2 million homes. National failure rates for on-site sewage treatment and disposal systems are reported at 10% annually by the EPA. However, estimates of failure rates range upwards of 20% in Pennsylvania, due to the frequent occurrences of soil conditions unsuitable for on-lot systems. Contamination of groundwater and surface water by failing or substandard septic systems is a considerable risk in much of Pennsylvania, due to the state's geology, soils, land development patterns and large number of aging systems.
- **Runoff has impacted 3,007 stream miles and 97 lake-acres.** Runoff includes urban runoff and storm sewers, road runoff and small residential runoff.
- **Acid mine drainage has impacted 4,040 stream miles.**
- **Non-point source discharges have impaired of 3,903 stream miles.** Concentrated animal feed operations are growing in size and number. Economies of scale and modern technologies are driving the establishment of these new concentrated livestock and poultry operations. The increased efficiencies are necessary for Pennsylvania's agriculture industry to stay competitive in America and abroad.

Fortunately, the PADEP has adopted policies to address the pollution these facilities may produce. In order to encourage the protection of water sources, low interest loans have been made available to farmers, so that they can implement best management practices for manure handling and storage and for land management. In addition, Pennsylvania took part in a multi-state attempt to stop the drastic decline in the ecological health of the Chesapeake Bay, implementing a watershed-based total maximum daily load nutrient discharge limit program in the Susquehanna River watershed.

- **Wastewater handling and treatment has damaged 744 stream miles.** Wastewater handling and treatment includes municipal point source discharges, on-site wastewater treatment and combined sewer overflows.



Sewage Overflow

Nationwide, there are 9,471 combined sewer outfalls (CSO) in 32 states, 1,569 of which are in Pennsylvania — making it the state with the most CSO's. The PADEP has identified 152 communities in the Commonwealth that are currently operating with CSO discharges. Recently, the EPA and the PADEP have placed regulatory and fiscal pressure on communities throughout the Commonwealth to upgrade, repair and replace aging CSO systems — demands that have often exceeded the financial abilities of many municipalities.

The PADEP's findings are alarming. A recent report from the staff of the House Transportation and Infrastructure Committee stated the issue bluntly: "Without increased investment in wastewater infrastructure, in less than a generation, the U.S. could lose much of the gains it made thus far in improving water quality, and wind up with dirtier water than existed prior to the enactment of the 1972 Clean Water Act."

While increased federal subsidies for wastewater needs would help finance required investments, federal support cannot address the entire need. Operation and maintenance costs are not eligible for federal funding and must be borne entirely by local utilities. Therefore, sewage system customers will be forced to pay for the vast majority of the investments, those not funded by the federal government or the state.

Clean and safe water is a public good, therefore the central question becomes to what extent can and will ratepayers pay for needed investment.

Currently, sewage treatment remains relatively inexpensive for many households, comprising less than one percent of household income. Because most water systems do not adequately account for investment needs, residents are paying for sewage treatment at rates that are below cost, and the systems are not generating sufficient revenue to finance investment. While rate increases would generate much needed funding, many low-income families will not be able to afford the added expense.

POLICY OPTIONS

Clean and safe water is no less a national priority than is national defense, an adequate system of interstate highways, and a safe and efficient aviation system. Many other highly important infrastructure programs enjoy sustainable, long-term sources of federal backing, often through the use of dedicated trust funds; under current policy, water and wastewater infrastructure do not.

The case for increased federal investment to assist Pennsylvania and the other states is compelling. Needs are large and unprecedented. In many locations, local sources cannot be expected to meet this challenge alone, and, because receiving waters are shared across local and state boundaries, the benefits of federal help will accrue to the entire nation.

- **Adequately fund PADEP to maximize regulatory flexibility.** Many of the national clean water regulations have included opportunities for states to reduce costs by tailoring requirements to the conditions actually experienced by their wastewater systems. States can only make use of this flexibility if they have adequate staff and administrative support to make case-by-case determination necessary to grant variances and exceptions available under the EPA's rules.
- **Use the best technology for the job.** Funding short falls in state budgets are magnified at the local level by a rigid one-size-fits-all prescription that often results in inefficient expenditures of capital, when more affordable or new innovatively efficient technologies could have been used.
- **Proactively maintain infrastructure.** In many cases, the approach towards public infrastructure is reactive. Systems are built and operated with minimal maintenance until they wear out. Wastewater systems need to conduct a full accounting of the costs to manage their assets both for current operations and future infrastructure needs. By appropriately managing its assets, a system may be able to reduce the overall investment required.
- **Adopt new technology.** Regulators, engineers, and wastewater operators tend to be conservative when it comes to adopting new technologies. New technologies exist to clean and repair old pipes that provide low cost alternatives to replacement of collection mains and sewers. New pipe materials can reduce ground water infiltration into sewers and new high efficiency fixture can reduce water demand. These new technologies must be supported by full-scale demonstrations to gain acceptance by the clean water industry.

RECOMMENDATIONS

The Pennsylvania Sections of the American Society of Civil Engineers encourage the Commonwealth to support the Water Infrastructure Trust Fund Act of 2005 (H.R. 4560). This act would provide a deficit-neutral, guaranteed source of federal-state-local shared investment for the construction and repair of drinking water facilities, and would enable the state to reduce the enormous funding gap.

In addition, the Sections support the following recommendations:

- **Issue state bonds.** With decreasing federal funding for the State Revolving Loan Fund (SRF) program, Pennsylvania should leverage the remaining federal dollars as collateral for the issuance of state bonds — effectively doubling the amount of capital available for infrastructure investments.
- **Create an infrastructure needs inventory.** ASCE supports the establishment of a statewide infrastructure needs inventory to be administered by the state’s municipal planning organizations. This inventory would serve as a mechanism to differentiate between expenditures for current consumption and long-term investment, and would reduce major inefficiencies in the planning, design and construction process for long-term investments. An infrastructure needs inventory would also help to increase public awareness of the problems and needs facing the state's physical infrastructure, and would help the state legislature focus on programs devoted to long-term growth and productivity.
- **Focus on technology.** State government can play an essential role in promoting research, development, testing and evaluation of new technologies and the dissemination of information about proven technologies. ASCE supports state-funded research into wastewater treatment technology, which may reduce capital expenditures as well as operation and maintenance costs. By creating research partnerships with universities throughout the state, Pennsylvania may reap additional economic benefits through public-private partnerships and licensing of new technologies.
- **Promote sustainable infrastructure initiatives.** In order to close the funding gap, support programs that will make infrastructure more sustainable. Promote better asset management techniques that will reduce long-term costs and improve performance. Encourage strides in water efficiency, which will reduce drinking water consumption and the volume of wastewater to be treated. Advocate for full-cost pricing of water and wastewater treatment, and support reduction of non-point source pollution of water sources.
- **Provide reduced rates to the disadvantaged.** In order to cushion the impact of rate increases on low-income households, the state should either a) encourage municipalities to use lifeline rates for low-income households or b) develop a rate reduction program similar to the federal low-income Energy Assistance Program.
- **Protect water sources in farming communities.** Continue to fund low-interest loans to farmers, so that they may implement best management practices for land management and manure handling and storage.
- **Reduce the burden on sanitary sewers.** Wastewater rate calculations are typically based on water consumption. Encourage municipalities to incorporate wastewater flows into rate calculations, providing an incentive to municipalities to reduce inflow to sanitary sewers. If this practice is adopted, care must be taken to account for combined sewer overflow communities – which are typically low-moderate income, so that they do not receive too much of the burden.

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