Sustaining Our Water Infrastructure

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Closing the Gap: Innovative Responses for Sustainable Water Infrastructure
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On behalf of the Office of Water, I want to thank you for your willingness to participate in this crucial dialogue on the future of America's water infrastructure.

First, I want to thank the Administrator for convening this forum. Her leadership on this issue is very much appreciated by all of us in the national water program, especially her focus on innovation as one element of the solution to our investment needs in the years ahead.
Let me build on the Administrator's introduction and sketch for you some of the promising developments in the public and private sector that will enhance our management of the infrastructure that ensures the protection of our water and the delivery of safe drinking water. These innovations will either reduce the need for infrastructure or bring down the costs of infrastructure – and hence "close the gap", the title of today's forum.

Before we talk about ways of closing the "gap," let's talk about what the "gap" is. This term "gap", I'm afraid, may be more a term of bureaucracy than a commonly understood phenomena. Two years ago, *U.S. News and World Report* (6/12/00) called it the "sickening sewer crisis" in an article that began with a description of an ordinary suburban family waking up to a basement flooded by a broken sewer line. *U.S. News* suggested that, without preventive action, this scenario represents our future all across America. Other magazines and newspapers across the country have published a number of stories on the emerging problems in the nation's plumbing.

EPA's report issued a few months ago was a bit more clinical.[1] We talked about "a gap between projected clean water and drinking water investment needs over the twenty-year period from 2000 - 2019 and current levels of spending." Wall Street might call it an "investment gap." An economist might even call it a "pricing gap." There are also different estimates of the size of this gap – the magnitude of our investment needs. But whatever our numbers and whatever our language, the problem we're here to discuss today is that our water and sewer systems are aging – even as our population is growing; and our clean water and drinking water rules are tightening.

Our hope is that today's forum will cover a range of solutions that will speak to everyone – whether you're from a small system facing new drinking water standards requiring treatment for the first time, a large system with a billion dollar combined sewer overflow (CSO) repair bill or a system in the arid West facing the worst drought in a decade. Today's challenges demand a multi-faceted approach to managing and sustaining our infrastructure assets. Not only are we going to have to manage better in both the public and private sectors, we're going to have to use less water and, yes, pay an adequate price for our infrastructure in our role as ratepayers. There is, as the saying goes, no free lunch in our future.

The subjects I'd like to offer up for today's discussion include (but are not limited to) the following four areas.

1. *Better Management.* Better management practices like asset management, environmental management systems, consolidation, and public-private partnerships offer significant savings.
2. *Smart Water Use.* We need to create incentives to conserve and to protect our sources of drinking water.
3. *Full Cost Pricing.* Full cost pricing and rate restructuring can capture the actual costs of our water systems, raise revenues and provide incentives to conserve.
4. *The Watershed Approach.* We need to use a watershed approach, looking more broadly at water resources in a coordinated way.

Better Management

The 1996 Safe Drinking Water Act Amendments stressed capacity development - the proposition being that when drinking water utilities possess adequate technical, financial, and managerial capacity, they are better able to provide safe drinking water. States are using the capacity development provisions in the law to improve utility management. More recently, in the Office of Water, we've been looking at the potential for asset management techniques to reduce a utility's long-term costs and improve performance. This is a structured management approach that is based on information about the condition of a system's assets. Knowing the condition of your assets and linking that information to inventory, service levels, useful life, and repair costs will provide the information needed to make optimal management decisions – including decisions about funding future renewal and replacement.

Recently, working with Australian and U.S. consultants, the Orange County Sanitation District approved an investment of $22-38 million, over a six year period, to implement its Asset Management Plan, as part of a $2 billion investment strategy over the next twenty years. This front-end investment in manpower, planning and assistance, information systems, software, training and other process changes will yield a 20 year return on investment (ROI) in the range of 9:1 to 16:1. This translates into a reduction of $150 million in their capital improvements program and a total life cycle cost savings of at least $200 million.

This 10% savings from just one utility, admittedly a very large one, is equivalent to the current full amount of the federal contribution to California's Clean Water State Revolving Fund (SRF) over two years!

Environmental management systems (EMS) are another important tool to help utilities manage better and reduce costs. The EMS approach involves a comprehensive assessment of an organization's impact on the environment followed by specific targets and objectives and continual checking to make sure the desired results are achieved. EMS and asset management can complement each other and give utilities a powerful way to continually manage for better results and greater efficiency.

EPA has also looked at cost savings that can be achieved by small systems through consolidating ownership or management with other small systems. Although consolidation is not always a viable option, by combining resources, systems can achieve a more sustainable level of technical, financial and managerial capacity. For instance, the system serving the city of Panora, Iowa consistently violated the public health standards for nitrate in drinking water. Rather than incur the cost of installing treatment, the city decided to purchase raw water of a higher quality from a neighboring system. In addition, the city pursued a partnership agreement with another neighboring system to assist with operating and monitoring its water treatment plant. This agreement enabled the city to take advantage of the other system's technical expertise and reduced the need for on-site operators.

Public-private partnerships have helped a number of communities provide water and wastewater treatment at reduced cost. Whether providing basic wastewater treatment supplies (e.g., chemicals), maintaining a portion of the collection or treatment system under a contract, or providing contract operation and maintenance for all of a municipality's facilities, the private sector can serve an important role in the effort to control water pollution across the country. Over the past decade, we've seen an increased interest in using the private sector to meet water and wastewater funding needs. In fact, a Presidential Executive Order (12803) was issued in 1992 directing federal agencies to remove obstacles to privatization, which offers one approach to improving the efficiency and sustainability of our drinking water and wastewater systems. The ultimate key to success lies in better management – irrespective of ownership.

Smart Water Use

In addition to managing better, we're going to have to learn to use water more efficiently. At the end of 2002, nearly half of the continental U.S. was in drought. In addition to reduced rainfall, most of our water systems also face a growing population and a growing economy. Moreover, we're reaching the end of the era in which we could always expand water supply – the era in which we built large dams and conveyance systems. Just this month, Secretary of Interior Gale Norton had to step in to reduce California's withdrawals of water from the Colorado River. As our waters are more stretched across competing demands, our supply side approach will have to be coupled with demand side management. During the next 100 years, we're going to have to become experts on the demand side of the equation: conservation, recycling, reuse and improved water-use efficiency. If we can reuse our treated wastewater for beneficial purposes such as irrigation, manufacturing or groundwater recharge, the environmental and economic benefits are manifold. If all communities would implement metering to measure their consumption, then there would be a basis for price incentives to begin to work. For example, Westfield, Massachusetts went from no meters to a fully metered system. The installation of meters enabled the city to set a metered water rate that allowed for complete cost recovery of its existing and projected expenses. Also the city found that it could abandon plans to develop a new surface water source, as its customers began to conserve water. Imagine the water savings if cities the size of Chicago and Sacramento fully metered their systems.

Metering and reuse aren't the only ways to save water. Many of you probably know the other options available for enhancing water efficiency: plumbing retrofits, leak detection and repair, irrigation improvements, water-saving appliances, landscaping measures and public education. Using these measures, a number of American cities have reduced their water use by as much as 20% and still haven't exhausted all their conservation options. Many of these cities are featured in our publication, *Cases in Water Conservation*.[2]

EPA has a number of resources available to assist water efficiency efforts. We published the *Water Conservation Plan Guidelines* in 1998 for public water systems and we sponsor a voluntary partnership program for businesses and institutions called WAVE (Water Alliances for Voluntary Efficiency). On our website[3] you can also find a number of other publications and links to our water conservation clearinghouse and software.

Full Cost Pricing

In addition to managing better and using less, I believe we're going to have to pay more of the actual costs of maintaining our water systems over time. The Congressional Budget Office recently issued a report entitled *Future Investment in Drinking Water and Wastewater Infrastructure*[4] which points out that increased future infrastructure costs will either have to be paid by taxpayers or ratepayers. To quote CBO: "Ultimately, society as a whole pays 100 percent of the costs of water services, whether through ratepayers' bills or through federal, state, or local taxes." CBO raises strong efficiency arguments for ratepayers picking up the increased costs

rather than taxpayers. Certainly the most direct route for funds to flow is straight from the ratepayer to the utility. In addition, we know that when prices rise, quantity demanded falls. Moreover, in this same report, CBO estimates that combined water and sewer bills currently average 0.5% of income in this country (i.e. one half of one percent of average household income). There appears to be room for higher water bills among *most* households. In a recent draft report from the Organization for Economic Cooperation and Development,[5] the United States had the lowest percentage of income going to water charges among the 18 OECD countries. CBO, in its report, calculated that even if future infrastructure needs fall into the very high range, average water bills will still only account for 0.9% of income *on average*. In a recent article, Harvard economist Robert Stavins describes our water prices as "muffled".[6] He suggests that ratepayers need to hear stronger price signals so that they see a connection between their consumption and their water bill.

This is not to overlook the affordability problems that low-income households may face. To alleviate these hardships, communities can offer rate structures that mitigate impacts on low-income customers. The most prominent example is "lifeline rates" where the charge for an amount of service considered non-discretionary (the minimum sanitary requirement) is kept low, but then higher unit charges are levied on water consumption beyond that amount. While affordability programs are offered by 14% of water utilities,[7] there is still much to learn from the gas and electric utilities in their many years' experience in offering low-income assistance. We want rates that are affordable for most households, but not so "muffled" that we can't hear a price signal, a signal which conveys important information on the condition of the infrastructure which it supports.

The Watershed Approach

Finally, in addition to managing better, using less and adequately pricing services, we're going to have to use the watershed approach. EPA views watersheds as the basic unit to define and gauge the nation's water quality. The watershed approach is a term generally invoked to mean broad stakeholder involvement, hydrologically defined boundaries, and coordinated management across all aspects of policy that affect water. Leading the way are over 4,000 local watershed organizations in the U.S. working to advocate watershed restoration, source water protection, improved site design, erosion control, land conservation, stormwater management and many other aspects of water resource management. I have asked our senior managers to identify ways to advance the watershed approach, including how to increase our training and technical assistance for these local, state, and tribal watershed partnerships.

Several facets of the watershed approach can be advanced by jurisdictions at all levels to reduce the cost of future infrastructure. I'll mention three areas:

1. *Targeting*. In the 1987 Amendments to the Clean Water Act, Congress created the Clean Water State Revolving Fund (SRF), and later, in the 1996 Amendments, Congress created its sister program, the Drinking Water State Revolving Fund, to provide a water infrastructure funding resource in perpetuity. To the extent that flexibility is available under these Amendments, federal, state, local and tribal governments need to target those watersheds and projects that have the greatest impact on human health issues, sources of drinking water and ecosystem protection. Some 19 states use integrated planning and priority setting so that highest priority water quality problems are addressed first with Clean Water SRF funds. This integrated approach helps direct SRF funds toward projects with the greatest water quality benefit.

The Safe Drinking Water Act Amendments of 1996 encourage a watershed approach to drinking water protection. As directed by the Amendments, each of the states has developed a Source Water Assessment Program which analyzes existing and potential threats to the quality of drinking water. States may use funds from the Drinking Water SRF to conduct source water assessment and protection activities including land acquisition and wellhead protection.

Protecting drinking water sources from contamination in the first place has been shown to reduce costs significantly. An EPA study has shown that prevention can be up to 40 times more cost effective than remediating or finding new drinking water sources.[8] Clearly, targeting our assistance to control nonpoint sources and protect source waters are promising ways of bringing down the costs of future infrastructure.

2. *Watershed-based Permitting*. A number of states are adopting a statewide watershed approach and I want to expand our efforts to assist those states. I have directed our Office of Wastewater Management to accelerate its efforts to support authorized states and regions to issue NPDES permits on a watershed basis. Integrating our NPDES permitting system into a community's watershed management plan, we will have more efficient and environmentally focused management.

3. *Watershed Trading*. Watersheds are ideal for experimenting with market-based incentives; and our Water Quality Trading Policy[9] released on January 13th of this year renews our efforts to pursue water-quality trading for nutrients, sediments and other pollutants to reduce the cost of compliance with water-quality based requirements. With this policy, we're supporting states and tribes in developing trading programs that meet the requirements of the Clean Water Act. A water quality "credit" could be created by reducing pollution loads beyond the level required by the most stringent technology requirement. For example, an unregulated landowner or a farmer could create credits by changing cropping practices and planting shrubs and trees next to a stream. A municipal wastewater treatment plant then could purchase and use these credits to meet water quality limits in its permit. Trading for TMDL (Total Maximum Daily Load) implementation offers particular promise for its water quality and economic benefits. Our policy supports trading among and between regulated and unregulated sources.

In its analysis of the Clinton Administration's Clean Water Initiative, EPA concluded that the total potential savings from all types of trading range from $658 million to $7.5 billion annually.[10] A current example of a successful trading effort, between point sources only, can be found on Long Island Sound where nitrogen trading among publicly owned treatment works in Connecticut is expected to save over $200 million in control costs.

A study of three watersheds in Minnesota, Michigan and Wisconsin by the World Resources Institute (2000)[11] found that the cost of reducing phosphorous from point sources, traditional pipe-in-the-water dischargers, was considerably higher than those based on trading between point and non-point, or diffuse, sources of runoff which are not regulated by the Clean Water Act. The estimates for point source controls ranged from $10.38 per pound of phosphorus in the Wisconsin watershed to $23.89 in the Michigan watershed. Using trading between point and non-point sources, these costs could be lowered to $5.95 per pound in Wisconsin, a reduction of over 40%, and to $4.04 in Michigan, a reduction of over 80%.

Clearly, if we use some or all of these facets of the watershed approach – prioritizing, permitting or trading – we can more efficiently address clean water and drinking water needs.

Conclusion

In conclusion, I've suggested 4 broad directions that will help us meet future infrastructure needs: better management, smart water use, full cost pricing, and the watershed approach. I invite your thoughts on each of 4 parallel questions:

- How can we manage better?
- How can we foster smarter water use?
- How can we use the price mechanism?
- How can we use the watershed approach?

My list is by no means, all-inclusive; I offer it merely as a rough outline for our discussion here today, focusing on the innovative aspects of these concepts. I look forward to hearing your thoughts on these and other matters. Moreover, I look forward to working with all of you to ensure clean and safe water for the 21st century. Again, thank you for your contribution of time and expertise to this concerted effort to close the gap in America's investment in our water infrastructure.

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[1] EPA-816-R-02-020, *The Clean Water and Drinking Water Infrastructure Gap Analysis*, Office of Water, September 2002. Website: http://www.epa.gov/owm/gapreport.pdf (PDF, 2MB)
[2] EPA832-B-02-003, *Cases in Water Conservation*, Office of Water, July 2002. Website: http://www.epa.gov/OW-OWM.html/water-efficiency/utilityconservation.pdf (PDF, 325KB)
[3] The Office of Water's website is http://www.epa.gov/ow/.
[4] Congressional Budget Office, *Future Investment in Drinking Water and Wastewater Infrastructure*, November 2002, ISBN 0-16–01243-3.
[5] OECD, 11-20-02 Draft, "Social Issues in the Provision of Water Services" Table 2-2.
[6] Sheila M. Cavanagh, W. Michael Hanemann, and Robert N. Stavins, "Muffled Price Signals: Household Water Demand Under Increasing-Block Prices," December 31, 2001 ASSA Paper.
[7] Survey by Raftelis Environmental Consulting (2002).
[8] EPA-813-B-95-005, Office of Water, *Benefits and Costs of Prevention: Case Studies of Community Wellhead Protection - Volume I*. 1996.
[9] EPA, Office of Water, *Final Water Quality Trading Policy*, January 13, 2003. Website: http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html.
[10] EPA-800-R-94-002, Office of Water, *President Clinton's Clean Water Initiative: Analysis of Benefits and Costs*, March 1994.
[11] Paul Faeth, *Fertile Ground: Nutrient Trading's Potential to Cost-effectively Improve Water Quality*, Washington, D.C.: World Resources Institute, 2000.