# CLEAN & SAFE WATER
## FOR THE 21ST CENTURY

A RENEWED NATIONAL COMMITMENT TO
WATER AND WASTEWATER INFRASTRUCTURE

WATER INFRASTRUCTURE NETWORK

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**The Water Infrastructure Network (WIN)** is a broad-based coalition of drinking water, wastewater, municipal and state government, engineering and environmental groups dedicated to preserving and protecting the hard-won public health, environmental and economic gains that America's water and wastewater infrastructure provides. WIN is calling on the federal government to significantly enhance its role in financing the nation's clean and safe water infrastructure.

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# Executive Summary

America's water and wastewater systems face an estimated funding gap of $23 billion a year between current investments in infrastructure and the investments that will be needed annually over the next 20 years to replace aging and failing pipes and meet mandates of the Clean Water Act and Safe Drinking Water Act. Of this total, water systems account for $11 billion a year and wastewater systems account for $12 billion a year.

This level of investment would be unprecedented and would face significant competition within local budgets from operating and maintenance costs that are escalating by 6 percent a year above the rate of inflation. Current federal contributions cannot help since they have declined by 75 percent in real terms since 1980 and today represent only about 10 percent of total capital outlays for water and wastewater infrastructure and less than 5 percent of total water and wastewater outlays.

New solutions are needed to what amounts to nearly a trillion dollars in critical water and wastewater investments over the next two decades. Not meeting the investment needs of the next 20 years risks reversing the environmental, public health, and economic gains of the last three decades.

## Is Water and Wastewater Infrastructure Important?

There is little disagreement that investments in water and wastewater systems pay substantial dividends to the environment, public health, and the economy. It is well documented that municipal wastewater treatment plants prevent billions of tons of pollutants each year from reaching America's rivers, lakes, and coastlines. In so doing, they preserve our natural treasures such as the Chesapeake Bay, the Great Lakes, and the Columbia River. Clean water supports a $50 billion a year water-based recreation industry, at least $300 billion a year in coastal tourism, a $45 billion annual commercial fishing and shell fishing industry, and hundreds of billions of dollars a year in basic manufacturing that relies on clean water. Clean rivers, lakes, and coastlines attract investment in local communities and increase land values on or near the water, which in turn, create jobs, add incremental tax base, and increase income and property tax revenue to local, state, and the federal government.

Some 54,000 community drinking water systems provide drinking water to more than 250 million Americans. By keeping water supplies free of contaminants that cause disease, our water systems reduce sickness and related health care costs as well as absenteeism in the workforce. By providing adequate supplies to industries that rely on pure water for processing, cooling, or product manufacturing, America's water systems create direct economic value across nearly every sector of the economy and every region of the country. America's water systems contribute directly to the productivity of our workforce and continuous growth in gross domestic product (GDP).

## Why Are Needs So High?

The cost of building, operating, and maintaining needed drinking water and wastewater facilities over the next 20 years approaches $2 trillion dollars. Annually, this would require about $95 billion in capital and O&M expenditures, of which some $50 billion is needed for drinking water (compared to roughly $36 billion in current local expenditures for drinking water) and $45 billion for wastewater (compared to roughly $25 billion in current local expenditures for wastewater). About half the 20-year need, or roughly $1 trillion, is associated with capital investment in plants, water distribution systems, and wastewater collection systems.

Three trends contribute to this unprecedented level of need: increasing federal mandates for clean water and safe drinking water; increasing unit costs of attaining these requirements using more complex technology and increased use of chemicals and energy; and historical under-recognition of the cost to replace aging and failing water and wastewater pipes.

## Can Water and Wastewater Utilities Meet This Need Alone?

Local solutions, like increased water and wastewater rates or operating efficiencies, can address only a portion of this problem. Financing the full $23 billion a year gap with utility rate increases would result in a doubling or tripling of rates across the nation. If this were to happen, at least a third of the population of the U.S. would have to pay more than 4 percent of their household income for water and sewer, the conventional criterion for affordability. Small, rural, and low-income communities would be hit the hardest, since costs are high in small, dispersed systems and low-income households have little disposable income with which to pay higher rates. Some 60 percent of the U.S. population has experienced no increase, or a loss, in real household income over the last 20 years, so for the majority of U.S. families, sharp increases in water and wastewater rates can be expected to have significant economic impacts.

## What Are the Options for Federal Investment?

There is ample precedent for, and clear economic principal supporting, a strong federal role in funding water and wastewater infrastructure. The importance of wastewater infrastructure was well understood in the 1960s as the nation watched the quality of its waters decline precipitously and chose in the 1972 Clean Water Act, to spend federal tax dollars to reverse this trend. Despite increasing federal mandates for cleaner water and safer drinking water, despite shifts in population that strand water and wastewater assets in urban core cities with few ways to pay for needed improvements, and despite the nearly universal need to replace billions of dollars in aging and failing water distribution and wastewater collection systems, the federal contribution to water and wastewater continues to decline.

Interestingly, this is not the case in other basic infrastructure systems such as highways, airports, or transit systems. To finance these equally critical transportation systems, Congress has established federal trust funds that assure continuous funding to meet changing needs. The rationale is simple: these basic infrastructure systems underpin the U.S. economy broadly and their benefits accrue widely to users without geographic limitations imposed by local political boundaries. Moreover, these infrastructure systems have network benefits that are felt only after all, or substantial portions, of the network is complete and functional, affording Americans anywhere in the country access to minimum levels of services.

Water and wastewater systems share these same characteristics. Accordingly, federal solutions like direct grants from the General Fund, a dedicated Clean and Safe Water Trust Fund, or other forms of targeted assistance make good economic sense. Each approach has certain advantages and limitations in terms of its ability to provide (1) sufficient funding to meet the water and wastewater investment gap; (2) an equitable distribution of funds; (3) funding stability and long-run predictability of capital; and, (4) financial and administrative innovation. Yet, any of these options would renew the federal commitment to clean water and safe drinking water and recognize the central role that these infrastructure investments play in the health of all Americans, the welfare of our communities, the integrity of our natural environment, and the strength of our economy.

# CHAPTER 1 The Value of Clean and Safe Water

America's water and wastewater infrastructure systems are national assets that yield dividends to all citizens in the form of healthy natural ecosystems, healthy people free from waterborne disease, and a healthy and growing economy. Over the last several decades, we have invested significantly in building the country's portfolio of public and private drinking water and wastewater treatment systems to preserve these values. At times, these investments were motivated on the basis of restoring degraded national treasures such as the Potomac River, the Great Lakes, and the Puget Sound. Americans have demanded – and asked that their tax dollars pay for – contaminant-free drinking water for all communities as well as rivers, lakes, and coastlines safe for swimming and fishing without fear of disease or contamination. In still other instances, decision makers have simply understood that water and wastewater systems form the foundation for economic expansion and industrial growth and have called upon the nation to invest in this infrastructure to build strong local, regional, and national economies. These are the reasons – ecology, public health, and economy – that the nation must once again renew its resolve to invest in water and wastewater systems.

Several observations about the physical and financial health of America's water and wastewater systems make it vital to begin to invest more now. First, a subsequent chapter will demonstrate that America has simply under-invested historically relative to growing needs to attain both surface water quality goals and goals for safe drinking water. Second, demographic trends suggest increasing migration of population to suburban and exurban communities, leaving our central cities and their shrinking populations with unmanageable costs to maintain and replace aging infrastructure. Finally, even in communities with stable populations, many if not most will face a bulge in investment need over the next decade or two as systems built earlier in the 20th Century require replacement. Financing these investments strictly with user payments will cause widespread economic hardship. In some communities – particularly small, rural, and low-income ones – neither public nor private capital markets are likely to support needed levels of financing, if repayment is drawn only from the user base.

## Investments in Safe Drinking Water Protect Millions of Americans Against Diseases

Each day most Americans enjoy the benefits of clean water when they simply turn on a faucet to pour a clean, safe glass of drinking water. This has not always been the case in the U.S. and is not the case in many countries where central water supplies still pose serious risks of waterborne disease.

**Investments in Drinking Water Systems Protect 9 out of 10 Americans**
Since the mid-1970s, investments made by community systems to ensure that water is safe for human consumption have helped prevent 200,000 to 470,000 cases of gastrointestinal illness each year.
**Source: U.S. EPA**

Outbreaks of waterborne diseases[1] are now rare in the U.S. due to investments to protect the safety of our public drinking water supplies from the effects of harmful chemicals and microbial pollutants. Some 54,000 community

drinking water systems provide drinking water for over 250 million Americans. About 20 percent of those systems, which serve two-thirds of the population, use surface waters, such as lakes or rivers, for their water source.[2]

The risk of waterborne disease, however, has not been completely eliminated. In 1993, contamination of the water supply in Milwaukee by *Cryptosporidium* shut down the city's water system, made over 400,000 people sick, was attributed as the cause of over 100 deaths, and cost local businesses over $50 million in lost economic activity.[3] In recent years, Washington, DC, residents were issued advisories to boil water before consumption along with other communities where localized cases of contamination left public water supplies unsafe for residents.

While these are examples of well-publicized outbreaks of gastrointestinal illness, the Centers for Disease Control and Prevention (CDC) advises that many outbreaks of waterborne disease remain unreported every year. Indeed, recent CDC estimates indicate that as many as 1.3 million cases of waterborne disease occur each year.[4] Other researchers estimate this figure to be significantly higher. New and stricter regulations will undoubtedly result in the need to upgrade many existing drinking water facilities throughout the nation. Scientists and researchers are also raising new concerns over endocrine disrupters, pharmaceuticals, and emerging viruses and other pathogens that can create adverse health effects or cause diseases when consumed in drinking water. Continued investment in improving the reliability of drinking water treatment along with investments in protecting drinking water sources is necessary to ensure that our drinking water supplies remain free of harmful contamination.

## Investments in Water and Wastewater Infrastructure Support Economic Prosperity and Growth

Every day, Americans rely on clean water for recreation, commercial fishing, and a wide range of industrial activity. These economic activities generate billions of dollars in income every year, none of which would be possible without the clean water resource base on which they rely. Adequate water supplies and capacity to safely manage wastewaters are both key to industrial production, public safety, and the general welfare of communities. The very existence of clean natural ecosystems increases the economic value of adjacent lands and nearby development, which in turn, stimulates additional investments, enhances local tax bases, and creates jobs.

### Recreation

When they are clean, coastal areas, rivers, and lakes support a large recreation and tourism industry that attracts investment, provides jobs, and generates substantial personal and corporate taxable income. Each year, Americans make an estimated 1.8 billion trips to go fishing, swimming, boating, or enjoy other activities at water destinations that they judge are clean and safe for these activities. While pursuing recreational activities that depend on clean water, they spend money and create jobs in the process. Nearly $45 billion of the $380 billion annual sales in 1993 for the U.S. recreation and tourism

**Cleaner Water in the Great Lakes Supports Valuable Sport Fisheries**

In 1995, the U.S. Fish and Wildlife Service reported that participants in the fishing industry in the U.S. portion of the Great Lakes generated about $2.22 billion in sales to local businesses and that the industry represented $4.4 billion in annual economic activity. About 75,000 jobs are supported by Great Lakes sport fisheries. **Source: U.S. Fish and Wildlife Service**

industry was for fishing, boating, birdwatching and waterfowl hunting. Nearly 49 million anglers spend $24 billion annually for recreational fishing, ultimately generating $69 billion for the U.S. economy. The Indian River Lagoon, an estuary in Florida that has been protected and preserved through investments in wastewater infrastructure and other programs, delivers more than $700 million a year in value to the local economy through recreational fishing, swimming, boating, and nature observation.[5]

But not all rivers, lakes, and coastal waters are clean enough to generate these economic benefits. According to EPA's most recent analysis, some 40 percent of America's surface waters are still too polluted for safe fishing or swimming. More than 2,500 beaches were closed in 1996 to protect the public from polluted water.[6] In 1996, nearly 2,200 advisories restricting consumption of fish contaminated with dangerous levels of mercury, PCBs and other toxics were in effect. These fish consumption advisories applied to 15 percent of the nation's lake acres and five percent of river miles.[7] When recreational fisheries are placed off limits or beaches are closed, local businesses that support recreational fishing and other water-based recreation suffer significant loss in income.[8]

**Beach Closings Can Devastate Local Economies**
After beach closings in 1988 in New York and New Jersey due to sewage and medical waste wash-ups, recreation and tourism dropped dramatically. Beach attendance on Long Island dropped 50 percent when the debris first washed ashore. Lodgings and reservations dropped sharply and retail sales fell in New York and New Jersey communities that depend on beach tourism. Economic losses to the region were estimated at more than $4 billion. **Source: U.S. EPA**

In 1993, recreational striped bass anglers from New York to Virginia spent $72.4 million on such items as tackle, fuel, and bait; and this ultimately produced a total economic output of $144 million.[9]

Sport fishing plays a significant role in the lives of over 35 million American adults. In 1996, these anglers spent more than 625 million days fishing the nation's inland and coastal waters for a variety of game fish. A substantial industry has evolved to provide goods and services to meet the diverse needs of the nation's anglers. A recent study by the American Sportfishing Association (funded by the U.S. Fish and Wildlife Service) estimated that the U.S. spent some $38 billion for goods and services to support their fishing activities. This $38 billion in direct expenditures for fishing, in turn, generated another $108 billion in purchases throughout the economy and 1.2 million jobs, with benefits to local economies wherever fishing takes place. In many small coastal and inland communities, angler expenditures were central to economic health and growth.[10]

Coastal water pollution has a significant economic effect on coastal states. Failing to invest in clean water in our coastal communities robs coastal states of jobs, worker productivity, tourism and property tax dollars, and economic growth. Polluted waters also cause economic losses both from swimming-related illnesses and from the beachgoers' lost use of the beach. Beaches are the top vacation destination in the country and coastal tourism, attributable in part to clean beaches, generates substantial revenues for state and local governments. For example, tourist expenditures in California coastal counties in 1997 were approximately $37.6 billion, providing 387,530 jobs. Tourist expenditures equaled $4 billion in 1997 in the coastal counties of South Carolina and $5.8 billion in New Jersey's coastal regions in 1998 (excluding Atlantic County, with its large gaming industry revenues). In 1998, tourist expenditures in Hawaii were estimated to be $14.6 billion, contributing to 179,950 jobs. These tourist dollars and jobs are put at risk if beach water is polluted and unsafe for swimming.[11]

## Commercial Fishing

The $45 billion commercial fishing and shellfishing industry depends on clean water to sustain fisheries and deliver products that are safe to eat. Our commercial fishing fleet delivers fish and shellfish products worth $3.5 billion annually, a value that increases tenfold or more in the retail marketplace. The industry employs 250,000 people harvesting over 10 billion pounds of fish and shellfish from the Great Lakes, Gulf of Mexico, Puget Sound, and other water bodies.[12]

**Improved Water Quality Leads to Comeback in Commercial Striped Bass Fisheries on East Coast**

By the early 1970s, commercial striped bass fishing was all but eliminated along the East Coast, in part a result of sustained pollution from municipal and other sources of water pollution. In 1993, after two decades of improvements to wastewater treatment plants, commercial striped bass landings from New York to Virginia were valued at $2.3 million, and this in turn generated a total economic output of $40.8 million. **Source: National Marine Fisheries Service, cited in *Bay Journal***

Despite these economic benefits, challenges still exist in cleaning up and managing the water resources that support fisheries. In 1994, nearly one out of every three shellfish beds were closed or restricted for harvest by the states.[13] The 1995 National Shellfish Register reported that 6.7 million acres of shellfish beds were restricted nationally, with water pollution as the cause for 72 percent of those restricted acres.[14] Lowered fishery productivity, reduced and more costly fish harvests, and weakened consumer confidence are among the effects of water pollution on the fishing industry. Clean water is essential to protecting our nation's fisheries, jobs in the fishing industry, and our seafood supply.

## Manufacturing

Manufacturers use about 13 trillion gallons of water a year.[15] While manufacturing operations vary widely, nearly all require a reliable source of clean water for production purposes, cooling, or as an essential ingredient in products. The soft drink manufacturing industry alone uses over 12 billion gallons of water each year to produce products generating over $54 billion in sales.[16]

**The Soft Drink and Beer Industries Rely on Clean Water**

A recent study found that the soft drink industry – producers, bottlers, and distributors of carbonated beverages – employs 175,000 people, creates 1.6 million jobs, generates $8 billion each year in salaries and wages, and pays $17 billion in federal and state taxes. **Source: National Soft Drink Association**

In 1997, the total economic contribution of the beer industry in the United States was $187 billion. The beer industry directly or indirectly employs some 2.5 million workers, who earn $60 billion in wages and benefits. According to the Beer Institute, "brewers rely on pure water and agricultural products to produce fine quality beers, ales and other malt beverages." **Source: Beer Institute**

Community and business leaders recognize the importance of a clean water supply and adequate sewage treatment capacity to attract, expand, and retain local industries. With clean water, a manufacturer can avoid installing expensive treatment technology, keep its production costs down, and have confidence in the local drinking water supply used by its employees. The cost of treating intake water for the manufacturing sector was estimated in 1990 at $550 million a year.[17]

Inadequate capacity to treat wastewater or supply clean water can cripple a local economy and drive manufacturing to locations with adequate capacity. Imagine, for example, a factory operating at 50 percent capacity because the local wastewater treatment plant cannot accommodate additional influent. The same capital plant in another location could double production, double sales, increase jobs, and return significantly more tax revenue to the local economy.

## Clean Water Creates Opportunities for Local Investments and Enhances Adjacent Land Values

Who wouldn't pay more to live on the shores of a clean lake as opposed to a polluted one? The same is true of almost any water body in the United States and when economists measure this effect, they find the extra price that people pay to live on or near a clean water body is reflected in the value of their property. Higher property values, in turn, generate increased tax revenues for government entities that collect property taxes.

**High Tech Needs Clean Water For Production**
Throughout Texas, cities are competing for high-tech industry because of its potential for providing "clean" jobs and economic growth. High-tech industries are high water use industries. In 1992, in the City of Austin, six of the top nine water users were high-tech industries. Companies like Motorola, IBM, and Texas Instruments depend on the City of Austin Water and Wastewater Utility to provide clean water and wastewater treatment capacity for their semiconductor and printed circuit board manufacturing processes.
**Source: Texas Water Resources Institute.**

A 1993 study by the National Association of Home Builders found that proximity to a body of water (i.e., within 300 feet) increases the value of property by an average of 28 percent.[18] When surface water quality is poor, any positive influence on property values is lost, or even reversed.

A 1996 study in Maine estimated the effect of water quality on lakefront property prices for selected Maine lakes using a hedonic property price model. Using the indicator of "clearer water" as a proxy for pollution because anyone can judge that parameter for themselves, the study showed that lakes with clearer water have higher lakefront property prices. The study found that one meter of visibility improvement resulted in increases in property values ranging from $11 to $200 per foot of lake frontage for selected lakes. These implicit prices, when aggregated for an entire lake, equate to millions of dollars in increased property prices per lake.[19]

An economic analysis of a plan for improving the management of the Lake Champlain watershed estimated that property values could rise by as much as 10 percent due to improvements in water quality in the lake. With a total assessed value of real estate around the lake of $8.6 billion and an estimated five percent or $430 million in lakefront property value, a modest 10 percent improvement in water quality would generate some $43 million in increased property value. At a relatively modest property tax rate of $10 per $1000 of assessed value, water quality improvement would result in more than $1 million net new tax revenue a year, essentially forever.[20]

## Investments in Wastewater Treatment Deliver Dividends in the Form of Healthy Ecosystems

While the precise economic value of people's pride in their environment is impossible to calculate, experience suggests that American citizens are willing to invest tax dollars in the environment to protect public health and achieve healthier biological systems. One recent survey, for example, confirmed that 74 percent of the 800 Americans polled were willing to pay one percent more in taxes to, "guarantee a safe and efficient sewage and water treatment system."[21] This finding is not unique – all over America, communities are focused on, and willing to pay to preserve, rivers, lakes, and estuaries as a source of outdoor recreation, economic growth and civic pride.

In the 1950s and 1960s, discharges from municipal and industrial sources to the Great Lakes nearly choked out fish populations. In those years, the oxygen needed to sustain aquatic life in Lake Erie was so low, that biologists described it as a dying lake. Odor was constant and beach closures were common. Now, after investments to improve wastewater treatment, recreation and tourism are increasing because fish populations are recovering. Lake Erie now supports a $600 million per year fishing industry.[22]

**Lake Sturgeon Return to the Niagara River**

Since the early 1980s, efforts to clean up toxic pollution in the Niagara River have restored its natural beauty and improved the aquatic ecosystem. Much of the 80 percent reduction in point source discharges of toxics is attributed to improved wastewater treatment by the City of Niagara Falls. With a healthier aquatic ecosystem, an important native fish species, Lake Sturgeon, has returned to the upper Niagara River. **Source: U.S. EPA**

In 1965, President Johnson called the Potomac River "a national disgrace" because it was too polluted for safe human contact. Fish kills were common. Dramatic improvements occurred after federal funding helped build a state-of-the-art sewage treatment plant that now treats over 70 percent of the region's wastes before discharging it into the Potomac River. Improved sewage treatment is recognized as the single biggest factor in the Potomac's restoration. With commercial and recreational fishing reestablished, the estimated annual economic benefit of recreation and other uses of the Potomac is some $120 million for Maryland, Virginia, West Virginia, and Washington, DC.[23] Perhaps more important, the Potomac now stands as the centerpiece of a healthy urban ecosystem, of which Americans are proud. With millions of foreign visitors to the region each year, nothing less would have been acceptable.

**Boston Harbor Clean-Up: A Source of Civic Pride**

President George Bush once called it "The filthiest harbor in America," but today after 14 years and $3.9 billion in treatment works, signs of recovery are everywhere: harbor seals sunning themselves on the rocks, clammers digging in Quincy for the first time in 10 years, significantly fewer fish tumors, and hundreds of millions of dollars in private development along Boston Harbor's beaches, piers, parks, and wharves. According to John DeVillars, former head of the EPA in Boston, "Without question, this is one of America's greatest environmental success stories." **Source: The Boston Globe 3/15/00**

Reductions in nitrogen and phosphorus discharges to the Chesapeake Bay and its tributaries are necessary to protect and sustain the productivity of the nation's largest estuary. The Patuxent River watershed, which drains into the Chesapeake Bay, was one of the most nutrient-enriched areas by the 1970s. Since 1984, improvements in local wastewater treatment plants substantially reduced nutrient loads to the river. Water clarity and dissolved oxygen levels are improving, fisheries and wetlands are healthier, and residents of the Bay region can now enjoy fishing and boating on the Patuxent River.[24]

There is no dispute that clean and safe water contribute to the nation's economy, the public health of all citizens, and the protection of lakes, rivers, and coastal ecosystems. This is, in fact, exactly the rationale behind decades of congressional and popular support for regulatory and financial assistance programs in the U.S. water sector. Today, however, we face future financial challenges in the water sectors that far exceed historical investment patterns. So, while national resolve to improve the economy, public health, and ecology are at an all-time high, one of our most successful strategies to accomplish these goals – adequate and efficient water and wastewater systems for all Americans – is at risk of failure because of inadequate investment. These issues deserve much deeper national attention.

1 Examples of waterborne diseases include cholera, typhoid, hepatitis, dysentery, and various gastrointestinal illnesses.

2 U.S. Environmental Protection Agency, Office of Ground Water and Drinking Water, "1998 Public Drinking Water Systems Facts and Figures."

3 U.S. Environmental Protection Agency, *Liquid Assets: A Summertime Perspective on the Importance of Clean Water to the Nation's Economy*, EPA-800-R-96-002, May 1996, p.17.

4 See, for example, Pierre Payment, Jack Siemiatycke, Lesley Richardson, Gilles Renaud, Eduardo Franco, and Michele Prevost, "A Prospective Epidemiologic Study of the Gastrointestinal Health Effects Due to the Consumption of Drinking Water," *International Journal of Environmental Health Research*, March 1997, page 5–32.

5 U.S. EPA, Liquid Assets, p.2.

6 U.S. Environmental Protection Agency (U.S. EPA) and U.S. Department of Agriculture (U.S.D.A.), *Clean Water Action Plan: Restoring and Protecting America's Waters*, EPA-840-R-98-001, February 1998, p. 27.

7 U.S. EPA and U.S.D.A., *Clean Water Action Plan*, p. 22.

8 U.S. EPA, *Liquid Assets*, p.5.

9 National Marine Fisheries Service data cited in: "Commentary," *Bay Journal*, December 1996.

10 American Sportfishing Association, "The 1996 Economic Impact of Sport Fishing in the United States," http:/www.asafishing.org.

11 Natural Resources Defense Council, "Testing the Waters – 1999: A Guide to Water Quality at Vacation Beaches," July 1999.

12 U.S. EPA, *Liquid Assets*, p.6.

13 U.S. EPA, *Liquid Assets*, p.6.

14 U.S. EPA and U.S.D.A., *Clean Water Action Plan*, p. 26.

15 U.S. Bureau of Census data cited in U.S. EPA, *Liquid Assets*, p.10.

16 U.S. EPA, *Liquid Assets*, p.10.

17 U.S. Environmental Protection Agency, *President Clinton's Clean Water Initiative: Analysis of Benefits and Costs*, EPA-800-R-94-002, March 1994, p. D-17.

18 National Association of Home Builders, *Housing Economics*, Washington DC, 1993.

19 Holly J. Michael, Kevin J. Boyle, and Roy Bouchard, *Water Quality Affects Property Prices: A Case Study of Selected Maine Lakes*, Maine Agricultural and Forest Experiment Station, February 1996.

20 Timothy P. Holmes and Anthony Artuso, *Economic Analysis of The Draft Final Plan*, The Lake Champlain Management Conference, July 1996.

21 The Luntz Research Companies, "Rebuild America—Infrastructure Survey," January 1999, Washington, D.C.

22 U.S. EPA and U.S.D.A., *Clean Water Action Plan*, p. 2.

23 U.S. EPA, *Liquid Assets*, p.4.

24 U.S. EPA, *President Clinton's Clean Water Initiative*, p. 32.

# CHAPTER 2 A HISTORICAL AND FUTURE PERSPECTIVE ON INVESTMENT IN WATER AND WASTEWATER

Originally, all investment in our nation's drinking water and wastewater infrastructure was either local or private. While this approach may have seemed adequate at the time, the cumulative effects of population and economic growth, insufficient facility investments, and inadequate national standards for water quality resulted in increasing discharges and considerable deterioration of America's waters by the 1950s and 1960s. Stringent federal requirements followed, which resulted in greatly increased local investments. At first, federal support to wastewater systems followed federal mandates, but the level of federal help has declined substantially. Federal help for drinking water systems has always been modest, despite historical escalation in mandates and expectations for them to continue.

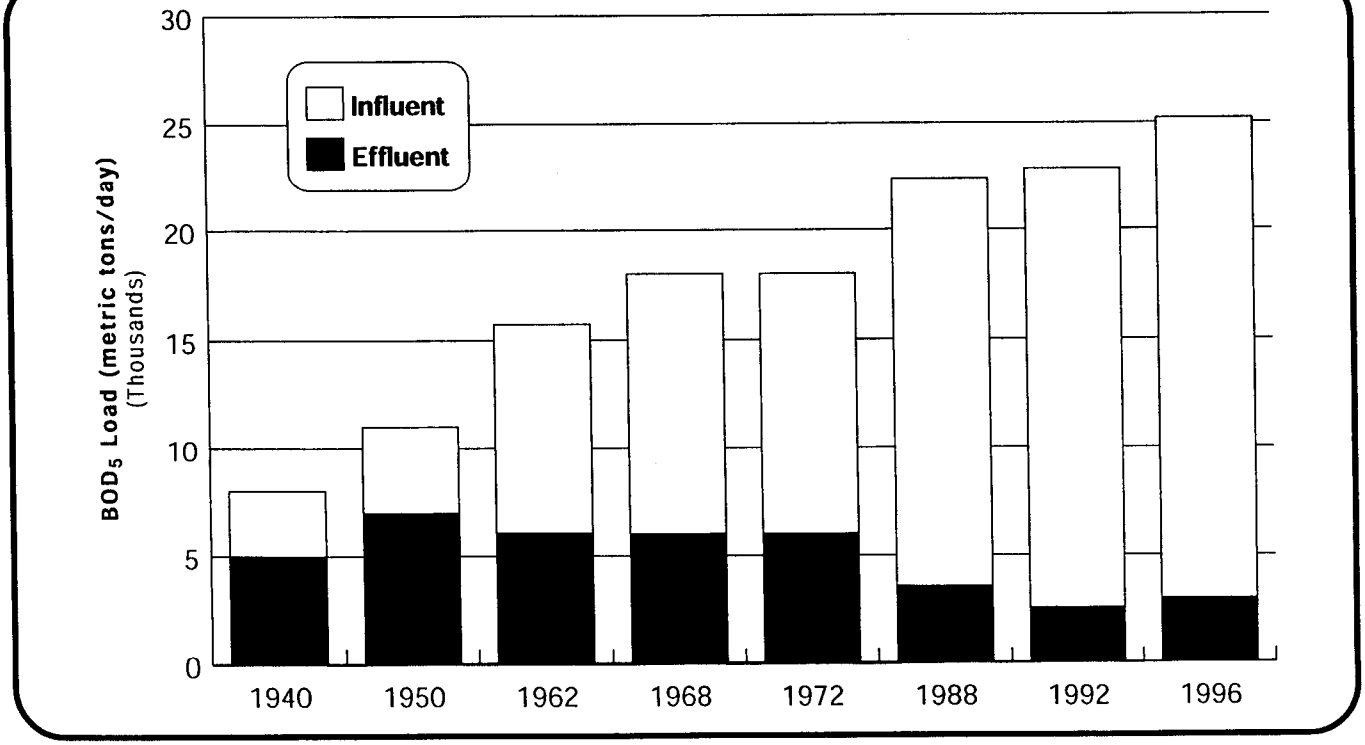
## Wastewater Systems

Historical changes in investment in wastewater treatment works can be seen in the graph below, which contrasts for each decade since 1940, raw wastewater levels entering wastewater utilities with levels of treated effluent after processing.[1]

As the graph shows, in the 1940s and even before, much more raw wastewater was entering the nation's waterways than was being treated in wastewater systems. In the 1950s and 1960s, pollution from municipal sources increased dramatically and wastewater treatment systems were ineffective in removing pollutants.

Source: Unpublished data of the U.S. Environmental Protection Agency.

**$BOD_5$ LOADING OF ALL POTWS**



In response to the dangers this situation posed to the health and economic well being of the nation, Congress established a wastewater grants program as part of the 1972 amendments to the Clean Water Act. The goal of this program was to assure adequate financing to build public wastewater facilities that, in turn, would remove at least 85 percent of harmful pollutants in raw wastewater nationwide. Without this program, Congress was convinced that water pollution would worsen because cities on their own had no incentive to invest enough to meet this level of water quality since the benefits of such an investment — cleaner rivers, lakes, and coastlines — would be enjoyed by people and businesses downstream who paid nothing for it.

> "It is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works." **The Federal Water Pollution Control Act (The Clean Water Act)**

In addition to providing grants throughout the 1970s and 1980s, the federal government also amended the Clean Water Act and enacted regulations pursuant to it mandating increasingly stringent water quality requirements. As a result, the nation built literally thousands of new, local wastewater treatment plants and expanded thousands more, which resulted in significant reductions in discharges of pollutants and greatly improved water quality, even as the nation's population and economy expanded. This is shown in the figure above as increasing influent levels throughout the 1970s and 1980s contrasted against effluent levels that decline to half of pre-1972 levels over the same period.

In the 1990s, the federal government continued to identify new investment needs and created additional legislative mandates, such as those that focus on wet-weather sources of pollution. No additional federal funding accompanied these requirements. Thus, the burden of funding needed wastewater investments shifted back to local governments and private sources.

## Drinking Water Systems

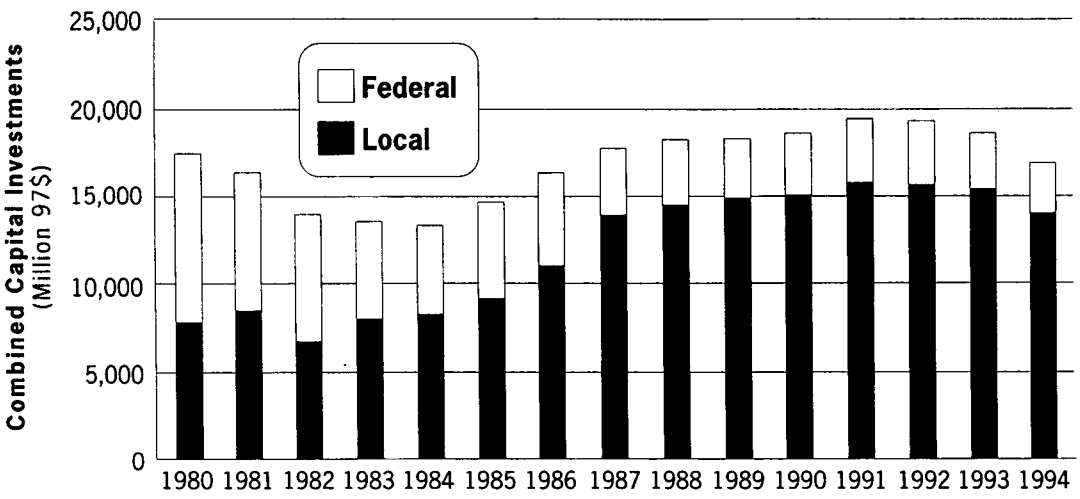
Over roughly the same period 1970-1990, federal requirements for drinking water were established under the 1974 Safe Drinking Water Act and strengthened in subsequent amendments in the 1970s, 1980s and 1990s. The 1986 amendments to the Safe Drinking Water Act added significant new mandates. Fifteen years later, we are still promulgating regulations under the 1986 amendments. Some of the most difficult — and the most expensive — ones are only now being implemented. Regulations on disinfection by-products affect drinking water quality at the tap, with costs to be borne throughout the current decade. The 1996 amendments to the Safe Drinking Water Act added a mandate to continuously update the list of contaminants for regulation, essentially forever.

> The centerpiece of the 1986 amendments to the Safe Drinking Water Act is an ambitious schedule mandating specific drinking water standards to be set by EPA and enforced by the states between 1987 and 1991. New or revised regulations will be promulgated for 83 contaminants based on best available technology for removal and monitoring. **The National Council on Public Works Improvement, 1987**

Federal funding for drinking water facilities was modest until a 1996 program to fund state revolving funds (SRFs) or banks for water supply infrastructure.[2] Even now, SRFs merely serve as sources of financing, which have to be repaid through user fees.

The cumulative result of these wastewater and drinking water mandates coupled with federal financial devolution is shown in the chart below. Combined federal funding for clean water and safe drinking water has dropped by nearly 70 percent since 1980, while local investment has nearly doubled.

## COMBINED CAPITAL INVESTMENTS (WATER AND WASTEWATER)

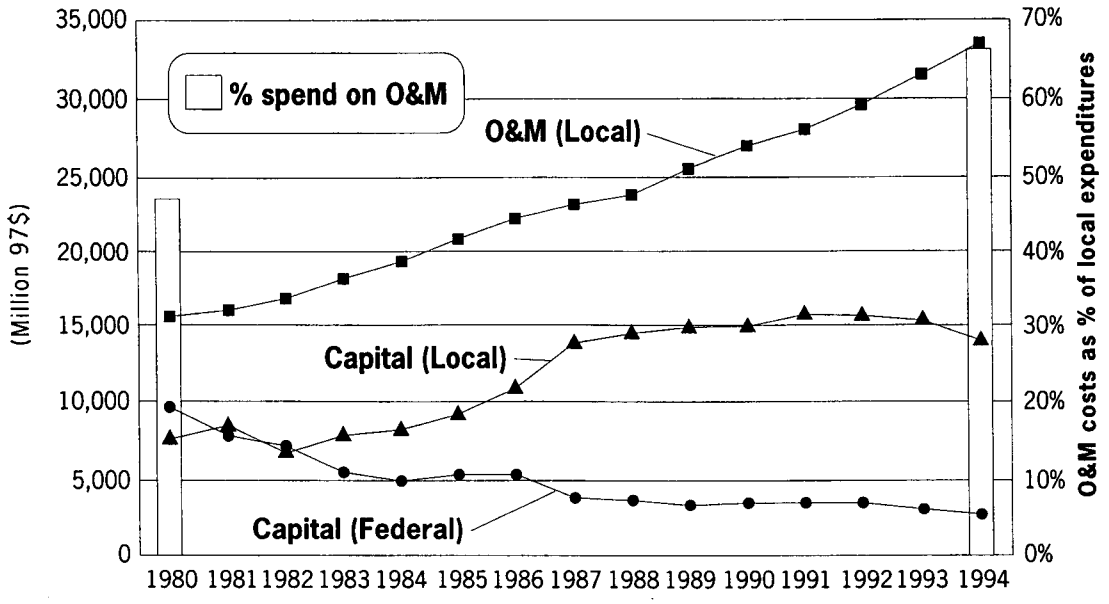



Source: U.S. Bureau of Census.

### Federal Financial Devolution

At the same time that local capital investment has had to increase to meet federal requirements, operating costs, almost entirely funded by local governments and private sources, also have continued to grow. The net effect is that declines in federal outlays and sharp increases in local outlays have created a situation where local capital investment appears to be crowded out by local operations and maintenance needs. This is shown in the chart below as a flattening in local capital spending after 1987, increasing local O&M expenditures, and a widening between local capital and O&M outlays between 1987 and 1994.

## WATER AND WASTEWATER EXPENDITURES




Source: U.S. Bureau of Census.

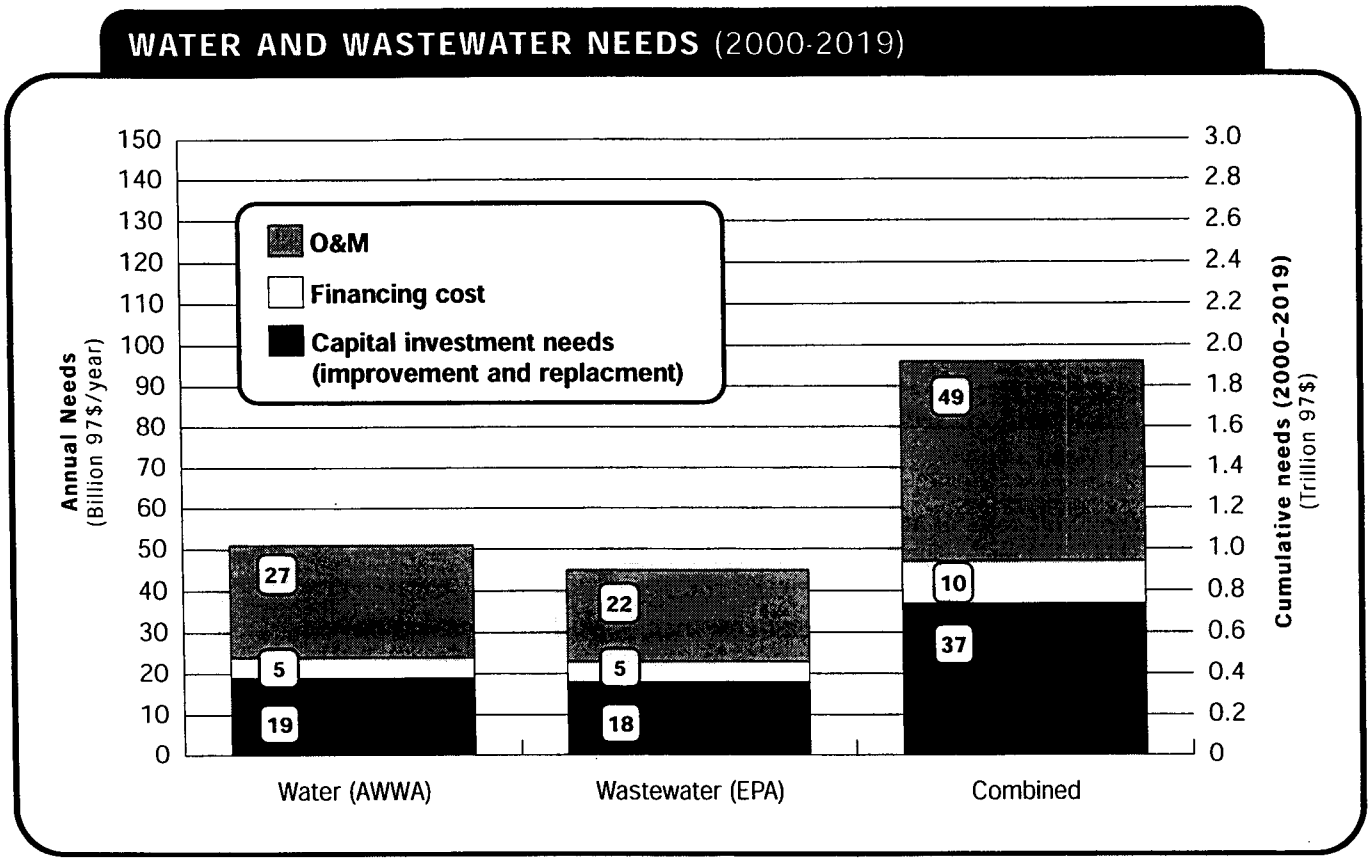
As we'll see in the next chapter, this is an unsustainable condition since current under-investment in water and wastewater infrastructure not only jeopardizes the welfare of communities today, but defers to later generations the burden of capital replacement in increasing amounts.

1 Influent and effluent can be characterized in terms of BOD5 loadings, which is a measure of the oxygen consuming organic matter in wastewater and is a typical indicator of pollution. The higher the $BOD_5$ loading, the greater the pollution.

2 Prior to 1996, several federal programs existed (and continue to the present) to finance rural water supply systems, through, for example the Farmer's Home Administration within the Department of Agriculture, or poor urban systems through a Community Development Block Grant program administered by HUD.

# CHAPTER 3 Water and Wastewater Investment Needs of the Next Century

The cost of building, operating and maintaining needed drinking water and wastewater facilities over the next 20 years or so presents a daunting figure – the best estimates approach two trillion dollars, as shown in the figure below. Annually, this would require about $95 billion in capital and O&M expenditures, of which some $50 billion is needed for drinking water and $45 billion for wastewater.




Source: Hagler Bailly Services, Inc. based on data and analyses conducted by the American Water Works Association, U.S. Environmental Protection Agency, U.S. Bureau of the Census, and U.S. Department of Commerce (figures rounded to the nearest billion).

The more common needs metrics, however, isolate capital needs to invest in new facilities or replace old ones. From this perspective, needs translate into roughly $1 trillion in water and wastewater expenditures over the next 20 years, or about $47 billion each year. Of this annual total, building new and replacing old drinking water facilities will require $24 billion a year in expenditures. Comparable investments for wastewater facilities will require spending $23 billion a year.

The figures above assume that 25 percent of water and wastewater facilities are financed with cash in the year of the investment. The remaining 75 percent of each year's capital outlay is financed with 20-year bonds or loans bearing a 3 percent real interest rate. The black bar above represents annual costs of capital associated with this financing structure.

## Why Are Needs So Large?

For both water and wastewater, needs reflect capital investments required to meet national environmental and public health goals of the Clean Water Act and Safe Drinking Water Act, respectively, plus those needed to replace worn and failing infrastructure. The capital base, so calculated, also requires annual operations and maintenance, which is projected based on historical relationships between the value and age of capital facilities and O&M outlays required to service this capital base. To represent the investment need, which occurs in practice in large "lumps" over relatively short construction periods, on an accounting basis comparable to O&M outlays that occur each year, we impose a standardized financing structure of 25 percent pay-as-you-go and 75 percent debt financing.

This is an important perspective since it represents the spending, and hence revenue requirements, that local governments face each year – so much in annual expenditures to operate and maintain their facilities, so much in direct capital investment from rate revenue, so much to repay the borrowed capital, and so much for interest on borrowed capital.

Beyond the mechanics of our needs estimates, however, the underlying trends that generate needs also are important. These trends include:

- Increasingly stringent federal requirements to improve water quality and drinking water safety;
- Increasing unit costs of attaining these requirements using more complex technology and increased use of chemicals and energy;
- Increasing water supply costs as least-cost sources are fully used and the quality of raw water declines; and
- Costs to replace aging and failing water distribution systems and wastewater collections systems are in needs estimates for the first time.

Replacement costs are handled somewhat differently in the case of water supply compared to wastewater treatment. For water supply, we simply adopted the method used by the American Water Works Association in a recent publication.[1] This method uses a simulation model to project the future costs of replacing distribution systems at then-current costs. For wastewater, our model assumes that 1/20 of the depreciated value of all collection systems nationwide is replaced each year over the next 20 years.[2]

Needs estimates also incorporate an important assumption that reduces future years' O&M costs. We assume that the effect of competition in the marketplace for O&M service contracts will reduce overall O&M costs by 25 percent over the projection period. Common benchmarks suggest that on average, private providers of O&M services can achieve some 25 percent savings in annual O&M costs compared to current public O&M costs.[3] Whether, in fact, private firms provide O&M under contract or facilities continue to be operated publicly is irrelevant. The forces of this competition will result in O&M efficiencies across the board.

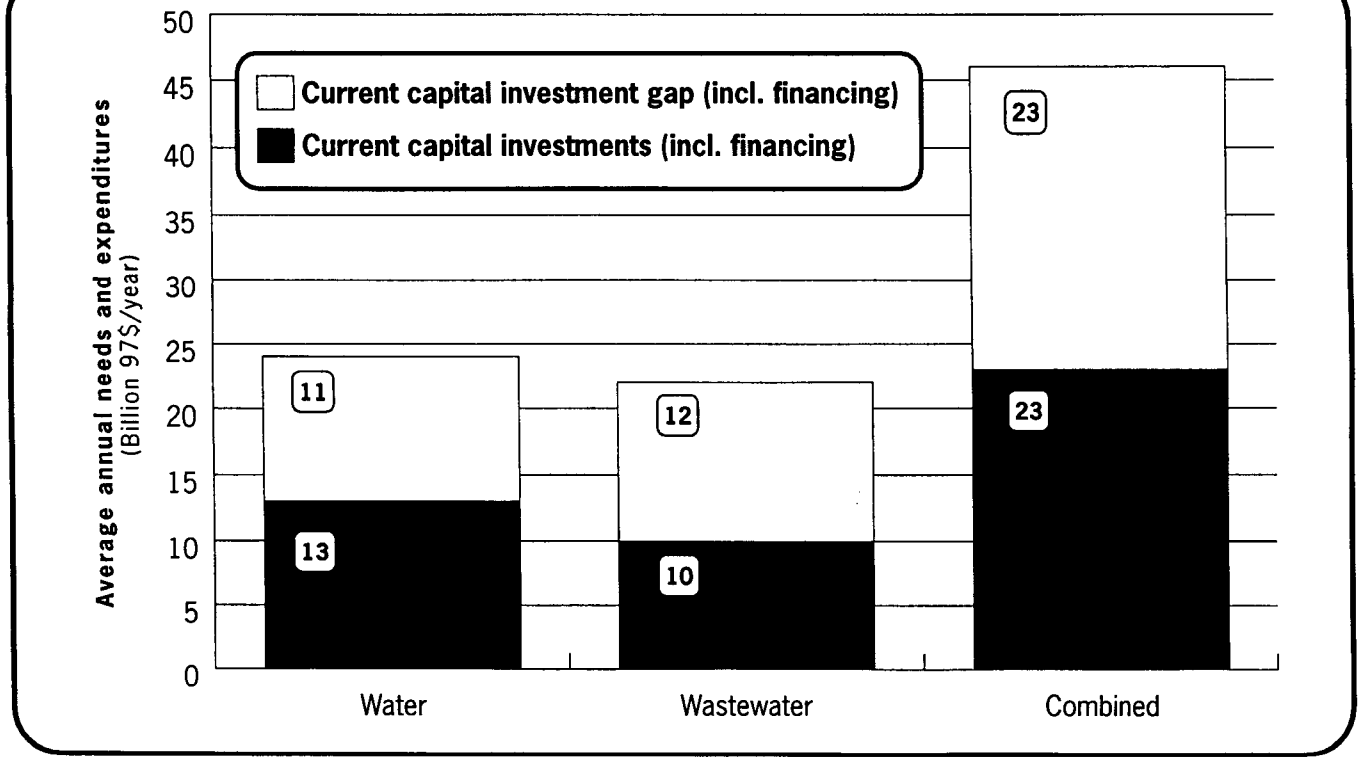
## Do Needs Create and Investment "Gap"?

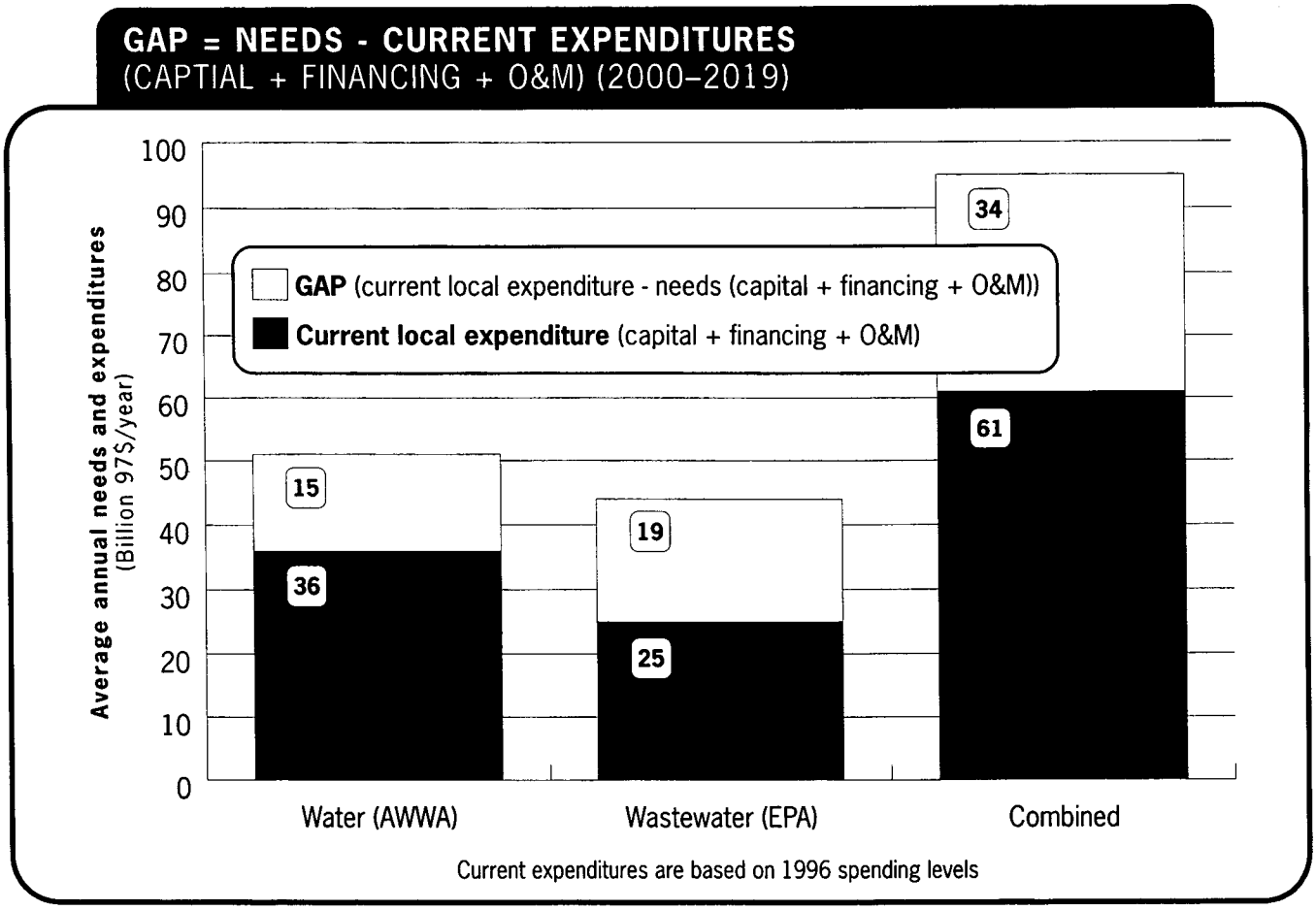
Compared to current water and wastewater expenditures, these needs create a total investment "gap" of some $34 billion a year, on average, over the next 20 years. This is simply the total needs as calculated above minus current expenditures, as calculated in Chapter 2. The implication is simple: local governments would have to spend roughly $34 billion more a year than they now spend if they were to meet the total investment, operations, and maintenance needs occasioned by the Clean Water Act and the Safe Drinking Water Act plus systematic replacement of aging and failing distribution and collection systems.

The capital investment portion of this $34 billion annual "gap" is $23 billion, of which $11 billion is for drinking water systems and $12 billion is for wastewater systems (see below). Again, the interpretation is simple: to meet all needs, capital spending would have to double. Compared to the $23 billion in current capital expenditures to build, replace, and rehabilitate existing and new water and wastewater systems, meeting all needs means spending an additional $23 billion a year, on average, each year for the next 20 years. Water systems that in total currently invest some $13 billion a year in infrastructure would have to spend another $11 billion a year to meet all capital needs. Wastewater systems would have to spend $12 billion more a year to meet all capital needs, compared to the $10 billion a year in current capital spending.

Source: Hagler Bailly Services, Inc. based on data and analyses conducted by the American Water Works Association, U.S. Environmental Protection Agency, U.S. Bureau of the Census, and U.S. Department of Commerce (figures rounded to the nearest billion).

**CAPITAL GAP = CAPITAL NEEDS - CURRENT CAPITAL EXPENDITURES** (INCLUDING FINANCING) (AVERAGES 2000–2019)





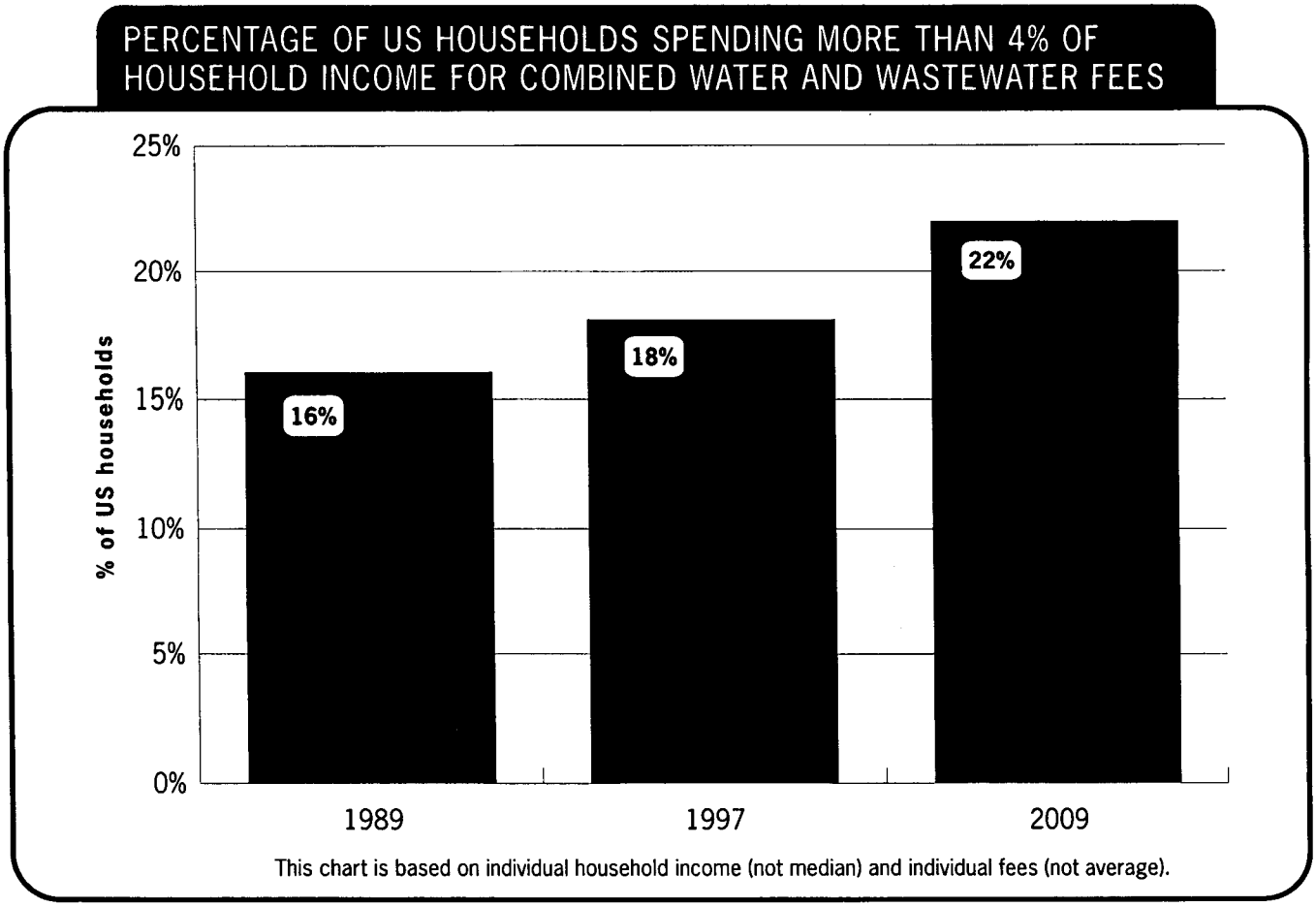

## Can Local Utilties Finance This Gap Alone?

Source: Hagler Bailly Services, Inc. based on data and analyses conducted by the American Water Works Association, U.S. Environmental Protection Agency, U.S. Bureau of the Census, and U.S. Department of Commerce (figures rounded to the nearest billion).

If local utilities had to finance the entire gap themselves and pass the costs along to users, on average water and sewer rates would more than double. In many systems, of course, rates could increase by far larger or smaller proportions, since there is no such thing as an "average" system. There is also no way to predict the reduction in demand, and hence the reduction in rate revenue, that would result from sharply higher water and wastewater rates.[4] Small cities and cities with large proportions of low-income families would be the hardest hit, but many families even in the average city would be unable to pay based on any reasonable affordability criteria.

Affordability or fiscal stress is measured in many ways. Using EPA's benchmark that households paying more than 2 percent of household income for either water or wastewater fees constitutes a hardship, we see from the chart above that even at today's water and sewer rates, some 18 percent of all U.S. households are paying water and sewer fees that exceed hardship levels. By 2009, or mid-period over the next 20 years, if the water and wastewater funding gap was shouldered entirely locally, at least 22 percent of U.S. households would face hardship in paying their bills. As consumers used less water in response to these sharply higher rates, rate revenue would decline and rates would have to be raised even higher to maintain revenue sufficient to pay off debt incurred to meet the gap. As rates increased still higher, demand would again fall of and the cycle would repeat. Eventually, the system would stabilize, but predicting exactly where would be

difficult. It is not difficult to imagine, however, that stabilization at significantly higher rates could result in a third or more of the population facing payments for water and wastewater in excess of conventional affordability criteria.



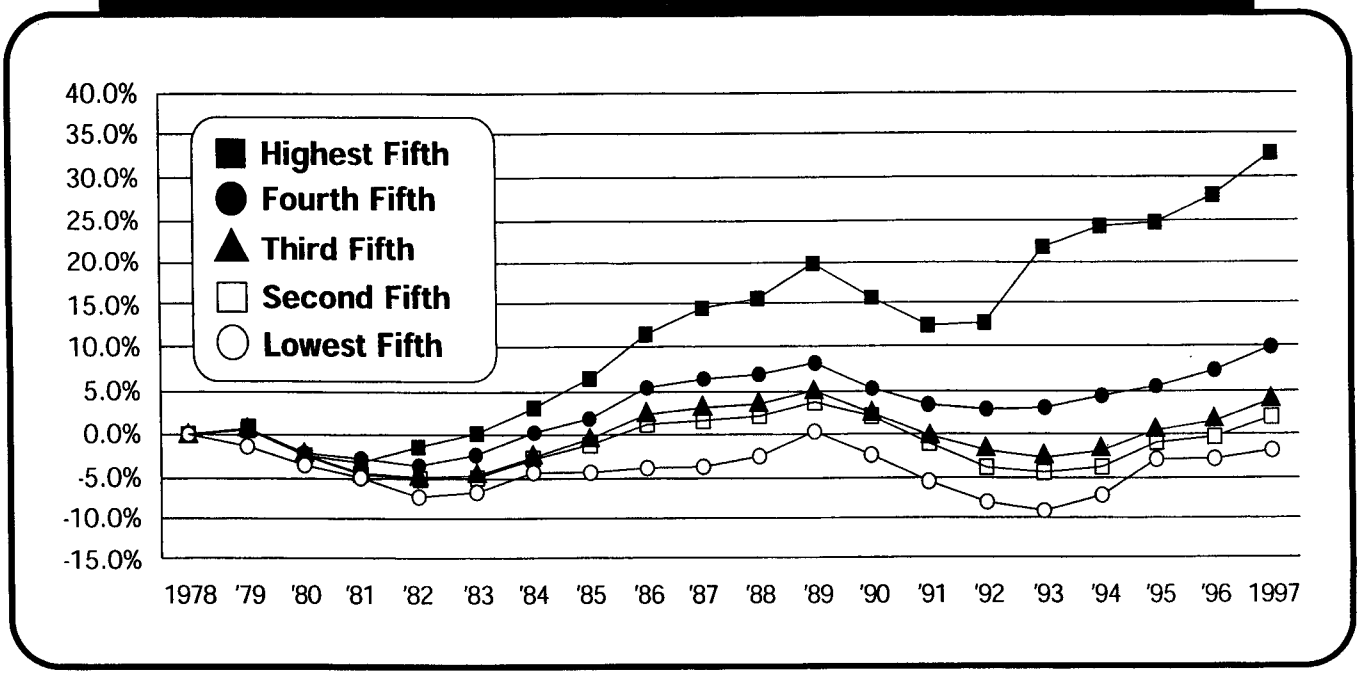

Source: Hagler Bailly Services, Inc. based on data compiled by the U.S. Bureau of the Census, Ohio Environmental Protection Agency, the U.S. Environmental Protection Agency, and the American Water Works Association.

## Why Would Low-Income Families Face Economic Hardships?

Proportionately, a doubling in water or wastewater rates would affect low-income families far more than higher-income families, both immediately and well into the future. Much of this differential effect is attributable solely to differences in disposable income. Higher-income households have much more disposable income than do lower-income families, so paying higher water or wastewater charges would reduce savings or discretionary consumption in higher income families. In contrast, it would conflict to a much greater degree with non-discretionary spending in lower income families, and could create, for example, pressure on payments for food, housing, health care, education, and other necessities.

The chart below presents the remarkable trend in real (inflation-adjusted) mean household income over the last 20 years by income level in quintiles. Whereas the highest income level households have enjoyed consistently increasing real incomes over the last decade (the top line), middle income households have barely kept pace with inflation and lower income households have lost income in real terms.

## PERCENTAGE CHANGE IN AVERAGE MEAN HOUSEHOLD INCOME SINCE 1978




Source: U.S Bureau of the Census, Housing and Household Economic Statistics Division

Assuming no structural change in the economy, it is not difficult to imagine the inequities created by passing along to all communities regardless of income, the full burden of meeting our water and wastewater funding gap.

### What Can Be Done to Avoid This Outcome?

As the following chapters will document, the gap in funding water and wastewater improvements over the next 20 years must have multiple solutions. Some communities may be able to finance and pay for portions of their needs with higher fees either for households, industry, or commercial users. Clearly, many communities will not be so capable.

**Phoenix Decides Against Private Financing of Its New 320 mgd Water Treatment Plant**

A 1999 study conducted for the City of Phoenix ruled out private financing of a new water treatment facility. City-issued tax-exempt water lease bonds, the study found, could be completed at a 5.2% cost of capital compared to 8.2% cost of capital for private debt-equity financing. While the facility will likely be financed publicly, Phoenix is examining a design-build-operate plan to harness private sector efficiencies. **Source: *Public Works Financing*, January 2000**

Some communities may be able to reduce operating costs through efficiencies in the ways they are organized, the ways they perform their work, or the technology used to streamline operations. But even efficiencies typical of a world-class system cannot offset the funding gap to any significant degree. Other solutions will be needed.

Some have called for increased private funding as a solution to the gap. But, regardless of whether investment capital comes from public coffers or private balance sheets, users will have to repay investments over time. While some claim private ownership and therefore private financing is more efficient than public ownership and will require less

capital to do the same job, private capital, at least under current federal tax provisions, is more expensive than public capital and the effects can easily offset each other. We need to look elsewhere for answers.

Chapter 4 presents ample historical precedent for a greater federal role in solving this problem. The federal government clearly recognized the urgency of acting in the 1972 Clean Water Act and could do so again. Moreover, Congress has demonstrated its willingness to take a greater role in financing other areas of public infrastructure – most prominently highways, airports, and mass transit systems – than it has in water or wastewater. Yet, the economic rationale for federal investment is no different in these infrastructure areas than it is in water or wastewater.

1 American Water Works Association, *Infrastructure Needs for the Public Water Supply Sector*, prepared by Stratus Consulting, December 22, 1998.

2 Our estimate of the depreciated value of these assets is based on the method first developed by the U.S. Department of Commerce. See U.S. Department of Commerce, Office of Business Analysis, *Effects of Structural Changes in the U.S. Economy on the Use of Public Works Services*, a report to the National Council on Public Works Improvement, 1987.

3 See, for example, the Association of Metropolitan Sewerage Agencies and Association of Metropolitan Water Agencies, *Thinking, Getting, and Staying Competitive: A Public Sector Handbook*, 1998.

4 Mathematically, doubling expenditures would double revenue requirements, which in turn and all things equal, would double rates. But, of course, when consumers face higher prices, they consume less. In the case of water, reductions in demand as a result of higher prices differ across systems and types of users (households, industrial, commercial, etc.). In some cases, rates might have to triple or more to generate sufficient rate revenue to pay for a doubling in capital expenditures. For additional details on the price elasticity of demand for residential water, see: Renwick, Mary, Richard Green, and Chester McCorkle, May 1998. "Measuring the Price Responsiveness of Residential Water Demand in California's Urban Areas," California Department of Water Resources.

# CHAPTER 4 The Federal Role In Water and Wastewater Infrastructure

The previous chapters explain the importance of sound water and wastewater infrastructure to our environment, the health of our communities, and the nation's economy. They demonstrate that governments at all levels have recognized this relationship and document shifts in federal and non-federal support to build and maintain these vital public assets. They also document that future financial demands will far exceed levels of investment today – to such an extent that many find the difference a crisis in the making. Without changes in how we finance and pay for water and wastewater infrastructure, the nation faces serious threats of losing the environmental, public health, and economic ground already gained or worse, allowing an avoidable funding gap to undermine future gains.

The mere existence of a financial problem, however, should not automatically evoke a call for "federal" solutions. Historically, the U.S. Congress has acted to avoid such crises with federal financial intervention. The theory for such federal investment is also grounded in classical economics. This chapter reviews the theory and practice of federal action to solve public infrastructure problems and provides numerous examples of economically justified federal funding programs in response to circumstances identical to the ones facing water and wastewater systems today.

Before doing so, we need to remind ourselves that we live in an age with few, if any, simple solutions. This is certainly true of infrastructure, where every financial challenge requires multi-dimensional solutions. For infrastructure, this usually combines fees paid directly by users, direct and indirect financial support from local or regional agencies, and one or more programs of federal grants and loans. The latter often make use of the tried-and-true trust funds to provide adequate and predictable financing. Federal monies, in turn, can come from a combination of benefit taxes or from the general fund.

## A History Lesson

From its earliest days, the federal government has taken on a series of infrastructure improvements. These usually involved efforts that were beyond the financial abilities of local government to handle on their own, as with the early work by the Army Corps of Engineers to clean the nation's rivers and harbors. Much of the motivation for federal involvement focussed on generation of regional benefits through networks of public infrastructure that crossed state lines. The Corps' work to enable water-based navigation, hydropower, and flood control provides good examples as do the federal land grants in the nineteenth century that enabled the private sector to complete the transcontinental railroad.

In recent times the largest federal infrastructure support program has been the Highway Trust Fund, set up in 1956 to provide grants to state Departments of Transportation to speed completion of the Interstate Highway System. While the federal government defined this system shortly after World War II, lack of local funds prevented work on

more than a fraction of the system by 1956. The Highway Trust Fund provided the states with the long-term financial assurances they needed and the bulk of the Interstate System was completed by the early 1970s.

Increasingly, these federal infrastructure programs have been driven by local financial shortfalls. Until the late 1950s and 1960s, for example, most of the nation's mass transit systems had been self-supporting, with many operated by private firms. By the early 1960s it became obvious that direct user fees were not adequate to cover operating costs and still provide the capital needed to rehabilitate neglected systems and support needed capacity expansion. As a result, the Congress created a program of grants to local transit authorities administered by the federal Urban Mass Transit Administration (UMTA). This has since evolved into its own trust fund (an independent account within the Highway Trust Fund) along with a name change to the Federal Transit Administration. Similarly, the Federal Aviation Administration (FAA) manages a system of airport grants from the Airport and Airway Trust Fund. These provide capital grants for airports nationwide, with a strong financial bias toward airports limited in their ability to raise funds on their own. Both airports and mass transit programs focus funds on individual local authorities as part of a coordinated national program.

In the environmental field, the federal Superfund program provides federally collected taxes on chemical feedstocks and petroleum, as well as a broad-based corporate environmental tax, to clean up local public lands contaminated by toxic wastes where the cost of completing such tasks are unaffordable locally. The Superfund also finances cleanup of private land where owners are insolvent or unwilling to take action on their own to protect the public from risks of hazardous waste contaminating the environment or threatening public health.

## A Public Policy Review

Where federal funding is concerned, of course, the Congress is the final arbiter of when a national investment program is justified. Nonetheless, economists and policy analysts have developed a series of guidelines for when such support is justified. These cover four broad categories:

- **Inability of non-federal entities to fully address vital needs** – This may occur because of unfunded mandates imposed by federal agencies, such as the many standards faced by water and wastewater utilities; or it may occur when multiple funding needs converge, as did the rehabilitation cycle and growth in ridership in mass transit during the 1960s and 1970s, or indeed, the rehabilitation cycle for water and wastewater assets today combined with continued mandates for improved water quality and drinking water safety; or simply because it is hard to communicate or compel the urgency to act, a particular issue for water and wastewater where assets are out of sight and benefits of improvements (or contamination from inaction) flow downstream and affect others.

- **Unique scale benefits of a federal role** – In many cases, as a result of its size, perspective, or span of authority, the federal government is often able to offer program benefits that can not be provided by other levels of government or the private sector. This is part of the justification used to establish the federal Superfund or the federal system of navigation structures to support shipping on America's rivers.

- **The need to capture non-local benefits from economies of scale or what is now called "network benefits"** – Federal funding is frequently justified to create a network of local or regional infrastructure that taken together benefits the entire nation, but that no other level of government or the private sector would complete on their own. This has long justified regional investments that form national networks, such as the nation's highways, inland waterways, and air traffic control system. For water and wastewater there are similar watershed issues that cut across state and local boundaries.

- **Control of negative externalities or promotion of environmental equity** – Federal action, although not necessarily funding, is often justified to correct negative effects on one private party or jurisdiction caused by the action or inaction of another. Closely related to this is the use of federal funds to ensure at least a minimum level of benefit for all people regardless of their location, income, or other factors. This was partly the justification for the federal wastewater construction grants program begun in 1972.

## Application to Water and Wastewater

The current set of financial problems faced by local water and wastewater systems match these considerations almost exactly. They face a series of financial burdens, many of which come in the form of unfunded federal mandates, and thus are beyond local control. In combination with looming asset replacement needs and user fees near the breaking point, utilities face financial burdens that can easily exceed local capacity, especially for rural and low-income systems. Finally, not resolving these issues has regional and national implications for equal environmental and public health protection.

### Local Revenue Limitations

From a practical perspective, a greater federal role in water and wastewater investment is simply the fastest way (if not the only way) to ensure that local utilities comply with federal mandates while maintaining adequate system preservation programs. That is, many utilities have already raised fees to, and in some cases beyond, what the market will bear. Unless direct federal assistance is provided, important needs are unlikely to be addressed. The factors influencing what the market will bear include:

- **Public misperception of need** – unlike other types of infrastructure needs, water and wastewater investment needs are rarely known or understood by the public since they rarely see or come in direct contact with the physical works. This leads to misperceptions of needs and can result in citizen unwillingness to accept fee increases.

- **Political resistance to fee changes** – closely tied to the misperception issue, efforts to raise utility fees to levels needed to address the funding gap may face significant political opposition from water boards, state regulatory commissions, and elected or appointed officials.

- **Equity and affordability issues** – even if public and political opposition to fee increases is not a barrier, equity and affordability issues may limit the ability of local utilities to raise additional revenues. Previous chapters demonstrated that small, rural, and low-income communities, in particular, will face the greatest challenges if all water and wastewater needs had to be financed – and paid for – through local sources alone.

## Unique Benefits of a Federal Role

In addition to helping utilities meet needs they cannot achieve on their own, increased federal participation offers the following critical benefits that can only be provided by the federal government.

**Size of the Challenge.** The sheer magnitude of the anticipated funding shortfall provides a sound rationale for greater federal involvement. Aid to mass transit in the 1960s and support for Conrail in the 1980s provide strong examples of where the financial scale exceeded state and regional resources. In both instances, Congress recognized the federal role and stepped in with a fiscally sound federal investment program.

The federal government is unique in its capacity to reach a broad economic base. While the average annual funding gap may appear daunting at the local or even state level, funding shortfalls are small in comparison to total federal resources.

**Enhanced Local Revenue-Raising Capacity.** Depending on how programs and non-federal matching requirements are established, federal funding can actually improve the political viability of local fee increase initiatives. Local water and sewer fee increases may be more acceptable to citizens and local officials if failure to raise additional revenues will result in the loss of federal funding. This has certainly been the history of most federal infrastructure programs. Indeed, the Federal Highway Program mandates states to maintain motor fuel taxes at or above certain historical levels as a condition of receiving distributions from the Highway Trust Fund.

**Validation of Needs.** As discussed above, public misperception about investment needs creates barriers to raising adequate revenues at the local level. The willingness of the federal government to step up to the plate and assist in funding needed system improvements can both increase public awareness about water and wastewater issues and provide high-level validation that increased investment is important.

**Program Stability and Predictability.** By virtue of the national scope of the federal government's revenue base, federal funding programs are typically insulated from the impacts of regional economic swings. This enables stable program funding levels from year to year, and will improve the ability of local water and wastewater utilities to conduct comprehensive short- and long-range investment planning. These benefits can be expanded depending on the type of budgeting structure selected and the nature of the programs developed.

**Innovative Financing.** In recent years, the forms of assistance provided by existing federal infrastructure programs have evolved from simple grant and allocation programs and now provide a variety of mechanisms to support innovative project financing. Creating a broader federal funding role can open the door to allowing local utilities to leverage the unsurpassed credit capabilities of the federal government. Again, this is particularly helpful for projects that face large funding gaps, measured in either absolute or relative terms.

### Maximize "Network Effects"

There is growing recognition within the economic community that, in the case of infrastructure, the whole can be greater than the sum of its parts. This lesson goes beyond the obvious cases of a fully interconnected network such as the Interstate Highway System. Rather, having a common standard or level of service provides a sense of universality that makes it easier for businesses and labor to move from place to place. It also provides cultural benefits by helping to bind together a continental-sized country. The value of these common standards has long been recognized by the highway community and is one of the motivators behind the Federal Transit Program.

### Fair and Equitable Allocation of Costs and Revenues

Neither costs nor ability to pay for water or wastewater investments is uniform across the nation. Federal programs can provide a means to smooth out some of these imbalances. For example, the Interstate Highway Program was a cost-to-complete program, with the Highway Trust Fund providing adequate resources for all communities to meet the standards of a national system. At the same time, those with lower costs and who finished first benefited from a predictable and steadily growing base of revenues that provided, in turn, funding for other highway investments.

## Conclusion

Clearly, economic and political history provide ample precedent for federal investment in infrastructure. By the mid-twentieth century, Congress recognized the federal role in building a transportation network and created the Highway Trust Fund and later the Airport and Airway Trust Fund to finance needed infrastructure in these sectors. More recently, Congress expanded federal funding of transportation works to mass transit, adding a program of grants to local transit authorities as a separate account in the Highway Trust Fund.

In contrast, while a network of clean rivers, lakes, and estuaries for all Americans to enjoy was a clear federal priority in the 1972 Clean Water Act and adequate supplies of safe drinking water was a clear federal priority in the 1974 Safe Drinking Water Act, federal funding of these programs has taken a very different path. While federal transportation infrastructure trust funds have received dramatic increases in support since 1990, there is no permanent federal source of funds to build water or wastewater infrastructure and the federal contribution to clean and safe water goals has declined in the 1990s.

# CHAPTER 5 The Path Forward – A National Dialogue on Water and Wastwater Infrastructure Investment

The importance of safe drinking water and adequate wastewater treatment to public health, the environment, and the economic welfare of our communities is undisputed. Despite this importance, improvements needed over the next twenty years cannot be assured unless significant action is taken to address a $23 billion annual gap between capital investment needs and current expenditures.

There are a number of options available to address this gap. Some observers suggest that operating efficiencies at the local utility level can solve the investment gap without the need for additional revenues. However, needs estimates presented in Chapter 3 already assume that as a result of competitive pressures all water and wastewater utilities will reduce operating costs by 25 percent over the next decade. Even the most efficient water or wastewater utility can, at best, meet only a portion of their capital gap through operating cost savings.

Increased local rates and fees also have been suggested as a way to address the gap, and to be sure, local governments will do their share. But, local homeowners and industries currently pay more than $60 billion a year in water and sewer rates and charges, and a draft EPA report estimates that a significant increase in local rates could very well create a hardship for a significant portion of the population. As described in Chapter 3, local water and wastewater rates would more than double if the entire gap were addressed through rate increases. Based on EPA's affordability benchmark (households paying more than 4 percent of household income for combined water and wastewater services), if the entire gap was shouldered locally, at least 22 percent of U.S. households would face hardship in paying their water and wastewater bills. Not only that, this burden would fall on those least able to pay – households in middle and lower income brackets that together comprise about 60% of the U.S. population.

Viewing the problem as one of capital formation in traditional public, tax-exempt capital markets, some observers argue for increased private investment. The reality is that interest rates on private capital are typically 2 or 3 percentage points higher than interest rates on public, tax-exempt capital. Moreover, the issue is not failure of public capital markets to lend, but rather the inability of some communities to repay, and the potential inequities created when only wealthy communities can afford to invest adequately in drinking water and wastewater improvements.

While operating efficiencies, local rate increases, and private capital could provide part of the solution, they cannot meet the total need. We must examine other solutions as part of a broad package.

The bottom line is that without a significantly enhanced federal role in financing drinking water and wastewater infrastructure, critical investments may not occur. As discussed in Chapter 4, there is ample justification and precedent for such a federal role. Indeed, the federal government has played, and continues to play, a major role in funding other critical aspects of our public works infrastructure, such as highways, airports, harbors, and mass transit systems.

The question then is not whether the federal government should provide additional funding for water and wastewater improvements – it is obvious that it should – but how to structure an effective, efficient, and equitable federal program. Such a program should provide significant new federal funding – sufficient to address the investment gap identified in this report – as well as provide incentives for additional, non-federal investment.

A new national dialogue is needed, with participation from all sectors of American society. In the coming decade, we will mark the 30th anniversary of both the Clean Water Act and the Safe Drinking Water Act. Leadership is needed to ensure that steps are taken now to preserve and build on the dramatic progress made in improving water quality and providing safe drinking water to all of our citizens. Investment in our critical water and wastewater infrastructure should be a national priority. All Americans benefit from clean and safe water, and all Americans must make their voices heard as we work together toward a new, 21st century consensus for clean and safe water.

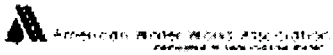
**Association of Metropolitan Sewerage Agencies**
1816 Jefferson Place, NW
Washington, DC 20036-2505
Phone: 202/833-2672
www.amsa-cleanwater.org

**Association of Metropolitan Water Agencies**
1717 K Street, NW, Suite 801
Washington, DC 20036-5302
Phone: 202-331-2820
www.amwa-water.org

**American Public Works Association**
1401 K Street, NW, 11th Floor
Washington, DC 20005
Phone: (202) 408-9541
www.apwa.net

**American Society of Civil Engineers**
1015 15th Street, NW, Suite 600
Washington, DC 20005
Phone: (202) 789-2200
www.asce.org

**Association of State Drinking Water Administrators**
1025 Connecticut Avenue, NW, Suite 903
Washington, DC 20036
Phone: (202) 293-7655
www.asdwa.org



**American Water Works Association**
1401 New York Avenue, NW, Suite 640
Washington, DC 20005
Phone: (202) 628-8303
www.awwa.org


**Construction Industry Manufacturers Association**
525 School Street, SW, Suite 303
Washington, DC 20024
Phone: (202) 479-2666
www.cimanet.com

National League of Cities
**National League of Cities**
1301 Pennsylvania Avenue, NW, Sixth Floor
Washington, DC 20004
Phone: (202) 626-3028
www.nlc.org

**National Rural Water Association**
2915 S. 13th Street
Duncan, OK 73533
Phone: (580)252-0629
www.nrwa.org


**National Society of Professional Engineers**
1420 King Street
Alexandria, VA 22314-2794
Phone: (703) 684-2800
www.nspe.org


**Rebuild America Coalition**
1401 K Street, NW, 11th Floor
Washington, DC 20005
Phone: (202) 408-1325
www.rebuildamerica.org


**Water Environment Federation**
601 Wythe Street
Alexandria, VA 22314-1994
Phone: (703) 684-2400
www.wef.org

**Western Coalition of Arid States**
1015 18th Street, NW, Suite 600
Washington, DC 20036
Phone: (202) 429-4344
www.westcas.org


**Water and Wastewater Equipment Manufacturers Association**
P. O. Box 17042
Washington, DC 20041
Phone: 703-444-1777
www.wwema.com

ACEC
**American Consulting Engineers Council**
1015 15th Street, NW, Suite 802
Washington, DC 20005
Phone: (202) 347-7474
www.acec.org

**The Associated General Contractors of America**
333 John Carlyle Street, Suite 200
Alexandria, VA 22314
Phone: (703) 548-3118
www.agc.org


**Council of Infrastructure Financing Authorities**
805 15th Street, NW, Suite 500
Washington, DC 20005
Phone: (202) 371-9694
www.cifanet.com

**Environmental Business Action Coalition**
1015 15th Street, NW
Washington, DC 20005
Phone: (202) 682-4352
www.acec.org

**Environmental and Energy Study Institute**
122 C Street, NW, Suite 700
Washington, DC 20001
Phone: (202) 628-1882
www.eesi.org

**U.S. Conference of Mayors**
1620 Eye Street, NW, 6th Floor
Washington, DC 20006
Phone: (202) 861-6777
www.usmayors.org

**Clean Water Action**
4455 Connecticut Avenue North West, Suite A300
Washington, DC 20008-2328
Phone: (202)895-0420
Fax: (202)895-0438
www.cleanwateraction.org